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The Role of Chest Physiotherapy on Pulmonary Outcome in Patients with Renal Dysfunction

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ABSTRACT

Introduction: Chest physical therapy is used in the intensive care unit to minimize pulmonary complications. In patients on mechanical ventilators with renal dysfunction, metabolic dysfunction leads to secondary pulmonary deficits and the clinical outcome of chest physiotherapy are sparsely available. Hence, this study was taken up.

Methods: This was a prospective observational study done with Ethical clearance. Among 75 intubated patients screened during the study period, 30 eligible patients were included with due consent. The participants received the routine chest physiotherapy as per the referral. The changes in the oxygenation indices, renal parameters were noted and analyzed after data grouping based on oxygenation index.

Results: The improvement in P_aO_2 , oxygenation index, (A-a) gradient was significant in ARDS group than other groups ($P < 0.05$) whereas there was no significant improvement in renal functions ($P > 0.05$, BUN-0.35, Creatinine-0.55). There was correlation between improvement in pulmonary and renal parameters was insignificant ($P > 0.05$).

Discussion: The chest physiotherapy improved the pulmonary outcomes in renal dysfunction among ARDS group than patients with normal oxygenation indices, even though the renal parameters were worsening due to bronchial hygiene improvement. Physiologically physiotherapy could not influence renal parameters.

Conclusions: The chest physiotherapy improves the pulmonary outcome independent of changes in renal parameters among patients with renal dysfunction.

Keywords: Chest physiotherapy, Renal dysfunction, Oxygenation indices, Metabolic acidosis.

INTRODUCTION

Chest physical therapy is used in the intensive care unit (ICU) to minimize pulmonary secretion retention, to maximize oxygenation, and to re-expand atelectatic lung segments. The term metabolic dysfunction is described to encompass a variety of systemic dysfunctions that would secondarily tend to involve the cardio pulmonary system. Most of the patients develop severe compromise in the steps of oxygenation, oxygen delivery, consumption and extraction by the tissue.

Background and need: Kidney disease remains one of the most complex and common clinical problems in ICU. About 5–6% of the patients in intensive care units suffer from Kidney disease. Kidney disease rarely occurs in isolation and it has become apparent that much of the increased risk of death is actually derived from extra renal complications, usually related to distant organ dysfunction. Distant organ effects of apparently isolated injuries to the lungs, gut, and kidneys have all been discovered in recent years⁴. Several studies have shown that the renal dysfunction leads to respiratory complications and increased mortality risks^{6, 7, 16, 17}

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Acute lung injury is a clinical syndrome characterized by acute (less than 7 days) onset of severe hypoxemia and bilateral pulmonary infiltrates in the absence of elevated left atrial pressures and it is defined as a ratio of

partial pressure of oxygen in the arterial blood (PaO₂) to the inspired fraction of oxygen (FiO₂) of less than 300. Acute respiratory distress syndrome (ARDS) is the most severe form of lung injury where this ratio (PaO₂/FiO₂) is less than 200. The association of renal dysfunction and lung injury leading to respiratory failure is widely studied^{8, 10, 11, 13}. There exists complex interaction between kidney and other distant organs mainly those by the immune mechanisms and systemic inflammatory mediators^{2, 4, 11, 12}. The lung injury in renal dysfunction was found to be worsen with prolong ventilation and delayed weaning,^{1, 19} rise in creatinine levels⁵ and release of inflammatory mediators^{18, 19}. In most cases acute lung injury and ARDS were significant causes for respiratory failure in renal dysfunction and critically ill⁷

The effect of physiotherapy is widely studied and found to reduce ventilator dependency and the length of stay in an intensive care unit^{14, 15}. In patients on mechanical ventilators with renal diseases, metabolic acidosis is a common clinical diagnosis which is leading to secondary pulmonary deficits. The respiratory physiotherapist working on the intensive care unit often encounters patients with acutely injured lungs. The temptation is to treat these patients conventionally using a combination of suction, positioning and manual hyperinflation, the aim being to improve arterial blood gases and pulmonary compliance by the clearance of retained large airway secretions and the recruitment of peripheral lung units. The clinical outcome of chest physiotherapy may not be similar as of primary conditions. Although many studies have been done to improve the patient care/ improvement in ICU setups in different conditions, the studies on pulmonary outcome in kidney diseases with physical therapy intervention are sparsely available. Hence, the study to find out the role of chest physiotherapy in the pulmonary outcome in patients with renal dysfunction is taken up.

METHODOLOGY

This was a prospective observational study done to analyze the role of chest physiotherapy on pulmonary outcome in patients with renal dysfunction, from a multidisciplinary ICU in multispecialty hospital. This study has been approved by Institutional Ethics

Committee (CSP/11/DEC/20/94). The patients on mechanically ventilation with Primary Renal Dysfunction referred for Chest physiotherapy were screened and included after due consent from the patient or the patient care taker. The operational definition of 'Patient with renal dysfunction' was those Patients having low bicarbonate level with elevated Bun and creatinine value. The patients with multiple organ dysfunctions, Primary Pulmonary disease and Hemodynamic instability were excluded from the study.

RESULTS AND DISCUSSION

Subjects: There were 30 subjects in this study with 11 males and 4 females in Group I; Group II had 4 males and 2 females and Group III had 7 males and 2 females. The mean age difference between groups was significant and being lowest in ARDS group-I (Table-1). This could be the reason for more damage in lung parenchyma leading to ARDS as the immune responses/mediators would be stronger in younger age than older patients.

Table 1: Descriptive data of the sample

		ARDS	ALI	NORMAL
N		15	6	9
Age	Mean ± SD	48 ± 12.77	64 ± 9.49	64 ± 17.21
Gender	M	11	4	7
	F	4	2	2

Oxygenation levels: The PaO₂ level and Oxygenation Index have improved from day 1 through day 6, the difference being significant in day 1 and Not significant on day 6 (Table 2). The (A-a) gradient also improved from day 1 to day 6, which was significant in Group II (ALI). The differences were significant on Day 1 whereas Not significant on Day 6 as the most affected group I (ARDS) improved towards the Normal subjects-Group III (Table-3). The improvement in difference between the groups shows that the most affected group (ARDS) is more benefitted than the normal subjects with chest physiotherapy even in renal dysfunction.

Table 2: Day Wise-Comparison of Changes in Po2 and OI Level between Three Groups

PO2	STAGE	N	Mean ± SD (Po ₂)	t-value Level of sig.	Mean ± SD (OI)	t-value Level of sig.
DAY 1	ARDS	15	75.43 ± 23.041	22.69 (P<0.01)	106.32 ± 35.36	103.78 P < 0.01
	ALI	6	128.16 ± 19.477		239.55 ± 19.12	
	NORMAL	9	188.77 ± 65.15		368.91 ± 63.11	
DAY 2	ARDS	15	186.66 ± 116	2.09 (P>0.05)	247.43 ± 178.99	1.58 P > 0.05
	ALI	6	141.71 ± 48.84		282.91 ± 137.85	
	NORMAL	9	257.33 ± 131.84		386.85 ± 223.87	
DAY 3	ARDS	15	176.29 ± 68.81	.937 P>0.05	279.99 ± 88.1	.81 P > 0.05
	ALI	6	140 ± 26.23		269.67 ± 90.92	
	NORMAL	9	195.4 ± 106.34		351.84 ± 235.32	
DAY 4	ARDS	15	154.91 ± 57.99	1.235 P>0.05	304.93 ± 153.95	.126 P > 0.05
	ALI	6	208.17 ± 117.77		329.1 ± 125.54	
	NORMAL	9	165.57 ± 47.77		330.57 ± 108.14	
DAY 5	ARDS	15	138.55 ± 26.38	5.66 P>0.05	287 ± 90.49	1.78 P > 0.05
	ALI	6	161 ± 34.32		321.4 ± 18.03	
	NORMAL	9	183.1 ± 24.27		364.86 ± 102.01	
DAY 6	ARDS	15	156.68 ± 19.46	2.47 P>0.05	323.88 ± 127.14	2.11 P > 0.05
	ALI	6	173.6 ± 16.04		365.47 ± 38.63	
	NORMAL	9	236.71 ± 37.26		468 ± 189.47	

Table3: Day-Wise Comparison of Changes in (A-a) Gradient Level between Three Groups

A-a	STAGE	n	Mean ± SD	t-value Level of sig.
DAY 1	ARDS	15	382.9 ± 119.5	24.18 P<0.01
	ALI	6	201.6 ± 67.36	
	NORMAL	9	120.2 ± 39.49	
DAY 2	ARDS	15	374 ± 163.35	2.077 P>0.05
	ALI	6	217 ± 181.3	
	NORMAL	9	268.4 ± 193.58	
DAY 3	ARDS	15	228.3 ± 133	0.028 P>0.05
	ALI	6	223.8 ± 164.1	
	NORMAL	9	241.3 ± 187	
DAY 4	ARDS	15	200 ± 173.6	0.125 P>0.05
	ALI	6	192.1 ± 123.92	
	NORMAL	9	168.2 ± 126.1	
DAY 5	ARDS	15	202.3 ± 119.5	0.413 P>0.05
	ALI	6	148.6 ± 39.3	
	NORMAL	9	167.7 ± 146.1	
DAY 6	ARDS	15	153 ± 119.1	0.627 P>0.05
	ALI	6	74.66 ± 43.46	
	NORMAL	9	126.4 ± 106.99	

Renal Parameters: There was no significant improvement in the renal parameters (BUN and Creatinine) among all the three groups as shown by table4 on all six days of the study duration. The changes in renal parameters were all insignificant showing that chest hygiene improvement alone could not improve renal functions.

Table 4: Day-Wise Comparison of Changes in Bun & CreatLevel between Three Groups

BUN& CREAT	STAGE	n	Mean ± SD (BUN)	t-value Level of sig.	Mean ± SD (CREAT)	t-value Level of sig.
DAY 1	ARDS	15	51.93 ± 26.256	3.139 P > 0.05	4.613 ± 3.4645	1.236 P > 0.05
	ALI	6	43.50 ± 34.449		2.900 ± 1.8910	
	NORMAL	9	25.89 ± 10.374		3.144 ± 1.4808	
DAY 2	ARDS	15	50.27 ± 18.379	2.622 P > 0.05	4.027 ± 2.5703	0.924 P > 0.05
	ALI	6	45.67 ± 37.367		2.817 ± 1.2781	
	NORMAL	9	29.56 ± 10.967		3.189 ± 1.2908	
DAY 3	ARDS	15	52.27 ± 17.090	1.293 P > 0.05	3.953 ± 2.0445	0.122 P > 0.05
	ALI	6	53.83 ± 38.028		3.600 ± 2.0317	
	NORMAL	9	38.11 ± 18.751		3.611 ± 1.5964	
DAY 4	ARDS	15	58.07 ± 18.751	1.886 P > 0.05	3.993 ± 2.0005	0.648 P > 0.05
	ALI	6	47.33 ± 23.972		2.900 ± 1.6171	
	NORMAL	9	40.44 ± 22.057		3.578 ± 1.8005	
DAY 5	ARDS	15	52.27 ± 24.241	0.958 P > 0.05	3.191 ± 2.1492	0.013 P > 0.05
	ALI	6	46.75 ± 17.988		3.300 ± 2.4617	
	NORMAL	9	37.43 ± 20.428		3.343 ± 1.3939	
DAY 6	ARDS	15	52.09 ± 26.505	0.924 P > 0.05	3.082 ± 2.0994	0.132 P > 0.05
	ALI	6	44.33 ± 21.733		3.367 ± 3.0436	
	NORMAL	9	36.86 ± 17.218		3.295 ± 1.6803	

The analysis of Table 5 indicates that there was a significant improvement in the study sample in all the pulmonary outcomes namely PaO₂, Oxygenation Index and A-a gradient. The changes in renal parameters were insignificant which indicates the potential benefits of Chest physiotherapy in improving the pulmonary outcomes among patients with renal dysfunction independent of improvement in renal parameters.

Table 5: Parameters Comparison between Day 1 and Day 6 in Three Groups

PARAMETERS	DAYS	N	Mean ± SD	t-value Level of sig.
PO ₂	DAY 1	21	118.3 ± 63.30	-3.246 P < 0.05
	DAY6		185.76 ± 80.44	
OI	DAY1	21	203.9 ± 122.49	-5.36 P < 0.01
	DAY6		377.8 ± 153.2	
A-a	DAY1	21	278.5 ± 145.2	3.81 P < 0.01
	DAY6		132.98 ± 107.0	
BUN	DAY1	21	42.4 ± 28	-.6 P < 0.05
	DAY6		45.9 ± 23.1	
CREAT	DAY1	21	3.72 ± 2.32	.94 P < 0.05
	DAY6		3.29 ± 2	

Conclusions and limitations: This study results supports that the Chest physiotherapy has a definite role in improving pulmonary outcomes among patients with renal dysfunction in intensive care Unit, with most affected group showing the maximal beneficial effects. On other hand Chest physiotherapy plays no role in improving renal parameters. However this needs to be verified in larger sample before generalization of these findings, with intrinsic analysis of renal replacement therapy received by the patient and physiotherapy of varying dose prescription based on Oxygenation status of the patient.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Cortejens, Determann RM, van Suijlen JD, Kamphuis SS, Foppen J, 2012 Lung-protective mechanical ventilation does not protect against acute kidney injury in patients without lung injury at onset of mechanical ventilation *J Crit Care*. Vol 11-12.
2. Jurgunflodge ,Stefan Uhlig 2010 Kidney calling lung and call back: how organs talk to each other *Nephrol Dial Transplant* 25: 32–34.
3. J D Paladino, JR Hotchkiss, and H Rabb (2009) Acute kidney injury and lung dysfunction: a paradigm for remote organ effects of kidney disease *Microvasc Res*. 77(1): 8–12.
4. Jay L. Koyner , Patrick T. Murray 2010 Mechanical Ventilation and the Kidney *Blood Purif* 29:52–68.
5. Jennifer, Joslin and Marlies Ostermann 2012 Care of the Critically Ill Emergency Department Patient with Acute Kidney Injury *Emergency Medicine International* Volume 2, Article ID 760623, 6 pages.
6. Kathleen D. Liu, Michael A. Matthay 2011 Impact of acute kidney injury on lung injury *Am J Physiol Lung Cell Mol Physiol* 296:L1-L2.
7. Kathleen 2008 *Advances in Critical Care for the Nephrologist: Acute Lung Injury/ARDS Clin J Am Soc Nephrol* 3: 578-586.
8. Kai , Jeffery V. Bishop, Xiaoyan Wen, Raghavan, Murugan 2011 Differential effects of kidney–lung cross-talk during acute kidney injury and bacterial pneumonia *Kidney International* 80, 633–644
9. Kurt, Zhengming Wang, Akitoshi Ishizaka 2002 Fas and Fas Ligand Are Up-Regulated in Pulmonary Edema Fluid and Lung Tissue of Patients with Acute Lung Injury and the Acute Respiratory Distress Syndrome *American Journal of Pathology*, Vol. 161, No. 5.
10. Laura, Heitham T. Hassoun 2012. Inflammatory Mechanisms of Organ Crosstalk during Ischemic Acute Kidney Injury *International Journal of Nephrology* Volume 202, Article ID 505197, 8 pages.
11. LUH Shi-ping , CHIANG Chi-huei 2007 Acute lung injury/acute respiratory distress syndrome (ALI/ARDS): the mechanism, present strategies and future perspectives of therapies *Zhejiang Univ Sci B* 8(1):60-69.
12. Mario, Joanne Lomas-Neira, Fabienne Venet, Chun-Shiang Chung 2011 Pathogenesis of indirect (secondary) acute lung injury *Respir Med.*; 5(1): 115–126.
13. Michel, Matthay, Hans G. Folkesson, and Christine Clerici 2002 Lung Epithelial Fluid Transport and the Resolution of Pulmonary Edema *Physiol Rev* • VOL 82.
14. Michael Barker, Sally Adams Guy's and St Thomas' 2002 An evaluation of a single chest physiotherapy treatment on mechanically ventilated patients with acute lung injury. *Physiotherapy Research International*, 7(3) 157–169.
15. Minhee Suh ,Margaret Heitkemper, 2011 Chest Physiotherapy on the Respiratory Mechanics and Elimination of Sputum in Paralyzed and Mechanically Ventilated Patients With Acute Lung Injury: A Pilot Study *Critical Care Med.* 5(1):60–69.
16. Ravindra I. Mehta, Maria T. Pascual, Carmencita G. Gruta 2002 Refining predictive models in critically ill patients with acute renal failure *J Am Soc Nephrol* 13: 1350–1357.
17. Vieira JM Jr, Demarzo S, Caruso P, Pastore L Jr, Imanishi MH 2007 Effect of acute kidney injury on weaning from mechanical ventilation in critically ill patients. *Crit Care Med.* Jan; 35(1):184-91.
18. Yves, Michael A. Matthay 2007 Alveolar Edema Fluid Clearance and Acute Lung Injury *Respir Physiol Neurobiol*. December 15; 159(3): 350–359.
19. Zaccaria, and Claudio Ronco 2010 Pulmonary/renal interaction *Current Opinion in Critical Care* 16:13–18.

A Prospective Study Comparing Combined Visco canalostomy– Trabeculectomy to Trabeculectomy for the Management of Primary Open Angle Glaucoma

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ABSTRACT

Purpose: To compare combined visco canalostomy–trabeculectomy to trabeculectomy in Primary Open angle glaucoma. **Material and Methods :** A total of 20 patients (40 eyes) of bilateral Primary Open Angle Glaucoma(POAG) were included in this study. They were randomly divided into two group. Twenty eyes underwent combined visco canalostomy–trabeculectomy and other twenty eyes underwent trabeculectomy with releasable suture. Combined visco canalostomy – trabeculectomy constituted lamellar sclera flap, deep sclera flap dissection, excision of deep sclera flap, deroofting of sclerom’s canal, viscodilatation of sclerom’s canal, trabeculectomy and tight flap closure. Success criteria included intraocular pressure < 14 mmHg or more than 30% reduction of IOP. **Result :** Although in both the groups IOP was decreased, there was more lowering of IOP in combined visco canalostomy–trabeculectomy than trabeculectomy. Target IOP was achieved in 95 % in visco canalostomy–trabeculectomy group compared to 85% in trabeculectomy group.

Keywords: Intra Ocular Pressure, Trabeculectomy, Combined Visco canalostomy – Trabeculectomy, Primary open angle glaucoma

INTRODUCTION

MATERIALS & METHODS

This is prospective study for which ethics committee approval was obtained. The patients were recruited from outpatient department of Ophthalmology of Rama Medical College and Hospital, Hapur and admitted in Rama Medical College and Hospital, Hapur.

A total of 20 patients (40 eyes) of bilateral Primary Open Angle Glaucoma(POAG) were included in this study. All patients gave full informed consent. They were randomly divided into two group.

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Group A : Trabeculectomy with single releasable suture in one eye.

Group B: Combined Visco canalostomy-Trabeculectomy with single releasable suture in other eye.

Inclusion Criteria: Patients of diagnosed Primary Open Angle Glaucoma(POAG) with clinical indication of surgery, patients of POAG not responding to medical multi drug therapy, intolerance of drugs, poor compliance and patients who could not afford anti glaucoma medication.

Exclusion Criteria: Patients with prior ocular surgeries, patients with Angle closure glaucoma, Neovascular glaucoma, Low tension glaucoma, Congenital glaucoma, Secondary glaucoma, and patients with any other corneal pathology.

All selected patients underwent full ophthalmic and systemic examination. Visual assessment, applanation tonometry, fundus examination, gonioscopy and visual field analysis were done.

Surgical Technique

Group A: Trabeculectomy with single releasable suture in one eye.

20 eyes of twenty patients underwent trabeculectomy with single releasable suture in one eye. Fornix based conjunctival flap was fashioned. Bipolar wet field cautery was done to achieve hemostasis. A 4 mm by 4 mm rectangular sclera flap of two third thickness was made with help of crescent knife. A paracentesis was done 90 degree away from trabeculectomy site and full thickness 2 mm by 3 mm sclerostomy was performed. Peripheral iridectomy was made. Scleral flap was sutured with 10-0 nylon suture, one releasable suture and variable number of interrupted sutures were given depending upon the status of flow through the flap.

Group B: Combined Visco canalostomy-Trabeculectomy with single releasable suture in other eye

Fornix based conjunctival flap was fashioned. Hemostasis was achieved using bipolar cautery. A 5 mm by 5 mm rectangular sclera flap of one third thickness was dissected within 1 mm of clear cornea with help of crescent knife. Other near full thickness deeper scleral flap was dissected 0.5 mm inside the border of first flap and it was carried up to 2 mm of clear cornea. Deeper scleral flap was excised, de roofing the schlemm’s canal. Balanced salt solution was injected in schlemm’s canal to confirm its position. Both the cut ends of schlemm’s canal were dilated with canula and then sodium hyaluronate was injected. A paracentesis was done and floor of schlemm’s canal was incised along with 2 mm by 3 mm trabecular meshwork ia also excised. Peripheral iridectomy was done. The outer scleral flap was sutured with 10-0 nylon, one releasable suture and variable number of interrupted sutures were given depending upon the status of flow through the flap.

Both A and B group: Subconjunctival injection of gentamycin 0.3 ml and dexamethasone 0.3 ml were given in inferior fornix. Moxifloxacin 0.3% eye drop and Predacetate 1% eye drop were advised to put 6 times par day and later on tapered. All the patients were examined post operatively on day 1, day 7, and then 1 month, 2

month and 3 month. On every visit unaided visual acuity and with pin hole visual acuity was recorded. Every patient was examined under slit lamp, for presence and absence of any complications, condition of filtering bleb, anterior chamber depth and any sign of inflammation. Applanation tonometry and fundoscopy was done.

OBSERVATION

Table 1: Distribution of patients, according to age and sex

Age Group in Years	Male	Female
40-49	1	0
50-59	1	2
60-69	4	2
70 and above	6	4
Total	12	8

Table 2: Mean Preoperative and Post operative Intra Ocular Pressure

Time	Group A Trab Mean IOP (SD)	Group B Combined Visco-Trab Mean IOP(SD)
Pre operative	31.9(3.276)	31.4(3.61)
Post operative		
1 st day	14.8(2.09)	12.3(2.54)
Around 7 th day	15.4(2.06)	13.8(2.33)
Around 1 st month	14.3(2.27)	13.4(1.73)
Around 2 nd month	14(2.05)	12.1(1.77)
Around 3 rd month	13.3(2.36)	11.9(1.65)

Table 3: Percent of IOP reduction in both group

Time	Group A Trab % of IOP reduction	Group B Combined Visco-Trab % of IOP reduction
Pre operative	0	0
Post operative		
1 st day	53.6%	60.82%
Around 7 th day	51.72%	56.05%
Around 1 st month	55.17%	57.32%
Around 2 nd month	56.11%	61.46%
Around 3 rd month	58.30%	62.10%

Table 4: Success rate by IOP control at 3months

	Group A Trab (n = 20)	Group B Combined Visco-Trab (n = 20)
Complete success (IOP<14 mmHg without medication)	19 (95%)	17 (85%)
Partial Success (IOP<14 mmHg with medication)	1	2
Failure (IOP>14 mmHg with medication)	0	1

Table 4: Intraoperative complications

Intraoperative Complications	Group A Trabeculectomy	Group B Combined Viscocanalostomy-Trabeculectomy
Repositioning of scleral flap	1	0
Descemet membrane tear	1	0
Hyphema	1	2

Table 5: Early postoperative complications

Postoperative Complications	Group A Trabeculectomy	Group B Combined Viscocanalostomy-Trabeculectomy
Hypotony	0	0
Wound Leak	2	1
Shallow AC	1	0
Fibrinous AC	1	2
Hyphema	0	0
Choroidal Maculopathy	0	0
Choroidal detachment	0	0

DISCUSSION

Glaucoma is one of the most common causes of legal blindness in the world. It is group of disorder which affects optic nerve causing vision loss. There are many glaucoma surgeries, and variations or combinations of their surgeries that facilitate the escape of excess aqueous humor from the eye to lower intraocular pressure.

In our study we compared the outcomes in form of efficacy and complications of both the types of surgeries. A total of 20 patients (40 eyes) of bilateral Primary Open Angle Glaucoma (POAG) were selected in this study. 40 eyes were divided into two groups. Group A (20 eyes) underwent conventional standard Trabeculectomy with releasable suture surgery and group B underwent combined Viscocanalostomy- Trabeculectomy surgery with releasable suture. All patients were operated by single surgeon to avoid any surgical variability which can give any variable results. All the patients were followed up for 3 months

In our study total 20 patients were included out of which 12 were males and 8 were females. The male to female ratio is 1.5:1 .The mean age was 66.35 and most of the patients were in age group of 70 and above. The number of anti glaucoma drugs used preoperatively and postoperatively was same.

The mean preoperative IOP was 31.9 ± 3.276 mmHg in group A and 31.4 ± 3.61 mmHg in group B. The mean

preoperative IOP was slightly higher in group A than in group B but the mean preoperative IOP in both the groups were not statically significant.

On first postoperative day the mean IOP was 14.8 ± 2.09 mmHg in group A (Trab) and 12.3 ± 2.54 mmHg in group B (Visco-Trab), a reduction in IOP by 53.6% in group A and 60.82% in group B. IOP was reduced in both the groups but reduction was higher in group B as compared to in group A. On seventh postoperative day the mean IOP was 15.4 ± 2.06 mmHg in group A (Trab) and 13.8 ± 2.33 mmHg in group B (Visco-Trab).Reduction in IOP was seen in group A and group B at 1 month 14.3 ± 2.27 (by 55.17%) and 13.4 ± 1.73 (by 57.32%) respectively ; at 2nd month 14 ± 2.05 mmHg in group A (reduction by 56.11%), 12.1 ± 1.77 mmHg in group B (reduction by 61.46 %); and at 3 month 13.3 ± 2.36 mmHg in group A (reduction by 58.30%), 11.9 ± 1.65 mmHg in group B (reduction by 62.10%). The mean IOP was reduced in both the group but reduction was higher in group B in our study. The mean IOP postoperatively after 3 months was found a reduction of 58.3% in TRAB (group A) and reduction of 62.10% in VISCO–TRAB (group B). While in study done by by Eid et al study² who found 43% reduction of IOP in TRAB group and reduction of 52.5% in VISCO–TRAB and study done by Shashidhar Harvyasi et al study³, 40.63% reduction of IOP in TRAB group and reduction of 54.41% in VISCO–TRAB. Viscocanalostomy increases the aqueous outflow

not only by dilating Schelmn canal but also by disrupting the internal and external walls of Schelmn canal, thus increasing the trabecular out flow facility¹.

Intra operative complications were found in both the groups. One case of repositioning of scleral flap, one case of descemet membrane tear and one case of hyphema were found in TRAB (group A) and two cases of hyphema were reported in VISCO – TRAB (group B). Early post operative complication were also seen. Two cases of wound leak, one case of shallow AC and one case of fibrinous AC were reported in TRAB (group A) and one case of wound leak and two cases of fibrinous AC were reported in VISCO – TRAB (group B). Late postoperative complications were not found in any group while late postoperative complication like lentiular changes are found in O’Brart DP study⁴.

CONCLUSION

In our study we found that in both the groups IOP was decreased but there was more lowering of IOP in combined viscocanalostomy–trabeculectomy than trabeculectomy alone for the management of primary open angle glaucoma. Also incidence of complications was lower in combined viscocanalostomy–trabeculectomy as compared to that of trabeculectomy.

Conflict of Interest: Nil.

Source of Funding: The study was carried in Rama Medical College, Hapur and no extra financial support was required.

Ethical Clearance: Ethics committee approval was obtained before study.

REFERENCES

1. Carassa RG, Bettin P, Fiori M, Brancato R. Viscocanalostomy versus trabeculectomy in white adults affected by open-angle glaucoma: a 2-year randomized, controlled trial. *Ophthalmology* 2003; 110(5): 882–887.
2. Eid TM, Tantawy WA. Combined Viscocanalostomy-Trabeculectomy for management of Advanced Glaucoma-A Comparative Study of the Contralateral Eye: A Pilot Study. *Middle East Afr J Ophthalmol* 2011 Oct;18(4):292-7. doi: 10.4103/0974-9233.90130.
3. Harvyasi Shashidhar et al, Surgical Management og Glaucoma: Newer Concept. *Del J Ophthalmol–Vol 27 No :1 July–Sept 2016*
4. O’Brart DP, Shiew M, Edmunds B. A randomised, prospective study comparing trabeculectomy with viscocanalostomy with adjunctive antimetabolite usage for the management of open angle glaucoma uncontrolled by medical therapy. *Br J Ophthalmol* 2004; 88(8): 1012–1017.

Comparison between Empirical and Variational Mode Decomposition Based on Percentage Variation in Entropy Feature from Glaucoma Image

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ABSTRACT

Glaucoma is a type of eye disease; it damages the optic nerve due to gradual increase in the fluid pressure and hence causes blindness. In the paper two decomposition techniques, namely, bi-dimensional empirical mode decomposition (BDEMD) and two dimensional variational mode decomposition (2DVMD) are used and compared to find the better decomposition technique. Images are decomposed by these methods and entropy features are extracted from decomposed sub band images. The percentage variations in entropy features have been calculated from the extracted features for each decomposition technique for normal and glaucoma image. These calculated percentage variations in entropy features are used to compare the two decomposition techniques for normal and glaucoma images. The results obtained put forward that the percentage variation in entropy feature extracted from 2DVMD are higher than BDEMD. Hence, 2DVMD outperforms over BDEMD.

Keywords: Glaucoma, BDEMD, 2DVMD, Entropy, PVEF.

INTRODUCTION

Glaucoma is an unsafe disease of eye⁽¹⁾ which causes continuing deterioration of optic nerve fibres. It is the major cause of permanent blindness. Glaucoma is caused by increased in intraocular pressure (IOP) within the eyes due to failure of drainage structure.⁽²⁾ It is expected that about 64.3 million suffered due to glaucoma in the year 2013. This number is projected to achieve 111.8 million by the year 2040.⁽³⁾ It is also expected that about 80 million people may be affected with glaucoma by 2020.⁽⁴⁾ Approximately 12.3% of blindness cases reported worldwide are due to glaucoma.⁽⁵⁾

In the present year's use of computer based systems⁽⁶⁾ have made the testing of glaucoma simple.

Optical Coherence Tomography⁽⁷⁾, Scanning Laser Ophthalmoscope⁽⁸⁾, and Heidelberg Retina Tomography⁽⁹⁾ (HRT) have been widely used for glaucoma diagnosis. These methods are costly and time consuming. So, more accurate, low cost and useful methods are required for glaucoma diagnosis.

Advanced methods have been generally applied for investigation of diabetic retinopathy⁽¹⁰⁾, and glaucoma⁽¹¹⁾ with fundus images. Kolar et al.⁽¹²⁾, Acharya et al.⁽¹³⁾ and Dua et al.⁽⁸⁾ used different recent features extraction methods from glaucoma fundus images are power spectral, higher order spectra bispectrum, wavelet energy respectively.

In this paper, a narrative approach to find out the better decomposition technique has been proposed. The BDEMD and 2DVMD decomposition techniques decompose the image into various sub-band images. Entropy features have been extracted from the decomposed sub-band images and used to calculate the percentage variation in entropy features (PVEF). Based on PVEF decomposition techniques are compared. 2DVMD is a latest and narrative approach which outperforms over BDEMD.

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The remaining part of the article is organized as follows: Section materials and method explains the glaucoma image, data and tools used & presents the proposed method. At last the results and their discussion are presented followed by conclusion and references.

MATERIALS AND METHOD

Glaucoma Image Data and Tools Used:

The digital fundus images of glaucoma were downloaded from the Medical Image Analysis Group⁽¹⁴⁾ (MIAG).

The proposed system has been implemented on glaucoma images using MATLAB 2014a on Pentium (R) dual core CPU T4300 @2.10 GHz with 2 GB RAM.

PROPOSED METHOD

The proposed work used mainly two image decomposition techniques, namely, BDEMD and 2DVMD. Fig.1 shows block diagram representation of the proposed method. Firstly, images are resized and converted to gray scale image and red, green and blue channel images. These converted images are subjected to BDEMD and 2DVMD decomposition techniques which decomposed images in to sub band images. Entropy features are extracted from these sub-band images. Entropy features are used to calculate the PVEF and based on PVEF decomposition technique is compared.

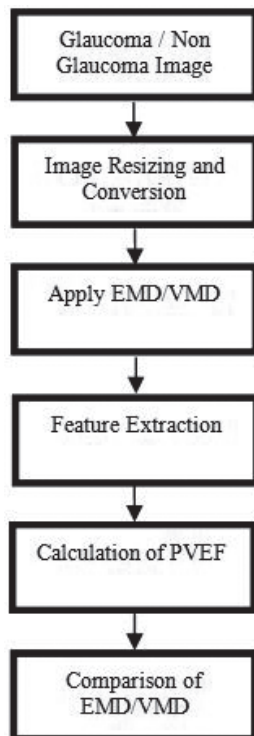


Fig. 1: Block diagram of proposed method

Image Resizing and Conversion: In this paper the glaucoma digital fundus image has been taken as input image. First of all the input image is resized and converted from RGB to gray scale image and red, green and blue channel images. Then decomposition techniques are implemented on these converted images.

Bi Dimensional Empirical Mode Decomposition: Empirical mode decomposition is abbreviated as EMD and developed by Huang.⁽¹⁵⁾ It is an adaptive in nature and used to decompose a signal which is non-stationary and non-linear in time domain. It is independent to linearity and stationary property of signal.⁽¹⁶⁾ Huang’s shifting algorithm to extract IMF $J_k(t)$ from signal $F(t)$ is given as:

$$F(t) = \sum_{k=1}^K J_k(t) + R_K(t) \quad \dots(1)$$

Where $J_k(t)$ represents the decomposed IMFs for $k = 1 \dots, K$ and R_K represents the residue.

J.C. Nunes⁽¹⁷⁾ extended EMD to Bi-dimensional EMD (BDEMD). The BDEMD⁽¹⁸⁾ algorithm which can be summarized as follows:

Step 1; Find the location of all the maxima extrema and minima extrema for the Input image $J(p, q)$.

Step 2; Envelops are obtained with the help of 2D interpolation method between minima and respective maxima.

Step 3; Compute the local mean m taking average of both the envelope upper and lower.

Step 4; Subtract mean, calculated in step 3 from the input image to obtain BDIMF $R = J - m$ and check for R weather is it a BDIMF. If yes then move to fifth step. If no, then repeat the step1 to 3 using the proto-BDIMF R is an input, awaiting the newest proto-BDIMF turns to be BDIMF.

Hanug Cauchy’s standard deviation criterion⁽¹⁷⁾ for image is given as:

$$SD = \sum_{p=1}^M \sum_{q=1}^N \frac{[R_k(p, q) - R_{k-1}(p, q)]^2}{R_{k-1}^2(p, q)} \quad \dots(2)$$

If the Standard deviation is more than the threshold ϵ , then repeat steps from 1-4 with input $R_k(p, q)$, otherwise $R_k(p, q)$ is a BDIMF $D_k(p, q)$.

Step 5; Take proto-BDIMF R as input for steps 1 to step 4 to obtain the remained BDIMF until the signal is not decomposed further.

The equation (3) represents the decomposition of image using BDEMD and is given as:

$$J(p, q) = \sum_{k=1}^K D_k(p, q) + R_k(p, q) \quad \dots(3)$$

Where $D_k(p, q)$ give BDIMF and $R_k(p, q)$ give residue. The BDEMD decompose the image as the sum of both BDIMFs and residue. D_1 represents the highest frequency of J , D_2 , represents the second highest frequency of J , and R_k represents the lowest frequency of J .

Two Dimensional Variational Mode Decomposition:

Two dimensional Variational Mode Decomposition⁽¹⁹⁾ (2DVMD) is a non-recursive, fully adaptive, non stationary, and a variational technique for analysis of signals. It depends upon the frequency information content of the signal. In this method decomposed sub-signals are band limited which are centered around a particular frequency and have specific sparsity properties.

2DVMD⁽¹⁹⁾ has been used for the decomposition of glaucoma fundus image. The complete algorithm for 2DVMD is described as follows⁽²⁰⁾

Input: signal $f(x)$, number of mode P , parameters α_p, τ, \in

Output: modes u_p , center frequency ω_p .

Initialize $\{\omega_p^0\}, \{\hat{u}_p^0\} \leftarrow 0, \lambda^0 \leftarrow 0, n \leftarrow 0$

Repeat $n \leftarrow n + 1$

For $p = 1 : P$ do

Create two dimensional masks for analytic signal fourier multiplie:

$$H_p^{t+1}(\omega) \leftarrow 1 + \text{sgn}(\langle \omega_p^t, \omega \rangle)$$

Update $\hat{u}_{AS,p}$:

$$\hat{u}_{AS,p}^{t+1}(\omega)$$

$$\leftarrow H_p^{t+1}(\omega) \frac{\hat{f}(\omega) - \sum_{i < p} \hat{u}_i^{t+1}(\omega) - \sum_{i > p} \hat{u}_i^t(\omega) - \frac{\hat{\lambda}^t(\omega)}{2}}{1 + 2\alpha_p \left| \omega - \omega_p^t \right|^2}$$

Update ω_p

$$\omega_p^{t+1} \leftarrow \frac{\int_{R^2} \omega \left| \hat{u}_{AS,p}^{t+1}(\omega) \right|^2 d\omega}{\int_{R^2} \left| \hat{u}_{AS,p}^{t+1}(\omega) \right|^2 d\omega}$$

Retrieve u_p :

$$u_i^{t+1}(x) \leftarrow R \left(F^{-1} \left\{ \hat{u}_{AS,p}^{t+1}(\omega) \right\} \right)$$

end for

Dual ascent (optional):

$$\hat{\lambda}^{t+1}(\omega) \leftarrow \hat{\lambda}^t(\omega) + \tau \left(\hat{f}(\omega) - \sum_k \hat{u}_p^{t+1}(\omega) \right)$$

$$\text{Until convergence: } \sum_p \frac{\left\| \hat{u}_p^{t+1} - \hat{u}_p^t \right\|_2^2}{\left\| \hat{u}_p^t \right\|_2^2} < \varepsilon$$

Feature Extraction: Feature extraction process is an important part and the proposed method has extracted entropy feature which can be explained as below:

Entropy: ⁽²¹⁾It is a statistical measure of uncertainty and randomness that can be used to differentiate the texture of the input image. Equal distribution of pixels intensity values leads to no information and hence zero entropy. The larger entropy will have more information and vice versa. Entropy is defined as :⁽²²⁾

$$E = - \sum_{i=0}^{L-1} p(x_i) \log_2 p(x_i) \quad \dots(4)$$

Where $p(x_i)$ is defined as the normalized histogram of the x_i . E_{xyz} denotes z^{th} entropy feature of y^{th} decomposed component for x^{th} decomposition technique.

Percentage Variation in Entropy Feature: It is calculated as:

$$\text{PVEF} = \frac{\text{Entropy of NI} - \text{Entropy of GI}}{\text{Entropy of NI}} \times 100 \dots(5)$$

Where, NI is the normal image and GI is the glaucoma image. The more is the PVEF, the more is the ability to detect and classify the glaucoma and vice versa.

Evaluation and Comparison: The entropy features, extracted from the sub band images obtained by the decomposition techniques are evaluated and used to calculate PVEF. Based on PVEF these two methods are compared.

RESULTS AND DISCUSSION

Entropy features have been extracted from each sub-band images of gray scale image, red channel, green channel and blue channel of both the normal and glaucoma images. The entropy feature distribution and PVEF for each sub-band images are shown in tables 1 to 4.

In table 1, E214 has the highest PVEF for fourth sub band image of gray scale using 2DVMD. In table 2 E223 has the highest PVEF for third sub band image of R-channel using 2DVMD. In table 3, E233 has the highest PVEF for third sub band image of G-channel using 2DVMD. In table 4, E243 has the highest PVEF for third sub band image of B-channel using 2DVMD. Based on PVEF value covering the overall analysis of tables from 1-4, it was found that the PVEF is higher as well as highest in all using 2DVMD than BDEMD.

Only E233 feature has the maximum PVEF for third sub band image of G-channel for normal and glaucoma image. It is the highest PVEF for third sub band image of G-channel using 2DVMD. Therefore, it has been concluded that 2DVMD has the highest ability for the detection and classification of glaucoma and hence it outperforms over BDEMD.

Over all, the third sub band image gives higher percentage variation in entropy feature for normal and glaucoma image using 2DVMD than BDEMD method.

Fig.2 shows the distribution of PVEF for both decomposition techniques. The graph shows that 2DVMD technique has higher percentage variation in entropy feature than BDEMD technique.

Fig.3 shows the comparison of decomposition techniques based on PVEF for glaucoma image. It also shows that percentage variation in entropy feature is higher for 2DVMD than BDEMD.

Nunes et al. (17) local features are extracted after applying BEMD on both natural textures and synthetic textures. Dragomiretskiy et al. (19) formed 2DVMD; in this concurrently extracted modes are band limited. They reported a superb performance on the real and synthetic images. BDEMD(15) is an adaptive method but suffers from sensitivity to noise and lack of mathematical representation whereas 2DVMD(19) is a non-recursive, fully adaptive, non stationary, and robust to noise which give band limited sub band images centered around a particular frequency.

Table 1: Entropy features distribution and PVEF for gray scale image

Features	EGI	ENI	PVEF
E111	3.1276	3.1928	2.0420947
E112	2.5635	2.6936	4.8299673
E113	2.1571	2.2109	2.4333982
E114	0	0	0
E211	0	0	0
E212	2.1953	2.682	18.146905
E213	3.9874	3.7716	-5.721709
E214	1.2332	2.4054	48.73202

ENI- Entropy of Normal Image, EGI- Entropy of Glaucoma Image, PVEF- Percentage Variation in Entropy Feature.

Table 2: Entropy features distribution and PVEF for R-channel image

Features	EGI	ENI	PVEF
E121	3.3296	3.405	2.2143906
E122	3.3013	2.9145	-13.27157
E123	2.4843	2.1841	-13.74479
E124	0	0	0
E221	0	0	0
E222	2.8751	2.7433	-4.804432
E223	1.3338	3.0335	56.03098
E224	1.4205	1.3046	-8.883949

Table 3: Entropy features distribution and PVEF for G-channel image

Features	EGI	ENI	PVEF
E131	2.7776	2.9665	6.3677735
E132	2.3997	2.4764	3.0972379
E133	1.893	2.2168	14.60664
E134	0	0	0
E231	0	0	0
E232	2.6104	2.167	-20.46146
E233	1.1439	3.0897	62.976988
E234	2.2994	3.1114	26.097577

Table 4: Entropy features distribution and PVEF for B-channel image

Features	EGI	ENI	PVEF
E141	2.5895	3.5955	27.979419
E142	2.5693	3.5698	28.02678
E143	2.1879	3.2004	31.63667
E144	0	0	0
E241	0	0	0
E242	2.8179	1.8489	-52.40954
E243	1.1189	2.5964	56.905716
E244	2.1952	3.5753	38.600957

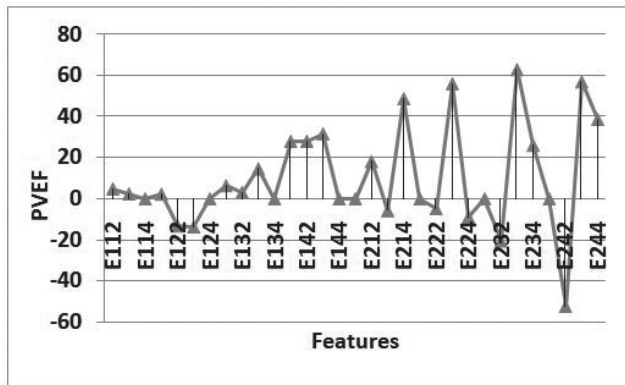


Fig. 2: Graph of PVEF versus features of decomposition techniques

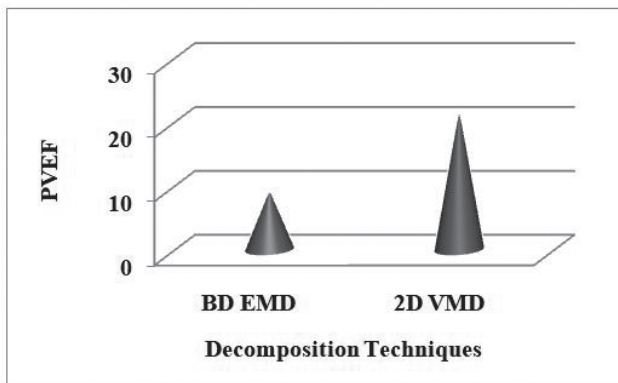


Fig. 3: Graph for comparison of decomposition techniques based on PVEF for glaucoma image.

CONCLUSION

This paper presents a comparison between BDEMD and 2DVMD based on PVEF from glaucoma images. Entropy features and PVEF have been calculated for each decomposition technique for normal and glaucoma image. From the table 1 to 4 and fig. 2 and fig.3, it is clear that the 2DVMD has the higher PVEF for normal and glaucoma images than BDEMD. Therefore, 2DVMD

perform better and has the higher ability for detection and classification of glaucoma and it outperforms over BDEMD.

The similar plan can be used to extract the features for additional diseases such as fatty liver and thyroid cancer.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: None (because two methods are compared)

REFERENCES

1. Rehman SN, Hussain MA. Glaucoma Classification Based on Contourlet Transform. Indian Journal of Public Health & Development. 2017 July;8(3):474-476.
2. Nayak J, Acharya UR, Bhat PS, Shetty N, Lim TC. Automated diagnosis of glaucoma using digital fundus images. J Med Syst. 2009 Oct;33(5):337-46.
3. Tham YC, Li X, Wong TY, Quigley HA, Aung T, Cheng CY. Global prevalence of glaucoma and projections of glaucoma burden through 2040: a systematic review and meta-analysis. Ophthalmology. 2014 Nov; 121(11):2081-90.
4. Julian Zilly, Joachim M. Buhmann, Dwarikanath Mahapatra. Glaucoma detection using entropy sampling and ensemble learning for automatic optic cup and disc segmentation. Computerized Medical Imaging and Graphics. 2017 Jan; 55:28–41.
5. Resnikoff S, Pascolini D. Etya’ale D, Kocur I, Pararajasegaram R, Pokharel GP, Mariotti SP. Global data on visual impairment in the year 2002. Bulletin of the World Health Organization. 2004 Nov; 82(11):811-890.
6. Song XX, Song K, Chen Y. A computer-based diagnosis system for early glaucoma screening. Proceedings of the 27th Annual IEEE Engineering in Medicine and Biology.2005:6608– 6611.
7. Lim TC, Chattopadhyay S, Acharya UR. A survey and comparative study on the instruments for

- glaucoma detection. *Medical Engineering & Physics*. 2012; 34(2):129 -139.
8. Dua S, Acharya UR, Chowriappa P, Sree SV. Wavelet based energy features for glaucomatous image classification. *IEEE Transactions on Information Technology in Biomedicine*. 2012 Jan; 16 (1):80–87.
 9. Hermann MM, David F, Garway Heath DF, Jonescu Cuyppers CP, Reinhard OW, Burk ROW, Jost B, Jonas JB, Mardin CY, Funk J, Diestelhorst M. Inter observer variability in confocal optic nerve analysis (HRT). *Int. Ophthalmol*. 2005; 26(4–5):143–149.
 10. Ganesan K, Martis RJ, Acharya UR, Chua CK, Min LC, Ng EYK, Laude A. Computer-aided diabetic retinopathy detection using trace transforms on digital fundus images. *Medical & Biological Engineering & Computing*. 2014; 52(8):663-672
 11. Maheshwari S, Pachori RB, Acharya UR. Automated diagnosis of glaucoma using empirical wavelet transform and correntropy features extracted from fundus images. *IEEE Journal of Biomedical and Health Informatics*. 2016; 21(3):803-813.
 12. Kolar R, Jan J. Detection of glaucomatous eye via color fundus images using fractal dimensions. *Radio Engineering*. 2008; 17(3):109–114.
 13. Acharya UR, Dua S, Du X, Sree, SV, Chua CK. Automated diagnosis of glaucoma using texture and higher order spectra features. *IEEE Transactions on Information Technology in Biomedicine*, 2011;15(3):449–455.
 14. Image dataset. 2015. accessed 25.02.17. available from <http://medimrg.webs.ull.es>.
 15. Huang NE, Shen Z, Long SR, Wu MC, Shih HH, Zheng Q, Yen NC, Tung CC, Liu HH. The empirical mode decomposition and the Hilbert spectrum for nonlinear and non-stationary time series analysis. *Proceedings of the Royal Society of London A: Mathematical, Physical and Engineering Sciences*. 1998; 454(1971):903-995.
 16. Dubey Rahul, Agrawal Dheeraj. Bearing fault classification using ANN-based Hilbert footprint analysis. *IET Sci. Meas. Technol*. 2015; 9(8):1016-1022.
 17. Nunes JC, Guyot S, Delechelle E. Texture analysis based on local analysis of the bidimensional empirical mode decomposition. *Mach. Vis. Appl*. 2005;16(3):177-188.
 18. Pan Jianjia, Tang Yuan Yan. A mean approximation based bidimensional empirical mode decomposition with application to image fusion. *Digital Signal Processing*. 2016; 50:61-71.
 19. Dragomiretskiy K, Zosso D. Variational mode decomposition. *IEEE Transactions on Signal Processing*. 2014; 62(3):531-544.
 20. Zosso D, Dragomiretskiy K, Bertozzi AL, Weiss. Two dimensional compact variational mode decomposition. *J Math Imaging Vis*. 2017;58,:294-320
 21. Huang Hui, Feng Xi'an, Jiang Jionghui. Medical image fusion algorithm based on nonlinear approximation of contourlet transform and regional features. *Hindawi Journal of Electrical and Computer Engineering*. 2017. Article ID 6807473, 9.
 22. Gonzalez RC, Woods RE, Eddin SL. *Digital image processing using MATLAB*. 2nd ed. New Delhi: TataMcgrawhill; 2009.

Isolation, Identification of Bacteria Associated with Mobile Phones and their Antibiotic Susceptibility

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ABSTRACT

Mobile phones, due to their nature and proximity to sensitive part of our bodies in usage such as faces, ears, lips and hands of users which could become veritable reservoirs of pathogens that could result in infections. The present study was carried out to isolate and identify bacteria associated with mobile cell phones in a Hospital environment. Bacterial load and the susceptibility pattern of the isolated bacteria checked with some commonly-used antibiotics. A total of ten (10) mobile phones were randomly sampled and divided in to two groups, Group I from Hospital Care Workers (HCW) and Five from patients (Group II) at SVRR Government hospital, Tirupati. For each mobile phone, two sterile swabs moistened with normal saline were rotated over the surface of both sides of the mobile phone and soaked in 10 ml sterile peptone broth. Enumeration of the bacterial counts was carried out using pour plate technique and all 10 mobile phones sampled were contaminated with varied number of bacteria. The range of number was $2-5 \times 10^7$ CFU/phone for total bacterial flora from Group I and number varied to Group II was less when compared to Group I ($1-2 \times 10^7$ CFU/ml) identified using cultural, morphological and biochemical techniques. The present work revealed that the majority of isolated bacterial contaminants were mixed with more than one organism. A total of 14 bacterial strains were isolated from all collected samples. The isolated microorganisms from mobile phones of two groups were similar. Among these 14 strains one spherical bacterium and two types of rods (03 strains) were picked from bacterial colonies and were subjected to biochemical characterization. The rate of bacterial contamination of mobile phones was 100%. The highest rate of contamination of personal mobile phone was recorded in patients (75%) and the lowest was recorded in HCW members (25%). 2 isolates belonging to genera: *Staphylococcus* spp. and *Pseudomonas* spp. were identified. Antibiotic susceptibility testing of the isolates indicated that *Staphylococcus* spp. had susceptibility against colitrine and *cefodoxime* while *Pseudomonas* spp against colitrine and *piperacillin*. The identified bacteria have pathogenic potential and their presence on the cell phones surfaces could serve as a source of cross-transmission of bacterial infections in hospital environment.

Keywords: Contamination, Cell phones, Nosocomial pathogens, patients, Hospital care workers(HCW), Hospitals, Antibiotic susceptibility profile.

INTRODUCTION

Mobile phones have become an integral and indispensable part of daily life⁸. Mobile phones are increasingly becoming an important means of communication. Mobile phones could be contaminated through sources such as human skin or hand, bag, phone pouch, bags, pockets, environment and food particles, these sources are links through which microorganisms colonized the phone, thus causing diseases that range from mild to chronic. Hospital staffs are mostly the

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source of contamination, they may serve as mobile reservoirs of infection, allowing the transportation of the contaminating bacteria to many different clinical environments¹. Further, sharing of mobile phones between people may directly facilitate the spread of potentially pathogenic bacteria to the community. The potential of mobile phones as vectors to nosocomial infection has been studied¹. Among Health Care Workers (HCWs), it has been reported that medical devices like thermometers, stethoscopes and non medical devices like computer keyboards, faucet, ballpoint pens, files, books and mobile phone have an important role in the transmission and spread of microorganisms^{2&5}. Attempts to study the bacterial flora present on the mobile phones of hospital staff members and to compare it with that found on mobile phones of patients in terms of composition, number and antibiotic sensitivity.

MATERIALS AND METHOD

Sample Collection: The study was conducted in SVRR Government hospital, total of (10) mobile phones were sampled from the following study groups: Samples were collected from two groups: five from Hospital care workers(HCW) and five from patients at the SVRR hospital. Mobile phones which were used for at least two months were sampled. A sterile cotton swab stick was soaked in sterile peptone water to moisten it. The target phone was swabbed over its surface after which the swab stick was put quickly into sterile vial and sealed. The cotton end was aseptically cut off and soaked in 10 ml of peptone water labelled with the specimen number and incubated at 37 for 24 hours. This served as the stock culture. Same technique was employed for each of the samples³.

Enumeration of bacterial counts: Bacterial count was determined using serial dilution technique³. The colonies developed after the incubation period were counted and the mean count obtained was recorded and expressed in colony forming unit per milliliter (cfu/ml) of the sample analyzed.

Cultural, morphological and biochemical characterization of the bacterial isolates: Loopful of discrete colonies on nutrient agar medium were selected and aseptically sub-cultured onto selective and differential media (blood agar, MacConkey agar, EMB

agar and mannitol salt agar media). The inoculated plates were incubated at 37°C for 24 hours after which their cultural characteristics were observed and recorded. Discrete suspected colonies were further subjected to Gram's staining to characterize their morphology while biochemical tests (Indole, MR-VP, citrate, catalase, coagulase, oxidase, urease, TSI) were carried out to authenticate their identity³.

Standardization of the inoculums and antibiotic susceptibility testing of the isolates: Antibiotic susceptibility testing was carried out using disc-diffusion technique⁷. The results were recorded and interpreted on the basis of Clinical and Laboratory Standards Institute guidelines⁴.

RESULTS

At the time of the study, no active investigation was being performed for a nosocomial pathogen. Samples from the mobile phones of all were collected and each one was asked regarding hygiene practices that is, if he/she ever cleaned his mobile phone or washed his hand after toilet. A sterile cotton swab was rolled over all exposed outer surfaces of the cell phones which were used for at least two months. Care was taken to make sure that the keypad and all buttons were swabbed, since these areas are most frequently in contact with the tips of fingers. The microbial load on the mobile phone and microorganisms colonized were examined from Hospital care workers (HCW) and patients of SVRR government hospital for hygiene and public health.

Enumeration of bacterial counts: All 10 mobile phones sampled were contaminated with varied number of bacteria (Table 1). The range of number was $2-5 \times 10^7$ CFU/phone for total bacterial flora from Group I and number varied to Group II was less when compared to Group I ($1-2 \times 10^7$ CFU/ml).

The present work revealed that the majority of isolated bacterial contaminants were mixed with more than one organism. The rate of bacterial contamination of mobile phones was 100%. The highest rate of contamination of personal mobile phone was recorded in patients (75%) and the lowest was recorded in HCW members (25%).

Table 1: No. of colony forming units/ml from Group-I

S. No.	Sample	CFU/ml
1.	Patient I	5×10^7
2.	Patient II	3×10^7
3.	Patient III	2×10^7
4.	Patient IV	4×10^7
5.	Patient V	2×10^7

Table 2: No. of colony forming units/ml from Group-II

S. No.	Sample	CFU/ml
1.	HCW I	1×10^7
2.	HCW II	2×10^7
3.	HCW III	2×10^7
4.	HCW IV	1×10^7
5.	HCW V	2×10^7

Table 3: Biochemical characterization

	Test Names	<i>Pseudomonas</i> sps	<i>Staphylococcus</i> sps	<i>Escherichia</i> sps
Sugars	Sucrose	-	+	+
	Lactose	+	-	-
	Fructose	-	+	+
	Galactose	-	+	-
Biochemical	Indole	-	-	+
	Methyle Red	-	+	+
	VP	-	+	-
	Citrate	+	-	-
	Oxidase	-	+	-
	Catalase	+	+	-
	Coagulase	-	-	-
	Urease	-	-	-

Based on the cultural, morphological and biochemical characterization the organisms were identified according to Bergey's Manual of Determinative Bacteriology and were identified up to genus level only⁹. Organisms are *Staphylococcus* sps and *Escherichia* sps. are almost similar from HCW group and patient group. *Pseudomonas* sps. is observed in samples of patients. The major cause of nosocomial infections is *Pseudomonas* sps. The above said 03 bacterial strains were checked for antibiotic susceptibility test.

Antibiotic Susceptibility Test (Zone Formation):

Antibiotics susceptibility test was done using with three

Cultural, morphological and biochemical characterization of the bacterial isolates: Loop full of discrete colonies on nutrient agar medium were selected and aseptically sub cultured on to selective and differential media such as mannitol salt agar, macconkey agar, EMB agar, and blood agar media.

The bacterial colonies were further subjected to gram staining technique and morphology was studied. From Mannitol salt agar culture stained showed spherical cocci with purple colour.

A total of 14 bacterial strains were isolated from all collected samples. Among these 14 strains one spherical bacterium and two types of rods (03 strains) were picked from bacterial colonies and were subjected to biochemical characterization (Table. 3).

types of antibiotic discs which are available from our Department of Applied Microbiology as namely coli trine, *cefodoxime*, *piperacillin* zone was observed with *pseudomonas* inoculated plate only for *cefodoxime* of about 0.5mm and for the two antibiotic discs *colistrine* and *piperacillin* zone of clearance was absent that means the organism is resistant to that particular antibiotics. For *staphylococcus* sps. zone of inhibition of about 0.2mm and 0.1mm was observed for coli trine and *cefodoxime* and for *piperacillin* zone of clearance has not been observed. *Escherichia* sps has shown zone for coli trine and *pieracillin* about 0.2mm and 0.4mm respectively and zone of inhibition absent for *cefodoxime*(Fig. 1)

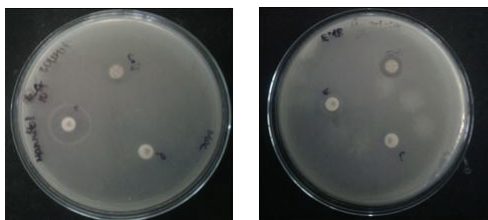


Fig. 1: Antibiotic susceptibility test (Zone formation)

DISCUSSION

Results from this study showed high levels of bacterial contamination of mobile phones used by patients especially nosocomial infection, organism *Pseudomonas sps.* whereas other organisms such as *Escherichia sps.* and *Staphylococcus sps.* are almost similar from group I and group II. This confirms the work by Goldblatt et al.,⁵ who found that One-fifth of the mobile phones examined in New York harbour pathogenic microorganisms. Depending on environmental conditions, pathogens may remain infectious on surfaces for weeks after being contaminated. In humid conditions, pathogens may actively colonize surfaces, transforming a passive reservoir into an active one. Furthermore, formation of biofilm by one bacterial agent can affect the survival of other pathogens on the same surface⁶. In general, the greater the concentration of the microbe, the longer it survives, and survival can range from minutes to months. This is a cause for concern, since these pathogenic isolates are capable of causing diseases in anyone who gets contaminated whilst using the mobile phone. All mobile phones were contaminated with different species of pathogenic bacteria, *E. coli*, potential illness causing bacteria that are fecal in origin. The likely reason is that people do not wash their hands after using the toilet which means that people spread fecal bacteria not just to their phones, but to everything else they touch around them. *E. coli* can survive on hands and other surfaces for hours, especially in warm conditions (like on a smartphone screen), and is easily transferred to door handles, computer keyboards, food, other people and back to person, and also *S. aureus*, the common bacteria that live on skin can cause illness if they enter the bloodstream. The presence of *E. coli* and Fecal coliform suggests fecal contamination of these phones, which can result in community-acquired infections and disease outbreaks.

SUMMARY AND CONCLUSIONS

All sampled mobile phones were highly contaminated with various types of bacteria. This

suggests the potential of the mobile phone as a fomite, which can result in community-acquired infections with possible public health implications. Periodic cleaning of mobile phones with disinfectants or hand cleaning detergents, as well as frequent hand-washing, should be encouraged as a means of curtailing any potential disease transmission. Bacterial flora on mobile phones of HCW may vary in composition, number and antibiotic sensitivity, to that found on mobile phones of patients. These results showed that health care workers (HCW) and patients mobile phones were contaminated with various types of microorganisms. Mobile phones used by patients in daily practice may be a source of nosocomial infections in clinics and hospitals. Therefore, mobile phones can act as an easy way for transfer of potential pathogens associated with nosocomial and other infections. Decontamination of mobile phones with alcohol disinfectant wipes as well as regular hand washing should be done to prevent infections.

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Conflict of Interest: Authors have no conflict of interest

Ethical Clearance: We have not collected any samples from humans

REFERENCES

1. Brady, R.R., Wasson. A., String, I., Mc-Allister, C. and Damani, N.N. (2006). Is your phone bugged?: The incidence of bacteria known to cause nosocomial infection in health care workers mobile phones. *Journal of Hospital Infections*, 62:123–125.
2. Bures, S., Fish-Brain, J.T., Uyehana, C.F., Parker, J.M. and Berg, B.W. (2000). Computer keyboard and faucet handles as reservoirs of nosocomial pathogens in intensive care unit. *American Journal of Infections and Control*, 28: 446–471.
3. Chesebrough, M. (2000). *Medical laboratory manual for tropical countries Volume II*. Second edition, University Press, Cambridge, Great Britain, 377pp.
4. Clinical and Laboratory Standards Institute (2005). Performance for antimicrobial

- susceptibility testing. *Fifteenth Informational Supplement***3(1)**:100–515
5. Goldblatt, J.G., Krief, I., Haller, T.D., Milloul, V. Six-Smith, D.M., Srugo, I. and Potasman, I. (2007). Use of cellular telephones and transmission of pathogens by medical staff in New York and Israel. *Infections Control of Hospital and Epidemiology*, **28**: 500–503.
 6. Hassan, A.N., Birt, D.M. and Frank, J.F. (2004). Behavior of *Listeria monocytogens* in a *Pseudomonas putida* biofilm on a condensable forming surface. *Journal of Food Protection*, **67(2)**: 322–327.
 7. Kirby, W.M. and Bauer, A.W. (1996). Susceptibility testing: A standard single disc method. *American Journal of Clinical Pathology*, 45: 493-494.
 8. Karabay, O., Kocoglu, E. and Tahtaci, M. (2007). The role of mobile phones in the spread of bacteria associated with nosolomial infections. *Journal of Infectious Diseases in Developing Countries*, 1:72–73.
 9. Mackie and McCartney. 1989. *Practical Medical Microbiology*. (Collee, G., Duguid, J.P., Fraser, A.G. and Marmion, B.P. Eds.). 13th Edition. Churchill Livingstone, London. 2: 43 – 160.

Effectiveness of Lumbar Flexors and Extensors Muscle Strengthening Exercises on Waist-Hip Ratio in Overweight Adolescents

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ABSTRACT

Background: Obesity is the worldwide epidemic and is characterized by excess adipose tissue. It contributes to numerous chronic diseases and early mortality.

Objective: To find out the effectiveness of lumbar flexors and extensors muscle strengthening exercises on Waist-Hip Ratio in overweight adolescents.

Study Design: Quasi experimental study design, pre and post type.

Procedure: 34 subjects were conveniently selected based on Inclusion and Exclusion Criteria and randomly divided into 2 groups. Group- A and Group- B. Each Group consists of 17 samples. Lumbar flexors and extensors strengthening exercises given to Group A, and Group B free from strengthening exercises.

Outcome Measures: Waist Circumference, Hip Circumference, Waist-Hip Ratio and Skin Fold Thickness at the abdomen.

Results: Statistical analysis was done by using paired “t” test which showed more significant improvement in Group A.

Conclusion: The study was concluded that Experimental group with exercise program showed statistical significant decrease in Waist Circumference, Hip Circumference and Skin Fold Thickness at the abdomen but no statistical significant reduction in Waist-Hip Ratio. Control group, who were not given any intervention showed increase in the Waist Circumference, Hip Circumference, Waist- Hip Ratio and Skin Fold Thickness at the abdomen.

Keywords: Lumbar flexors and extensors strengthening exercise, skin fold caliper, Waist-Hip Ratio.

INTRODUCTION

Overweight and obesity are defined as abnormal or excessive fat accumulation. Quality of life of individuals varies and it is influenced by life style, infrastructure, emotional and social wellbeing. According to Jerrold S Greenburg, Geprge B Ditiman, Barabee Myers Oakes there are about 50 million men & 60 million women between the age of 18-79 and 10%-20% of adolescents who were suffering from overweight and obesity are recognizable^{1,2} So it is necessary for physical therapist to assess and manage patients with excess weight to prevent

clinical composition. People who possess excessive fat in their body are said to either obese or overweight³.

Gray A Thibodea and Kevin Patton defined as obesity as an abnormal increase in the proportion of body fat. Most of the fat is stored in the subcutaneous tissue and around the viscera. Fat catabolism and yield energy and anabolize to form adipose tissue⁴. Michale L Pollock and Jack Hilmore defines overweight as the condition where an individual's weight exceeds the population norm or average as determined on the basis of gender, weight and frame size. Obesity refers to be over-fat. Obesity can be treated by diet, physical activities, medications or surgery⁵.

According to Ruthsansford, Jonna Bullock Saxtan, SuemacklVel L, obesity and overweight are recognized by health professions as pre-disposing factors for its

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complication⁶. India ranks third in the world, having self-destruction of an individual due to increased eating of junk foods, consuming alcohol and change in sedentary life style, making one in every five Indian men and women either obese or overweight⁷.

Fitness is associated with increased basal metabolic rate, improved body composition, preserved lean body mass during weight loss, lowered insulin level, increased oxidative capacity of muscle tissue, larger amount of glycogen store in active muscles and increased sensitivity to fat-mobilizing hormones that decrease body fat^{8,9}. Obesity is consider to be the main cause for many disease. Increased weight carries much risks for some cancers, diabetes, heart diseases and stroke¹⁰.

As there is an increase in the awareness among the people about the various risk factors associated with obesity, many individuals are undergoing different weight reduction programs¹¹.

Abdominal muscle weakness leads to increase lumbar lordosis and anterior pelvic tilt that results in mechanical low back pain which may persist as a chronic low back pain in adult life too. Lumbar lordosis and thoracic kyphosis, stretched abdominal muscles and tightened the hip flexors are few factors arises due to an anterior pelvic tilt. In order to maintain balance in a standing upright position with anterior pelvic tilt, the spine must be hyper-extended along with the lengthening of rectus abdominis and shortening of erector spinae muscles, associated with the lumbar lordosis.

Lordosis can not only accompany with anterior pelvic tilt, but it can also balance the kyphotic spine in other different way, such as when the arms are supported, or when the hips drifted backwards (posterior femur tilt) or when enough hip flexion occurs¹². The objective of

the study was to evaluate the effectiveness of lumbar flexors and extensors muscle strengthening exercises on Waist Circumference, Hip Circumference, Waist – Hip Ratio and skin folds at abdomen measurement in overweight adolescents.

METHODOLOGY

Study design was Quasi Experimental, pretest and posttest type. 34 subjects aged between 13- 19 years, both males and females and Body Mass Index range between(22.99-24.99) were included. Exclusion criteria were individuals with recent spinal trauma, unhealed upper or lower limb fracture, low back pain with / without neurological symptoms and subjects who were undertaking any other forms of treatment for weight reduction were not included.

34 subjects were conveniently selected from SRM college of Physiotherapy, based on Inclusion and Exclusion Criteria and randomly divided in to two groups. Group – A and Group - B. Each group consists of 17 samples. Informed consent was obtained from subjects and Institutional Ethical Committee approval also got before starting the study. Lumbar flexors and extensors strengthening exercises given to Group A, and Group B free from strengthening exercises. Demographic data was collected. Waist and Hip circumference, Waist- Hip Ratio and measurement of skin fold at the abdominals was measured using the skin fold caliper was taken before intervention. Subjects have to follow a set of exercise protocol for 30 days.

Group-A

After pretest assessment both lumbar flexors and extensor strengthening exercises were taught to Group-A subjects with respective rest period for 30 day

Exercise Protocol

	FLEXORS	EXTENXORS
DAY 1	Isometric exercise 2crunches,2 leg raises	2 back extensions,2 cat camel exercise
DAY 2	Isometricexercise,2crunches,2 leg raises	2 back extensions,2 cat camel exercise
DAY 3	3 leg raises, 3 crunches, 3 Russian twist, 3 heel twist, 3 modified v sits.	3 back extensions, 3 opposite arm/leg raises, 3 bridges, 3 cat camel exercise, 3 the dart.
DAY 4	REST DAY	
DAY 5	5 leg raises, 5 crunches, 5 Russian twist, 5 heel twist, 5 modified v sits.	5 back extensions, opposite arm/leg raises, 5 bridges, 5 cat camel exercise, 5 the dart.
DAY 6	6 leg raises, 6 crunches, 6 Russian twist, 6 heel twist, 6 modified v sits.	6 back extensions, 6 opposite arm/leg raises, 6 bridges, 6 cat camel exercise, 6 the dart.

Conted...

DAY 7	7 leg raises, 7 crunches, 7 Russian twist, 7 heel twist, 7 modified v sits.	7 back extensions, 7 opposite arm/leg raises, 7 bridges, 7 cat camel exercise, 7 the dart.
DAY 8	REST DAY	
DAY 9	8 leg raises, 8 crunches, 8 Russian twist, 8 heel twist, 8 modified v sits.	8 back extensions, 8 opposite arm/leg raises, 8 bridges, 8 cat camel exercise, 8 the dart.
DAY 10	8 leg raises, 8 crunches, 8 Russian twist, 8 heel twist, 8 modified v sits.	8 back extensions, 8 opposite arm/leg raises, 8 bridges, 8 cat camel exercise, 8 the dart.
DAY 11	9 leg raises, 9 crunches, 9 Russian twist, 9 heel twist, 9 modified v sits.	9 back extensions, 9 opposite arm/leg raises, 9 bridges, 9 cat camel exercise, 9 the dart.
DAY 12	REST DAY	
DAY 13	9 leg raises, 9 crunches, 9 Russian twist, 9 heel twist, 9 modified v sits.	9 back extensions, 9 opposite arm/leg raises, 9 bridges, 9 cat camel exercise, 9 the dart.
DAY 14	10 leg raises, 10 crunches, 10 Russian twist, 10 heel twist, 10 modified v sits.	10 back extensions, 10 opposite arm/leg raises, 10 bridges, 10 cat camel exercise, 10 the dart.
DAY 15	10 leg raises, 10 crunches, 10 Russian twist, 10 heel twist, 10 modified v sits.	10 back extensions, 10 opposite arm/leg raises, 10 bridges, 10 cat camel exercise, 10 the dart.
DAY 16	REST DAY	
DAY 17	11 leg raises, 11 crunches, 11 Russian twist, 11 heel twist, 11 modified v sits.	11 back extensions, 11 opposite arm/leg raises, 11 bridges, 11 cat camel exercise, 11 the dart.
DAY 18	12 leg raises, 12 crunches, 12 Russian twist, 12 heel twist, 12 modified v sits.	12 back extensions, 12 opposite arm/leg raises, 12 bridges, 12 cat camel exercise, 12 the dart.
DAY 19	13 leg raises, 13 crunches, 13 Russian twist, 13 heel twist, 13 modified v sits.	13 back extensions, 13 opposite arm/leg raises, 13 bridges, 13 cat camel exercise, 13 the dart.
DAY 20	REST DAY	
DAY 21-24	14 leg raises, 14 crunches, 14 Russian twist, 14 heel twist, 14 modified v sits.	14 back extensions, 14 opposite arm/leg raises, 14 bridges, 14 cat camel exercise, 14 the dart.
DAY 25	REST DAY	
DAY 26-30	15 leg raises, 15 crunches, 15 Russian twist, 15 heel twist, 15 modified v sits.	15 back extensions, 15 opposite arm/leg raises, 15 bridges, 15 cat camel exercise, 15 the dart.

Group-B

The control group does not receive any intervention for period of 1 month. After 30 days of lumbar flexors and extensors strengthening exercises, post-test measurement was taken.

should pinch the skin at the appropriate site by raising a double layer of skin and the underlying adipose tissue on the right side without involving the muscle. The caliper must be applied 1cm below and right angles to the pinch, and a reading from the caliper should be taken within two seconds.

OUTCOME MEASURES

Waist-Hip Ratio: Waist-Hip Ratio was calculated as,

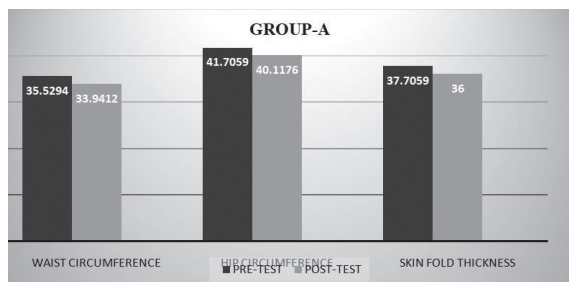
$$\frac{\text{Waist Circumference}}{\text{Hip Circumference}}$$

Skin Fold Measurement at the Abdomen: Abdominal skin fold measurement can be taken with the tester, as it

DATA ANALYSIS

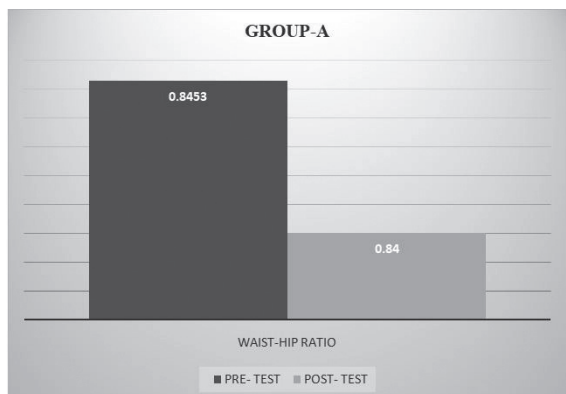
Data were analyzed by using IBM SPSS version 20.0 software. Paired t- test and student independent test was applied to assess the Waist and Hip Circumference, Waist- Hip Ratio and Thickness of skin fold.

GRAPH-1



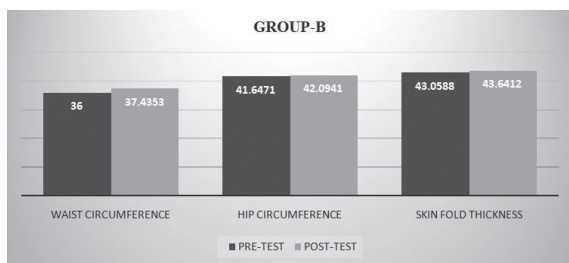
Pre And Post-Test within Group-A

GRAPH-2



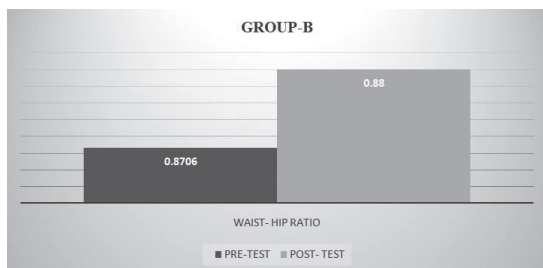
Waist-Hip Ratio Value for Pre and Post-Test Within Group-A

GRAPH-3



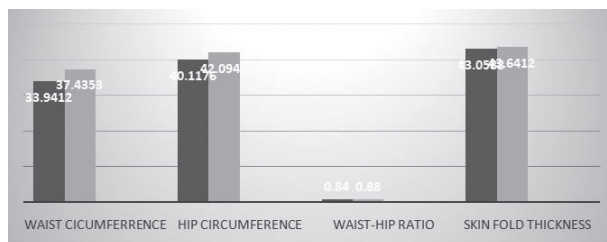
Pre and Post-Test within Group-B

GRAPH-4



Waist-Hip Ratio Value for Pre and Post-Test within Group-B

GRAPH-5



Comparison of Post-Test Difference between Group-A and Group-B

RESULTS

According to Graph 1 the experimental group has shown significant decrease in waist and Hip Circumference and Thickness of Skin Fold at abdominal value between pre and post- test at $p < 0.001$ level.

According to Graph 2 the experimental group has shown a Waist- Hip Ratio decrease in mean value from 0.8453 to 0.8400 between pre and post-test. It shows not significant result in Waist–Hip Ratio between pre and post- test at $p < 0.1$ level.

According to Graph 3 the control group has shown significant result in Waist and Hip Circumference and Thickness of Skin Fold at abdominal value between pre and post- test at $p < 0.001$ level.

According to Graph 4 the control group has shown a Waist- Hip Ratio increase in mean value from 0.8706 to 0.8800 between pre and post-test. The table shows significant result increase in Waist-Hip Ratio value between pre and post- test at $p < 0.001$ level.

According to Graph 5, overweight individuals showed decrease in Waist and Hip Circumference, Waist- Hip Ratio and Skin Fold Thickness in Group-A and Group-B showed increase in in Waist and Hip Circumference, Waist- Hip Ratio and Thickness of skin fold.

DISCUSSION

The objective of the study was to find out the effectiveness of abdominal exercises on Waist and Hip Circumference, Waist- Hip Ratio and Thickness of Skin Fold at the abdomen in overweight adolescents. The statistical results have shown that Experimental group (17 subjects) with exercise program showed statistical significant decrease in Waist and Hip Circumference and

Thickness of skin fold at the abdomen but no statistical significant reduction in Waist-Hip Ratio. Control group (17 subjects), who were not given any intervention showed increase in the Waist and Hip Circumference, Waist- Hip Ratio and Thickness of skin fold at the abdomen.

Several studies have shown that exercise induced relative loss of fat seems to be higher in the abdominal region, arms and thigh region in obese individuals. **Gidding S, Nehgher, Jacobs (2003)** concluded that poor fitness in young adults is associated with the development of cardiovascular risk factors. **Tremblay A, Despres JPFeb (1990)** concluded that the waist-hip ratio remained significantly lower in subjects performing high-intensity exercises. **Martinez-Gomez D, Welk GJ et al (2011)** said that adolescents who were involved in resistance training had significantly higher muscle fitness scores compare with youth in low and medium tertile of vigorous physical activity.

In this study, Core muscles were concentrated and Exercise programs were performed for weight loss by reducing energy expenditure which also increases the strength and endurance of the abdominal muscles. Many studies has been shown that exercise training is more effective to get rid of abdominal fat as it reduces stress and insulin levels, which reduces the presence of cortisol, a hormone that leads to more belly fat deposits. Evidence from studies shows that manipulating free fatty acids (FFA) are important because the number of metabolic abnormalities in overweight individuals are caused by elevated free fatty acids. The role of core muscles are to stabilize the spine and core muscle training is important in increasing functional predispositions of physical activity. This particularly involves improving intra and inter muscular coordination or synchronization of participating muscles. **Vijay Pratapsingh, Preeti Thakur Jan (2015)**, concluded that moderate amount of physical activity is significantly associated with a more favorable biochemical profile in terms of lipid circulating levels with respect to both absent and intense categories. **Jaimie N. Davis, Amy tung Mar(2011)** concluded that subjects who received the combination of aerobic and strengthening exercise training achieved better cardiovascular gains (VO₂ MAX) thereby, losing more amount fat when measured by Dual-Energy X-Ray¹³.

Watts et al.(2004) revealed that an 8 week crossover combination of aerobic and strength training

intervention three time in a week that resulted decrease trunk and abdominal fat as measured by Dual Energy X-Ray in obese adolescents¹⁴. **Leo Stoner May(2016)** stated that exercise intervention leads to moderate decrease in Body Mass Index, mild decrease in waist circumference and body fat and a better improvement in lean tissue mass. Some evidence suggested that exercise can decreased systolic blood pressure moderately, and also moderately improves in glucose handling, with improved insulin sensitivity¹⁵.

LambrickDM (2014) revealed that exercise intervention or combination of exercise along with other modification in lifestyle can resulted in 3.7 kg decreased in body weight. Exercise plays an important role in maintaining the cardio metabolic health beyond maintenance of body weight or Body Mass Index¹⁶. Thus this study concluded that Overweight individuals showed decrease in Waist Circumference, Hip Circumference and Skin Fold Thickness at the abdomen with exercise intervention and control group showed increase in Waist Circumference, Hip Circumference, Waist- Hip Ratio and Skin Fold Thickness.

In this study there was not much difference in Waist-Hip Ratio according to the statistical analysis may be due to short duration of the study. It may differ if this study will carried out in longer duration and with larger sample size.

CONCLUSION

The study was concluded that Experimental group with exercise program showed statistical significant decrease in Waist and Hip Circumference and Thickness of skin fold at the abdomen but no statistical significant reduction in Waist-Hip Ratio.

Control group who were not given any intervention showed increase in the Waist and Hip Circumference, Waist- Hip Ratio and Thickness of skin fold at the abdomen.

The limitations of the study were, subjects more than 19 years of age were not included, Daily dietary intake was not checked and gender distribution in both the groups was unequal. Future studies on comparison of these exercises on Body Mass Index and weight of an individual could be done. Objective outcomes like ultra-sonography and EMG could also be used and long duration of the study can be done.

Conflict of Interest: Conflict of interest declared none.

Source of Funding: Self

REFERENCES

1. CharleenD'Silvia. Effect of 30 days Abdominal Challenge Versus 30 days Planks Challenge on Waist Circumference and Abdominal Skin Fold Measurement in Healthy Young Individuals: Randomized Clinical Trail. International Journal of Physiotherapy and Research 2016, Vol 4(3).
2. Jerrold S Greenberg, George B Dintiman, Barbee Myers Oakes: Physical Fitness and wellness, Benjamin- Cummingd-1997 p.no: 345,vol6.
3. Robert V Hockey, Ed.D. Physical fitness: The pathway to health to healthful living.McGraw-Hill Humanities/Social Science/Languages-1996 Edition 8th p.no: 320.
4. Gray A Thibodeao and KevintPantton: The human body in health and disease, Luppincott Williams and Winkis.2001 Edition 9th p.no: 832.
5. Michael C Pollack and Jack H Wilmore: Exercise in health and disease, Edition:2ndW.B.Saunders company-1984.p.no: 967.
6. Ruth Savsfore, Ana Joaune, Bullock Saxton, Sue Mackwell: Women's health, a textbook of physical therapist. Benjamin- cummings-1997p.no:543-46.
7. Walter R. Thompson, Neil F. Gordon et al. ACSM's guidelines for exercise testing and prescription.8th ed. 2009. Pno: 74.
8. Joan Luckmann: Youth health. Prentice Hall College-1990p.no:234,467.
9. Deepak Kumar. Is Your Child Obese? Indian Health Care and Fitness Bolg.2015 April 17.
10. TomlisonD.J.Erskine RM, Winwood K, OnambeleGL. The Impact of Obesity on Skeletal Muscle Strength and Structure Through Adolescence to Old. Biogerontology 2016;17:4pg no: 43-45.
11. Walter. R.Thompson, Neil F.Gordon et al. ACSM'S guidelines for exercise testing and prescription8thed.2009.Pgno:71-7.
12. Pamela K Levangie, Cynthia C.Norkin. Joint Structure and Function A Comprehensive Analysis.4th Edition pg no: 369-71.
13. Byrne N, Hunter G, Meerkin J. Combining resistance and aerobic training results in greater body composition and fitness benefits than either mode separately. Obese Res. 2005.
14. Watts K, Beye P, Siafarikas A, et al. Exercise training normalizes vascular dysfunction and improves central adiposity in obese adolescents.J an Coll Card.2004:pg no 1823-7.
15. Roberts CK, Lee MM et al. strength fitness and body fat status on markers of cardio metabolic health. Med science sports exercise. 2011 pg no: 341-50.
16. Lambrick DM, Stoner L, Faulkner J, et al. Preventive medicine needs to begin with ourchildren.intjorprevmedicine2014. pg.no:129-3

Influence of Good Governance Implementation on Healthcare Performance in Three Provinces in Indonesia

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ABSTRACT

This study analyzes the role of good governance and its impact on the performance of regional governments in the three Indonesian provinces that showed the greatest progress in Millennium Development Goals (MDGs): DKI Jakarta, Aceh, and West Nusa Tenggara. This study was a narrative review, a critical appraisal of the chosen articles was done according to the method for preferred reporting items for systematic reviews and meta-analyses (PRISMA). Based on government performance reviews according to the Indonesian Governance Index (IGI), DKI Jakarta is far above the national average score of 6.37. Overall the three provinces have implemented good governance based on good leadership, commitment, and integrity to public service. Poor internal control, partly caused by the lack of an accountable and transparent mindset, was identified as an obstacle in the implementation of good governance in the three provinces. Thus, the implementation of good governance is necessary for improving the quality of healthcare services. A correlation is evident between improved growth and development indices and good governance. The government plays an important role and need to adjust according to local wisdom should be further explored in the future.

Keywords: *good governance, Indonesian Governance Index, narrative review*

INTRODUCTION

Based on the Law No. 23/2004, article 13 stipulating that regional governments should be based on accountability, efficiency, and externality and operate in accordance with national government.^[1] Therefore, the Ministry of Communication and Information developed an internet-based information system available through an online government portal. This represents one strategy in the systematic development of e-government based

upon realistic and measurable phases. The expected outcomes of this project are a greater flow of available information from the government to the public and improved interaction and communication patterns within public administration, thus supporting good governance. In the present era of technology, several government departments have initiated efforts to use digital platforms in order to assist administrative processes. Such efforts can eventually lead to the administrative reform of regional government.

A well-integrated information system can support local governments in providing efficient and improved public healthcare services. In this sense, the correct application of information technology, proportional to the needs of a region, can significantly drive government improvements and promote efficiency.

However, such integrated policies cannot be discussed, without considering the case of DKI Jakarta, the capital of Indonesia, which first implemented the strategy for developing information technology. The

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DKI Jakarta Public Health Department released its healthcare information system as an effort to attain good governance, as promoted in its master plan, mentioned as “*Pengembangan IT Pemda DKI Jakarta.*”

The Ministry of National Development Planning Agency (*Bappenas*) awarded regions that performed well in the indicators of the Millennium Development Goals (MDGs). Awards were given in four areas: best achievement of MDG indicators 2013–2015, best poverty relief 2013–2015, most advances in MDGs 2013–2015, and highest number of MDG achievements in 2013–2015. DKI Jakarta came first in two categories—the first and the fourth. West Nusa Tenggara came first in the third category, whereas Aceh came third in this category.

DKI Jakarta, West Nusa Tenggara, and Aceh initiated e-government systems as part of their efforts to attain good governance at the regional level. Therefore, this paper aims to identify the impact of good governance in the provision of healthcare in these three provinces, which led to these provinces receiving awards as the best MDG achievers.

METHOD

A narrative review of published articles associated with the implementation of good governance in DKI Jakarta, Aceh, and West Nusa Tenggara, as well as MDG achievements, was performed. The study focused on getting information through secondary sources which obtained articles from several accredited journals indexed in Scopus were searched using the keywords MDGs, good governance, Indonesia, and the names of the three respective provinces. The search was limited to the last 10 years (2007–2017). A critical appraisal of chosen articles was performed using the PRISMA method.^[2]

FINDINGS

Implementation of Good Governance in DKI Jakarta: DKI Jakarta has a structured and systematic e-government system. The webpage offers specific services that are well defined, attractive, and easily understood, enabling public access. The DKI Jakarta Public Health Department is responsible for operating several healthcare programs, in seven sub-departments.

The defining characteristic of this system is the direct relationship and coordination that has established between the Public Health Department at the provincial level and the Regional Public Health and the healthcare services of five areas: East Jakarta, West Jakarta, South Jakarta, North Jakarta, and Central Jakarta, and the Thousand Islands Regency. These subdivisions are located on front lines of healthcare provision and are responsible for directly providing and coordinating basic healthcare services and for developing healthcare services at district and sub-district levels.

The DKI Jakarta Public Health Department implemented an integrated healthcare information system several years ago. One key reason for this strategy was need for objective, reliable healthcare information in order to support departmental policies. Another need was to enhance the provision of healthcare to a large population requiring healthcare services. Also, this system aimed to professionalize healthcare management, emergency service management, and other healthcare issues.

Various laws established by the central government and Jakarta *PEMDA* necessitated the implementation of a reliable electronic information system. Thus, this government department implemented the e-government system in response to The President’s Instructions No. 6/2001, regarding telematic technology for supporting good governance. Additional instructions, No. 3/2003, structured the policy and the strategy for the development of national e-government. However, the e-government momentum began even earlier following the release of Government Law No. 108/2000 and No. 39/2001 regarding minimal healthcare standards (*KW-SPMBK*).

Based on this background, the DKI Jakarta Public Healthcare Department released two important policies, the Integrated Healthcare Information System Master Plan and Head of the Public Healthcare Department, Regulation No. 7719/2004, in addition to the Implementation of the Healthcare Information System at the province and the city level, contemplating the primary healthcare centers.^[3] This was in response to public critique of healthcare with respect to obtaining services, welfare, and education; also, as the economy of Indonesia has steadily improved, the public has become more active in fulfilling health needs. The public therefore demanded an open system with continuously accessible information.

Following the implementation of this system, the Public Healthcare Department faced several challenges such as data delay and inaccuracy. Several issues were present in coordinating the programs with the units, including the primary healthcare center and regional hospitals. These issues worsened in cases of emergency and disaster relief, for which the Public Healthcare Department was criticized for its slow response. Upon investigation, one root cause of these issues was inaccurate data.

Implementation of Good Governance in Aceh: Aceh is a province in Indonesia with characteristic differences from the rest of the country.^[4] Thus, Aceh retains some uniqueness compared to other regions of Indonesia that has permeated to the policy level. In context of government, relationship between Aceh and the central government has faced several difficulties. Years ago, there was momentum to separate from the military and the politics of Indonesia, resulting in conflict and violence within the community. Following a lengthy process, a solution was identified and was marked by the signing of the Helsinki Memorandum of Understanding (MoU) on 15 August 2005.

The Helsinki MoU emphasized that Aceh is part of the nation and subjected to the constitution of the Indonesian Republic. It also emphasized a commitment to socially integrate conflicting parties, improve economic access and employment opportunities, and foster security, including the security of those directly and indirectly associated with the conflict, in order to rebuild Aceh. Since the Helsinki MoU, social development has become the main approach for solving problems in different areas of Aceh.

The Helsinki MoU was adopted as a governmentwide public policy, formulated as a regulation in accordance with Indonesian law. The RI government, in agreement with the DPR, implemented regulation No. 11/2006, establishing the Law on Governing Aceh, known as UUPA in Indonesia. The UUPA was the beginning of the institutionalization of government and development in Aceh.

Base on the UUPA, the Aceh government is autonomous in the area of politics, serving the Aceh community, and is to be governed based on the principles of good governance—transparency, accountability, professionalism, efficiency, and effectiveness—in favor

of the welfare of the Aceh people. According to the Helsinki MoU and the considerations of UUPA, special policies were set in place regarding institutionalized social development. Also, autonomy was chosen as the method of governance in Aceh, making it independent from other regions. Institutionalized social development refers to the involvement of the central Aceh government in managing, controlling, coordinating, and mobilizing resources owned by the government, public, market, and even overseas donors, and also in encouraging the public to actively participate.

In a practical government information system, a data analysis process must be in place in order to make decisions. In view of the direct role of the government and its importance in public life, information systems should be efficient, effective, and economical. Technology for the government information system was implemented based on these considerations.

These ideas, supported by increasing knowledge and better communications technologies, have led to the concept of e-government, in which the Aceh government also chose to participate. According to the World Bank, e-government is the use of information technology by governing bodies involving information and communication technologies. E-government can involve the provision of online services and government functions to its constituents in a simple manner, including managing or receiving retribution payments, handling property taxes, or licensing, and can also involve the synchronization or the facilitation of different government operations or internal activities performed by government employees, such as electronic procurement, documentation, and electronic forms.

The concept of e-government has been implemented in *Satuan Kerja Perangkat Aceh* (SKPA) and various service departments in Aceh. This revolution has proved useful for both leaders and the public, although the information system could be improved upon in order to provide more appropriate information to the public. Overall, the e-government websites of Aceh are in good condition, are informative, and provide beneficial services to the Aceh people.

Implementation of Good Governance in West Nusa Tenggara: Among the three provinces, West Nusa Tenggara was the least prepared for e-government. The websites for accessing government services are not ready

for use, as account registration is first required. Based on the data found for the entebePlan services, a website that helps citizens to access anything about the province. Still, the data are not up to date; also, the system is not completely integrated with government functions, and it was difficult to access important services. Even so, the West Nusa Tenggara Barat's government has declared that it will maximize services by improving entebePlan.

Learning from Other Countries: The principles of good governance have gained momentum around the world. One example, in India,^[5] wherein the government has implemented principles of good governance over the course of the past several decades. In addressing these issues, India developed its vision to improve government management with the aid of three important parties: the public, politicians, and administrators, as well as academics and practitioners, which was known as the Participatory Stakeholder Assessment (PSA).

The impact of information and communications technology as well as its significant contributions toward attaining good governance. There are three primary contributions of e-governance: the improvement of government processes (e-administration); the connection of government with people (e-citizens and e-services); and the construction of external interactions (e-society). The successful contribution to e-society was important; based on surveys, one indicator of successful e-governance implementation was politeness and simple meeting procedures, which were encouraged by the online system. The three pillars its important for attaining good governance.^[6]

Many countries integrated of information technology (IT) in the implementation of policy and administrative reforms. Many government agencies use IT facilities to tell the public about their accomplishments, achievements, programs, and plans. The availability of information helps people, especially those who live in the provinces, to access the data that they need without going to the nation's capital. Advances in IT offer potentially beneficial effects on governance, to make public administration more efficient.^[7]

Study in India identified those initiatives that can be classified as good examples of e-governance. However, India has successfully implemented good governance to some extent. Indonesia is also optimistic in implementing e-governance, and some preliminary results are being

seen in different government initiatives. For example, the current literacy numbers indicate a huge leap forward; this effort has been aided by information technology. Thus, efforts to build e-governance, e-citizens, and e-society appear to provide promising results.^[8]

In another study, discussed the evaluation of governance in Croatia and other central and eastern European countries from 1996 to 2002. These countries were chosen based on regional affiliations and because of their efforts for institutional reform in order to access the European Union. The evaluation was performed with the goal of continuously assessing the quality of the government.^[9]

Similar to Indonesia, politics in South Africa have influenced the provision of government services at several points in history. In South Africa, all healthcare policies are generated by a board of directors, and this board forms the primary reference in public service processes. The important role of hospitals as providers of primary healthcare services and how healthcare services have been influenced by the political climate and stability.^[10]

Hospitals are gateways to public healthcare; thus, the implementation of good governance at the hospital level can reflect good governance of services as a whole in a country. In reality, both directors and the government should prioritize the provision of quality healthcare services. Essentially, good governance should serve to bridge the gap between policy and provision of care.

Implications and Limitations of The Study: Indonesia can learn from India, as both countries have several similarities and public health conditions. Additionally, both countries suffer from information asymmetry and the need to travel long distances to reach services or use technology, which are both characteristics of developing countries.

A final factor to continue is educating the public on good governance. All people should be informed of implementation of good governance, thereby avoiding paradigm errors that hinder development, such as the accountability and transparency issues. Implementation of good governance should occur across all government departments and functions. The successful implementation and planning of good governance measures will ensure that the community benefit from such efforts.

Public health systems in Italy known that healthcare is considered a basic right of all Italian citizens and not an exclusive service. Good governance ensures that healthcare systems and institutions benefit all members of a society.^[11, 12] The good governance in healthcare service concept of competency has also widely been applied in the implementation of good governance, because they likely to more effectively manage healthcare systems.^[11]

Based on the present review, good governance supports the management of public services, prioritizes transparency, and encourages active public participation. Additionally, good governance can simplify central and regional administrative processes and can improve government effectiveness and efficiency. Ultimately, good governance is not a project but a journey. Implementation processes should be planned and well prepared to guarantee the success.

CONCLUSIONS

The implementation of good governance is necessary for improving the quality of healthcare services. A correlation is evident between improved growth and development indices and good governance. The government plays an important role in improving healthcare via healthcare policies, which affect the services provided by primary healthcare centers. The clear delivery and the organization of relevant information among government, stakeholders, and the public is also key. Most importantly, good governance must be maintained over time to ensure that it is sustainable and not just a passing trend.

Ethical Clearance: None

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Republik Indonesia, *Law no. 32/2004 about Regional Government*. 2004: Jakarta.
2. Liberati, A., et al., *The PRISMA Statement for Reporting Systematic Reviews and Meta-Analyses of Studies That Evaluate Health Care*

- Interventions: Explanation and Elaboration*. PLOS Medicine, 2009. **6**(7): p. e1000100.
3. Provinsi DKI Jakarta, *Keputusan Kepala Dinas Kesehatan Propinsi DKI Jakarta No. 7719/2004 tentang Juknis Pelaksanaan SIK Integrasi di Dinkes Propinsi DKI Jakarta, Sudin Kesmas dan Yankes Kotamadya dan Puskesmas Kecamatan dan Kelurahan*. 2004, Dinas Kesehatan Provinsi DKI Jakarta: Jakarta.
 4. Basyar, H., et al., *Aceh Baru: Tantangan Perdamaian dan Reintegrasi*. 2008, Yogyakarta: Pustaka Pelajar.
 5. Kalsi, N.S. and R. Kiran, *e-Governance for Good Governance in Punjab in India: A Shared Vision*. Productivity, 2012. **53**(3): p. 203.
 6. Heeks, R., *Understanding e-governance for development*. Information Technology in Developing Countries, 2001. **11**(3): p. 13-34.
 7. Magno, F.A. and R.B. Serafica, *Information technology for good governance*. 2001: Yuchengco Center for East Asia, De La Salle University.
 8. Kalsi, N., R. Kiran, and S. Vaidya, *Effective e-governance for good governance in India*. International Review of Business Research Papers, 2009. **5**(1): p. 212-229.
 9. Zoran, A. and B. Jelena, *Institutional Development and Good Governance Assessments in Croatia: An Extended Focus on Corruption*. Zagreb International Review of Economics & Business, 2004(1): p. 17-34.
 10. Fusheini, A., J. Eyles, and J. Goudge, *The Social Determinants of Health and the Role of the Health Care System: A Case Study of the Significance of Good Governance in Public Hospitals in South Africa*. Health, 2016. **8**(12): p. 1288.
 11. Bertonecello, C., et al., *Good governance competencies in public health to train public health physicians*. International Journal of Public Health, 2015. **60**(6): p. 737-749.
 12. Gray, J.M., *The shift to personalised and population medicine*. The Lancet, 2013. **382**(9888): p. 200-201.

Pattern of Skin Diseases in Children Attending Anganwadis a Cross Sectional Study

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ABSTRACT

Background: Skin diseases in children are common and are either transitory or chronic and recurrent. Monitoring their epidemiology helps in effectively planning relevant educational programs and preventive measures. The pattern of skin disease is a consequence of low socio economic status, malnutrition, overcrowding, poor hygiene, illiteracy, and social backwardness in many parts of India.¹ The present study was carried to find out the pattern and incidence of various skin disorders in preschool children (upto 5 years) attending, the Anganwadis at Sarjapura PHC Area

Method: A cross sectional study was conducted on children attending the 26 Anganwadis of Sarjapur PHC . A total of 412 children were examined. The various dermatological disorders were diagnosed in accordance with diagnostic criteria and point prevalence of each diseases is determined. Skin disorders were classified into groups like Infectious Dermatitis, Non –Infectious Dermatitis and nutritional deficiency Dermatitis which include bacterial, fungal, parasitic, viral, eczematous, allergic, papulosquamous, pigmentary, miscellaneous.

Results: A total of 68(16.5%) children were found to have dermatological disorders. Male patients (56.6%) out-numbered female patients (43.4%). Maximum prevalence was of Pityriasis Alba infections (41.1%). Other infections, include fungal infections ,scabies, warts , post inflammatory hyperpigmentation and popular urticaria.

Conclusions: The prevalence of certain skin diseases in children reflects the status of health, hygiene, and personal cleanliness in a community The role of low socio economic status, overcrowding, and low level of health education, under nutrition and consequent poor immunity are emphasized by these preventable diseases. Hence necessitates the need of health education at Anganwadis.

Keywords: Anganwadis, Dermatological disorders, Under five population

INTRODUCTION

The pattern of skin disease is a consequence of poverty, malnutrition, overcrowding, poor hygiene, illiteracy, and social backwardness in many parts of India.¹ Status of health, hygiene and personal cleanliness of a society can be judged from the prevalence of certain skin diseases in the children of the community.²

The evaluation for skin disorders is an important component of primary health care practice for all, including children.³

Wide range of primary skin disorders are seen during childhood and skin is often a marker of underlying systemic diseases and hereditary syndromes .⁴ The pattern of skin diseases varies from country to country with Pyoderma and malnutrition being more prevalent in developing countries, while eczemas are more common in developed countries. This can be attributed to differing climatic, cultural and socio-economic factors. Dermatological problems account for about 30% of primary and secondary reasons for pediatric clinic visits and 30% of all visits to dermatologists involve patients

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of pediatric age group.⁵ The incidence of skin diseases in children has been reported to be 9%-37% in various studies.^{2,7-9}

In the past, studies from developing countries have reported a high prevalence of skin disorders in pediatric populations.² Few population-based studies focus on disorders in children in low-income countries, and some of these studies are performed on healthy children at school. ⁶⁻⁹ Despite the high frequency of certain skin diseases in developing countries, they have yet to be regarded as significant health problem in the development of public health strategies.¹⁰

Screening at school is a useful method to identify a large number of children of the particular age group for the presence of diseases at a time. The purpose of studying the prevalence of skin lesions is to assess the level of health, hygienic practices, awareness and availability of health-care services to prevent ,promote and provide primary care of the diseases..

This study was done to know about the prevalence of dermatological disorders prevalent among children up to five years of age attending Anganwadis in Sarjapura PHC

MATERIALS AND METHOD

Settings: The study was performed at all the Anganwadi of Sarjapur PHC in Bangalore. There were 26 Anganwadi located in PHC area .The children attending the Anganwadis were all included in the study. A total of 412 children were thoroughly examined for any dermatological disorders and systemic examination.

Type of study: A cross-sectional study was conducted on children under 5 years who attended at Anganwadis during the study period were included. In all, 412 children attended the Anganwadis were included in the study.

Socio-demographic information and physical examination: Each child ‘s mother was interviewed for age, residence, and any specific complaint related to skin. Then, the child was evaluated for hygiene status. Each child was then subjected to a complete dermatological examination including skin, nail, and mucosa in adequate daylight. The diagnosis was made based on clinical features. Laboratory tests to confirm diagnoses were not performed. After examination, skin diseases were classified into three broad categories for the purpose of analysis: (1) infectious dermatoses, (2) noninfectious dermatoses, (3) nutritional deficiency dermatoses. The findings were recorded in a pro forma for analysis and interpretation of data.

Data management: The data gathered using the questionnaire and clinical examination were compiled, coded, and entered in Excel Spreadsheets. Statistical analysis was performed using SPSS Version 16 [SPSS, Inc., Chicago, IL, USA]. Chi-square test was used to compare categorical variables. *P*< 0.05 was considered to indicate statistical significance.

Ethical considerations: The study protocol was performed according to the Helsinki declaration and approved by Institutional Ethical Review Committee. Informed written consent was obtained from parents/guardians. Confidentiality about patient information was maintained.

RESULTS

A total of 412 children in Anganwadi of age 2-5 years were included in the study. Of these, 227 (55.1%) were males and 185 (44.9%) were females. The majority of the study subjects were in the age group of 2-5 years (40.3%), and the mean age of the study population is 3.5 years. Of 412 study subjects, only 344 (83.5%) were totally normal without any skin lesion and the remaining 68(16.5%) children had any one of the skin lesions, which makes the prevalence of dermatoses has 68(16.5%) . Male patients 39(57.3%) out-numbered female patients 29 (42.6%)

Table 1: Prevalence of skin lesions among Anganwadi children

Skin lesions	Boys	Girls	Total
Absent	227 (55.1%)	185 (44.9%)	412 (100%)
present	39 (57.3%)	29 (42.6%)	68 (16.5%)

Table 2: Distribution of Prevalence of skin lesions in Anganwadis children based on category of skin lesions

Sl. No.	Category of skin diseases	Prevalence in boys	Prevalence in girls	Total Prevalence
1.	Infectious skin lesions	11 (52.4%)	10 (47.6%)	21 (30.1%)
2.	Non- Infectious lesions	22 (57.9%)	16 (42.1%)	38 (55.9%)
3.	Nutritional skin lesions	6 (66.7%)	3 (33.4%)	9 (13.2%)

Table 3: Distribution of Infectious skin lesions(Dermatitis) among Anganwadi children

Sl. No.	Infectious skin lesions	Prevalence in Boys	Prevalence in Girls	Total
1.	Pediculosis Capitis	6 (54.5%)	5 (45.4%)	11 (52.3%)
2.	Scabies	1 (33.4%)	2 (66.7%)	3 (15%)
3.	Impetigo	3 (75%)	1 (25%)	4 (19.0%)
4.	Furncle	2 (66.7%)	1 (33.4%)	3 (14.3%)
5.	Chicken pox	0	0	0

Table 4: Distribution of Non-Infectious skin lesions(Dermatitis) among anganwadi children

Sl. No.	Non –infectious skin lesions	Prevalence in Boys	Prevalence in Girls	Total
1.	Pityriasis Alba	15 (60.0%)	10 (40.0%)	25 (65.8%)
2.	Allergic contact dermatitis	1 (33.4%)	2 (66.7%)	3 (7.9%)
3.	Atopic dermatiits	1 (100%)	0	1 (3%)
4.	Miliaria Rubra	4 (57.1%)	3 (42.9%)	7 (18.4%)
5.	Post inflammatory Pigmentation/scars	1 (50.0%0	1 (50.0%)	2 (5.3%)

Table 5: Distribution of Nutritional skin lesions(Dermatitis) among Anganwadi children

Sl. No.	Nutritional skin lesions	Prevalence in Boys	Prevalence in Girls	Total
1.	Xerosis	1 (100%)	0	1 (11.25%)
2.	Phrnoderma	3 (60.0%)	2 (40.0%)	5 (55.5%)
3.	Angular Chelitis	2 (66.7%)	1 (33.4%)	3 (33.4%)

DISCUSSION

Dermatological problems, especially infectious dermatoses, affect a high proportion of school children in developing countries like India. Skin disorders in children may result in considerable discomfort, parental anxiety, and embarrassment to the child and unnecessary absence from school and work. This, in turn, leads to loss of confidence and disruption of social relations, feeling of stigmatization, and major changes in lifestyle.

Dermato-epidemiological data from population-based studies are important in planning public health strategies intended to control skin diseases. Information on the epidemiological characteristics and economic constraints in a particular area is required to formulate standardized recommendations for treating the common skin diseases prevalent there.¹¹

We have compared our study with other studies done by Dogra and Kumar,¹² Rao *et al.*,¹³ and Valia *et al.*,¹⁴ In our study, skin disorders were found in 68.2% which is comparable to Rao *et al.* (76.65%) and Valia *et al.* (53.6%). However, in Dogra and Kumar and Sharma *et al.*'s¹² study, the prevalence of dermatoses was 38.80% and 14.30% which is less when compared to our study. This might be because of rural area and low socioeconomic status of the population in our area. In our study, infectious dermatoses were present in 50.73% which is comparable to Koley SK *et al.*¹⁵ (50.69%) and Valia *et al.*¹⁴ (43%). Noninfectious dermatoses were present in 37.10% in our study while it was 31.6% in Koley SK 's study. In our study, nutritional deficiency dermatoses were present in 9(13.2 %) which is less when compared to Rao's study (6.71%).

The infants are mostly confined to their household, while preschool children aged one to five years are exposed to their neighborhood. Thus, childhood age may be considered as a surrogate marker for environmental risks.¹⁶

Pattern of dermatological disorders has varied in different studies. 38(55.9%) were non infectious which include Pityriasis Alba 25(65.8%) with male preponderance. Our study is consistent with study done by Saya et al.⁵

Of the infective dermatoses, bacterial infections 21(30.1%) were the most common followed by fungal 38(55.9%). Similar pattern has been observed in some other studies as well.^{2,9,16,21} In a study by Wenk and Itin *et al.*,¹⁸ and Gul *et al.*,²⁰ The variation among infective dermatoses can possibly be attributed to the region of study, prevalent environmental factors, type of population studied, and hygiene and nutritional status. Most studies^{12,17} report impetigo as the commonest bacterial infection. Molluscum contagiosum, was the commonest viral infection followed by warts. Pityriasis capitis was the most frequent fungal infection seen in majority of cases followed by Miliaria rubra (7; 10.45%) and post inflammatory scar (1; 10.45%). This is in accordance with other studies [13,16] in which Pityriasis capitis was the most common.

Pityriasis alba (29; 8.10%), a finding similar to other studies.¹⁸⁻²⁰ However, Hayden³ documented. The incidence of eczemas' primarily depends upon genetic constitution, individual predisposition, and environmental threats/allergens. Papular urticaria was the commonest hypersensitivity disorder (62; 59.05%) followed by urticaria (34; 32.38%). Sayal *et al.*,⁹

The prevalence of certain dermatoses may be influenced by seasonal and climatic changes. This was quite evident in our study in which atopic dermatitis and seborrhoeic dermatitis were not noted since they are predominantly occur in winters while papular urticaria was seen more frequently in rainy season. Banerjee *et al.*,¹⁹ studied seasonal variations in pediatric dermatoses and found scabies and seborrhoeic dermatitis to be more prevalent during winter, while impetigo, furunculosis, and miliaria during summer and rainy seasons. Almost a similar observation was documented in our study also.

This study provides a preliminary baseline data for future epidemiological and clinical research. It might also help to assess the need for health education of children and mothers regarding hygienic practices.

CONCLUSION

The overall prevalence of dermatoses in the Anganwadi children in our study is 68.2% which is because of rural area and low socioeconomic status of the population in our area. Infectious dermatoses were seen in 30.1% of students, noninfectious dermatoses were seen in 55.9% of students, and nutritional deficiency dermatoses in 13.2% of students. The top three conditions, i.e., Pityriasis Alba (21%), Pediculosis capitis (11%), and bacterial infections (30.1%), contributed the total burden 16.5% of skin diseases. Thus, simple approaches on promoting hygiene, sanitation, improving awareness regarding dermatoses, and provision of commonly required drugs at the Anganwadi may bring down the burden of skin diseases drastically.

The prevalence of skin disorders was 16.5% among the children in the study area. a reflection of. Skin diseases, especially infestations, are not given due attention. Similar population-based studies are required to estimate the burden of skin disorders and formulate appropriate strategies to prevent and treat them. Regular community-based studies are necessary to trace community changes, assess the influence of healthcare services, and follow up trends in pediatric dermatoses.

Regular examination of children by experienced doctors with the help of anganwadi staff will help in reducing the prevalence of skin disorders in children and society. Health education and good personal hygiene will definitely help improve the health status of school children. Even though most of the dermatoses were asymptomatic, routine screening and school survey should be carried out every year for the early diagnosis and treatment of communicable and nutritional diseases. Because India is a developing country, it still shows a relatively high prevalence of infections as a result of relatively low standards of hygiene, as well as ignorance, poverty, and overcrowding. We would like to highlight the fact that many of these dermatoses can be controlled by proper sanitation, improving nutrition and environm

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REFERENCES

1. Kandhari S. Ecology of skin diseases in India. In: Valia RG, Valia VR, editors. IADVLT Textbook of Dermatology. 3rd ed. Mumbai India: Bhalani Publishing House; 2008. pp. 1–6.
2. Sharma NK, Garg BK, Goel M. Pattern of skin diseases in urban school children. *Indian J Dermatol Venereol Leprol.* 1986;52:330–1.
3. Hayden GF. Skin diseases encountered in a pediatric clinic. *Am J Dis Child.* 1985;139:36–8. [[PubMed](#)]
4. Gupta P, Sarkar R. Common skin disorders and leprosy. In: Ghai OP, Gupta P, Paul VK, editors. *Ghai Essential Pediatrics.* 6th ed. New Delhi: CBS Publishers and Distributors; 2004. pp. 627–63.
5. Schachner LA, Hansen RG. Preface. In: Schachner LA, Hansen RG, editors. *Pediatric dermatology.* 2nd ed. New York: Churchill Livingstone; 1995. p. 9.
6. Gram YC. Skin diseases in children in Singapore. *Ann Acad Med Singapore.* 1988;17:569–72. [[PubMed](#)]
7. Porter MJ, Mack RW, Chaudhary MA. Pediatric skin disease in Pakistan: A study of three Punjab villages. *Int J Dermatol.* 1984;23:613–7. [[PubMed](#)]
8. Karthikeyan K, Thappa DM, Jeevankumar B. Pattern of pediatric dermatoses in a referral centre in South India. *Indian Pediatr.* 2004;41:373–7. [[PubMed](#)]
9. Sayal SK, Bal AS, Gupta CM. Pattern of skin diseases in pediatric age group and adolescents. *Indian J Dermatol Venereol Leprol.* 1998;64:117–9. [[PubMed](#)]
10. Javed M, Jairamani C. Pediatric dermatology: An audit at Hamdard University Hospital, Karachi. *J Pak Assoc Dermatol.* 2006;16:93–6.
11. Goly Jose, Seethalakshmi Ganga Vellaisamy. *Indian Journal of Paediatric Dermatology: Prevalence of common dermatoses in school children of rural areas of Salem a Region of south India.* 2017;18(3):202-208
12. Dogra S, Kumar B. Epidemiology of skin diseases in school children: A study from Northern India. *Pediatr Dermatol* 2003;20:470-3.
13. Rao GS, Kumar P, Kuruvilla M. Prevalence of various dermatoses in school children. *Indian J Dermatol Venereol Leprol* 1999;65:126-7.
14. Valia RA, Pandey SS, Kaur P, Singh G. Prevalence of skin diseases in Varanasi school children. *Indian J Dermatol Venereol Leprol* 1991;57:141-3
15. Koley SK, Sen MK, Sengupta SN. Incidence of skin diseases in children in the district of Bankura. *Indian J Pediatr.* 1975;42:106–9. [[PubMed](#)]
16. Ghosh SK, Saha DK, Roy AK. A clinico-aetiological study of dermatoses in paediatric age group. *Indian J Dermatol.* 1995;40:29–31.
17. Sardana K, Mahajan S, Sarkar R, Mendiratta V, Bhushan P, Koranne RV, et al. The spectrum of skin disease among Indian children. *Pediatr Dermatol.* 2009;26:6–13. [[PubMed](#)]
18. Nanda A, Hasawi FA, Alsaleh QA. A prospective survey of pediatric dermatology clinic patients in Kuwait: An analysis of 10,000 cases. *Pediatr Dermatol.* 1999;16:6–11. [[PubMed](#)]
19. Banerjee S, Gangopadhyay DN, Jana S, Mitra C. Seasonal variations in pediatric dermatoses. *Indian J Dermatol.* 2010;55:44–6. [[PMC free article](#)] [[PubMed](#)]
20. Umar Yaseen, Iffat Hassan .Prevalence of various skin disorders in school going children of Kashmir valley of North India : A Cross Sectional study. *Paediatric Dermatology.*2013;14(3):67-72

Clinical Spectrum of HIV Infection in Children

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ABSTRACT

Objective: Present descriptive prospective study was undertaken to know the clinical spectrum of HIV infection in children.

Method: 72 children from 2 months to 10 years presenting for confirmation of diagnosis of HIV infection were evaluated. HIV infection was confirmed by serological tests. Children were categorized as per CDC clinical classification of pediatric HIV.

Results: Majority of children were between 18 months to 5 Years .Predominant mode of transmission was vertical transmission. Only 4 children were asymptomatic. 37(51.4 %) children had category C symptoms. Bacterial infections were more common than opportunistic infections.

Conclusion: Initial manifestations of HIV infection are nonspecific and overlap symptoms of other common illnesses. Thus high index of clinical suspicion is necessary to diagnose HIV infection in children.

Keywords: children, clinical spectrum, HIV infection

INTRODUCTION

HIV/AIDS is a global epidemic. In underdeveloped countries, that are yet to conquer malnutrition, diarrhea, infections, AIDS has been added to the list of most threatening killer diseases.

In India, ever since the diagnosis of first case of HIV infection in 1986, the problem had grown at an exponential rate and accounted for 65% of that of South - East Asia HIV burden in 2001-2003¹. Since then adult HIV prevalence at National level has shown a steady decline with adult HIV prevalence in India being 0. 26 %.(0.30% in males and 0.22% in females) in 2015¹.

The epidemiological profile of HIV/AIDS in children in our country has not been well defined. Children (<15 years) account for 6.54% of total HIV infections¹. As women account for 40.5% of total HIV infections with HIV prevalence of 0.29% in antenatal mothers¹, the number of children born infected with HIV is more.

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Vertical transmission is the most common means of transmission and accounts for over 85% of pediatric infections¹. The clinical manifestations are nonspecific due to the overlapping of symptoms with other common illnesses and clinical manifestations of HIV infection in Children are different from those in adults.

The present descriptive prospective study was undertaken to study the clinical spectrum of HIV infection in children.

MATERIALS AND METHOD

All children from 2 months to 10 years with diagnosis of HIV infection were evaluated.

Children < 18 months who were symptomatic and HIV positive by serology with positive HIV serology in parents were included in the study. In < 18 months, HIV infection could not be confirmed by PCR in all babies. As per revised CDC guidelines², children <18 months, whose illness meets clinical criteria for the AIDS case definition but does not meet laboratory criteria for definitive or presumptive HIV infection are still categorized as HIV infected when the mother has laboratory-confirmed HIV infection².

All children had a detailed history and clinical examination performed at first visit. The diagnosis was confirmed by serological test (ELISA REACTIVE or Reactive in all the three test - First test (COMB AIDS) Second Test (CAPILLARY) Third Test (TRIDOT)) done at Integrated counselling and testing centre, JSS Hospital, Mysore.

Indications for serological testing were:

- (i) Symptoms and signs suggestive of HIV infection
- (ii) Parents having positive HIV ELISA.
- (iii) As a part of preoperative screening

HIV infection was defined using the revised CDC surveillance case definition for HIV infection². Children were categorized into clinical categories as per revised CDC classification(1994) of pediatric HIV³.

Microbiologic confirmation of diagnosis of Tuberculosis and Pneumocystis Carini Pneumonia was not always possible, so guidelines from 1983 CDC surveillance case definition⁴ were used.

Tuberculosis was diagnosed on basis of chronic cough / fever, failure to thrive, persisting radiographic findings despite adequate antibiotic treatment and clinical and radiological improvement with ATT.

PCP was diagnosed based on findings of persistent cough and /or tachypnea with minimal findings on auscultation, hypoxemia on pulse oximetry or ABG monitoring, increased serum LDH, presence of diffuse infiltrates on chest radiographs and response to cotrimoxazole.

LIP was diagnosed on the basis of chronic cough and presence of reticulonodular opacities on Chest X-ray with / without Hilar lymphadenopathy persistent for > 2 months and unresponsive to antimicrobials or ATT.

Recurrent RTI was defined as 2 episodes of infection in 1 year or 3 episodes over any period of time. Persistent RTI was defined as persistence of radiographic abnormalities for more than 3 months.

Coexisting infections were managed accordingly. All children who were HIV positive were started on PCP prophylaxis.

A descriptive analysis was performed to outline the various clinical manifestations in these children. All these children being followed up regularly for further evaluation.

RESULTS AND OBSERVATIONS

17(23.6 %) children were < 18 months, 33 (45.8%) were between 18 months to 5 yrs and 22(30.6%) were between 5 and 10 years. 43 (%) were male and 29 (%) were female children. (TABLE I)

In this study, HIV status during pregnancy was not known in 46 (59.7%) mothers, 14 (19.4%) mothers were HIV positive and only two were HIV negative, according to antenatal records available(TABLE II).

In this study only 2 children were born by LSCS and all others were delivered normal vaginally. All the babies were exclusively breastfed except one baby which was formula fed..

In this study, HIV status of parents was not known in 9(12.5%) cases. In 47(65.2%) cases, both parents were positive. In only one case, both parents were negative. In this child there was no prior history of blood transfusion also. With prior history of hospitalization and injection, the mode of transmission was deduced to be parenteral. The mother was reactive and HIV status of father was not determined in 14cases (19.4%) and in one case mother was reactive but father was negative (TABLE II)

The most common means of transmission was vertical, as in 62(86.1%) cases mother was HIV reactive.

Only 8(11.1%) children were asymptomatic, 64(88.9%) children were symptomatic of which 24(33.3%) children had category 'B' symptoms and 37(51.4%) children had category C symptoms (TABLE III).

Clinical features of HIV infected children are enumerated in TABLE IV. Of the 29(40.3%) children diagnosed to have TB, 20(27.8) had pulmonary, 6 had disseminated tuberculosis, 1 miliary, 1 TB abdomen, 1 CNS tuberculoma. History of contact with TB was present in 16(22.2%) cases. Mantoux test was positive in 9 (12.5%) cases.

Of the 12(16.7%) children with evidence of encephalopathy, only 1 child had progressive encephalopathy and 11 had static encephalopathy with delayed milestones and microcephaly.

Bronchiectasis was seen in 4(5.5%) children. Clubbing was noted in 9(12.5%) children with underlying pulmonary TB or recurrent RTI or Bronchiectasis. 4(5.5%) children had vitamin A deficiency and one child had nutritional rickets.

Median duration of follow up was 24 months. 58(80.5%) children are still on regular follow up. Only one infant expired who was diagnosed to have PCP. 13(18.05%) children were lost to follow up at Varying periods.

Table I: Age & Sex Distribution of HIV Infected Children

AGE \ SEX	MALE	FEMALE	TOTAL
< 18 mnths	8	9	17 (23.6)
18 mnths – 5 yrs	20	13	33 (45.8)
> 5 yrs – 10 yrs	15	7	22 (30.6)
Total	43 (59.7)	29 (40.3)	72 (100)

Figures In Paranthesis Indicate Percentages

Table II: HIV Status of Parents

Age \ HIV Status	Both +ve	Both – ve	Mother +ve Father – ve	Mother +ve Father not known	Both not known	Total
< 18 mnths	11	0	0	6	0	17
18 mnths – 5 yrs	26	0	1	2	4	33
> 5 yrs – 10 yrs	10	1	0	6	5	22
Total	47(65.3)	1(1.4)	1(1.4)	14(19.4)	9(12.5)	72 (100)

Figures In Paranthesis Indicate Percentages

Table III: Clinical Categorisation Based on Revised Cdc Classification

AGE \ Clinical Category	< 18 mnths	18 mnths – 5yrs	> 5 yrs – 10 yrs	Total
N	-	3	1	4(5.6)
A	1	4	2	7(9.7)
B	7	11	6	24(33.3)
C	9	15	13	37(51.4)
Total	17	33	22	72 (100)

Figures In Paranthesis Indicate Percentages

Table IV: Clinical Features of HIV Infected Children

Category A Symptoms	No (%)
Hepatosplenomegaly	43 (59.7)
Generalised Lymphadenopathy	27 (37.5)
Recurrent/Persistent RTI	18 (25)
Skin Manifestations	
1. Papular urticaria	20 (27.8)
2. Pyoderma	10 (13.9)
3. Seborrheic dermatitis	2 (2.8)

Conted...

4. Tinea infection	3 ((4.2)
5. Scabies	1 (1.4)
Hepatomegaly	4 (5.5)
Recurrent parotitis	5 (6.9)
Recurrent CSOM	17 (23.6)
Category B Symptoms	
Anemia	38 (52.8)
Thrombocytopenia	2 (2.8)
Pneumonia	17 (23.6)

Conted...

Oropharyngeal candidiasis	14 (19.4)
Cardiomyopathy	1 (1.4)
Persistent/recurrent diarrhea	11 (15.3)
HSV stomatitis	1 (1.4)
Herpes zoster	1 (1.4)
LIP	6 (8.3)
Persistent fever (> 1months)	21 (29.2)
Pulmonary TB	20 (27.8)
TB Abdomen	1 (1.4)
CNS Tuberculosis (Tuberculoma)	1 (1.4)
Molluscum Contagiosum	1 (1.4)
Category 'C' Symptoms	
FTT	37 (51.4)
HIV Encephalopathy	1 (1.4)
1. Progressive	
2. Delayed milestones	4 (5.5)
3. Microcephaly	7 (9.7)
PCP	1 (1.4)
Cryptococcal meningitis	1 (1.4)
Disseminated TB	6 (8.3)
Miliary TB	1 (1.4)

DISCUSSION

The clinical manifestations of HIV infection in children are different from those in adults in concordance with other studies⁵. Vertical transmission is the predominant route of transmission in concordance with other studies⁵. Significant proportion of patients presented in infancy had severe disease^{6,7}.

Tuberculosis is a major infectious complication of HIV infection in the developing countries^{5,6,8}, as was also seen in the present study

Bacterial infections are common opportunistic infection and is an AIDS defining condition in children. Bacterial pneumonia occurred more frequently than PCP and LIP. This reflects the importance of bacterial infection in developing countries and limited diagnostic facilities for diagnosing PCP and LIP.

The high incidence of encephalopathy¹⁰ highlights the need for developmental and neurological assessment of HIV infected child at each visit.

Initial manifestations are nonspecific and overlap symptoms of other common illnesses⁵. Thus high index of clinical suspicion is necessary in diagnosing HIV infection.

In this study, perinatal transmission is a major route of acquiring pediatric HIV infection hence emphasis must be laid on identification and treatment of seropositive mothers to prevent or reduce transmission. In addition to antiretroviral therapy, prompt diagnosis and treatment of bacterial infection and PCP prophylaxis may be the keys to prolonging life and ensuring optimal health in children with HIV infection.

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REFERENCES

1. Department of AIDS Control, Ministry of Family Welfare, Government of India. Annual Report 2016-2017 Available from: [http://naco.gov.in/Annual Report 2016-17.pdf](http://naco.gov.in/Annual%20Report%202016-17.pdf). Accessed on 18.10.2017
2. Schneider E, Whitmore S, Glynn KM, Dominguez K, Mitsch A, McKenna MT, Centers for Disease Control and Prevention (CDC). Revised surveillance case definitions for HIV infection among adults, adolescents, and children aged <18 months and for HIV infection and AIDS among children aged 18 months to <13 years--United States, 2008. *MMWR Recomm Rep.* 2008;57(RR-10):1.
3. CDC. 1994 Revised classification system for human immunodeficiency virus infection in children less than 13 years of age. *MMWR* 1994; 43(No. RR-12).
4. CDC. Centers for Disease Control. Revision of the case definition of acquired immunodeficiency syndrome for national reporting, United states. *MMWR* 1987, 36 (Suppl 15): 3-15. 1983
5. Dhurat R, Manglani M, Sharma R, Shah NK. Clinical spectrum of HIV infection. *2000*;37(8):831-6.
6. S.R. Daga, Bela Verma, D.V. Gosavi . **HIV Infection in Children: Indian Experience.** *Indian Pediatrics* 1999;36: 1250-1253

7. Tovo PA, De Martino M, Gabiano C, Cappello N, D'Elia R, Loy *et al.* Prognostic factors and survival in children with perinatal HIV-1. *Lancet* 1992; 339: 1249-1253.
8. Harries A, Maher D, Uplekar M, Raviglione M, Chaulet P, Nunn P, *et al.* HIV related Tuberculosis. *In: Tuberculosis: A Clinical Manual for South East Asia, 1st edn.* India, Jaypee Brothers, 1998; pp 91-95.
9. Gomber S, Kaushik Js, Chandra J, Anand R. Profile of HIV Infected Children from Delhi and Their Response to Antiretroviral Treatment. *INDIAN PEDIATRICS. VOLUME 48__ SEPTEMBER 17, 2011.*703-707.
10. European Collaborative Study. Neurological signs in young children with human immuno-deficiency virus infection. *Pediatric Infect Dis J* 1990; 9: 402-406

Compatibility of Sodium Fluoride Patch as an Innovation Model of Transferring Fluoride in Dental Care: A Quantitative Study Using in Vitro & in Vivo Rabbit Skin

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ABSTRACT

Background: Fluoride reduces dental caries by creating the fluor apatite which is more invulnerable to acid caries attack. However, the conventional fluoride found in toothpaste is seldom to reach the therapeutic achievement level when interacting with water during teeth brushing. As such fluoride in a systemic mode without passing metabolism with safe dose needs developing through transdermal drug delivery. This study aims to investigate the compatibility of *Sodium Fluoride* (Na F) patch as the transporter of fluoride to prevent caries attack besides the viability of macrophage cell and haemolytic acute to secure safety.

Method: This research applied experimental clinical laboratories with pre and post control group design. The sample of the acute haemolytic test was performed with a physiologic saline solution and oxalate blood. The sample of viability was the suspension of macrophage cell on a trifan blue solution. Furthermore, the irritation skin test was tested on five rabbits attached Na F patch on the left back side while the one as the control group was attached a patch without Na F on the right side.

Results: There were no differences of erythrocyte lysis and macrophage viable between the group of Na F patch and without Na F patch. Skin irritation test was shown on Mann Whitney result the significance of 0.317 indicating no differences of skin reaction between rabbit back which was applied with Na F patch and not attached.

Conclusions: Na F patch has excellent biocompatibility and safe to be used.

Keywords: Na F patch, biocompatibility, haemolytic, irritation, rabbits

INTRODUCTION

Caries is a disease that involves many factors including *Streptococcus Mutants* (SM) bacteria which if interacted with carbohydrate will cause pH to decrease in the oral environment and increase demineralization process. However, demineralization process will not cause caries if it is balanced with the higher remineralization process such as by adding fluoride ⁽¹⁾. Administration of fluoride in small doses and

administered over a lifetime as well as regularly is the most appropriate method for increasing tooth resistance against caries attacks ⁽²⁾. In this case, the use of fluoride toothpaste and adding fluoride to drinking water is the most appropriate method.

In Indonesia, the use of toothpaste reaches the public widely as almost all toothpaste on the market contains fluoride. The therapeutic dose of fluoride in saliva is 0.1 ppm⁽³⁾ but in every time of tooth brushing, fluoride absorbed in the saliva is only 0.02-0.04 ppm which is still lacking in the level of therapeutic achievement. The concentration of fluoride in toothpaste cannot be directly made to a higher dose (maximum 1500 ppm in 1 tube) due to the dangerous effect if fluoride is being ingested ⁽⁴⁾. Another method is water fluoridation where the fluoride is added to drinking water at a concentration

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of 0.7-1 ppm. This model has the advantage of being able to reach a broad layer of society and nature in its application. Many countries have already succeeded in implementation and continue up to this day⁽⁵⁾. However, success in some countries cannot be done in developing countries such as in Indonesia due to the high price and limited expertise⁽⁶⁾.

Due to the limitations of the fluoride supplying model above, it is necessary to consider a fluoride delivery method which can be continuously administered at low doses, safe, convenient and affordable. Current preparations, which may become an alternative is the supply in the form of TDD (transdermal drug delivery) which is the delivery through the skin in the shape of a gel, cream, and patch. The patch model has been widely used and proven effective such as nicotine, contraception, analgesic, and antibiotic patches⁽⁷⁾. However, a patch containing fluoride is still in an infant stage and should be developed as a new model in combatting carries.

Patch could penetrate the skin of a mouse and survive in the blood plasma and tooth denoting an excellent bioavailability⁽⁸⁾. Development of the physical form of the Na F patch has been performed and proved that the combination of PVP: PVA with the ratio 2: 1 is the best polymer based on its physical properties after storage⁽⁹⁾.

The development of fluoride patch as a new model that will have direct contact with the human body must go through a biocompatibility test. Biocompatibility is the suitability of an ingredient against living tissue when in contact with the material⁽¹⁰⁾. The patch application is started from the attachment to the skin; fluoride penetrates the skin layer, to the blood vessels, then to the bones and teeth. Based on the fluoride travel route, the biological evaluation must be conducted including irritation reaction and sensitivity to patch material, cytotoxicity test, and haemolysis test. The skin is often irritated because of the direct contact with the environment outside the body like the exposure to chemicals. Fluoride in the form of implants proved to be compatible with tissue based on cytotoxicity and haemolysis test⁽¹¹⁾ while its effect on fluoride patch has not been identified. This phenomenon underlies the researcher to examine the effect of Na F patch reaction to blood; viability and macrophage cell phagocytosis activity as well as in vivo application of Na F patch application to skin tissue.

MATERIAL AND METHOD

The research design was a quasi-experimental study with post-test only design in the non-equivalent group. Na F piece was made at Health Analyst Laboratory of Health Polytechnic of Semarang and biocompatibility test was conducted in the laboratory of experimental animal Gadjah Mada University Jogjakarta.

Population in acute haemolysis test (in vitro) was the solution of oxalic blood that was used to soak the Na F patch and taken as the sample was 10.2 ml physiological saline solution and blood oxalate. Population in cell viability test (in vitro) was a macrophage cell cultures treated with Na F patch, sample feasibility test in the form of macrophage cell suspension in blue trifu solution with 110- μ l volume and skin irritation population test of Na F patch application was five rabbits. Na F patch was attached to left side of the rabbit's back, and the patch did not contain Na F as the control was attached to the right side of the rabbit's back.

The procedure of making Na F patch and in vitro test was adopted by previous researchers^{(8),(9),(11)}. Test of rabbit skin tissue response was conducted by firstly adapting the rabbit for a week. Rabbit's back was shaved with an electric shaver on the left and right side. Treatment and control group were five rabbits patched with Na F patch on left back (treatment), and right patched of non-Na F (control group). The patch was changed every three days. Skin tissue observation was conducted on day 1 and 14 to see an inflammatory reaction. Categories of erythema incidence (state of skin redness tissue) were categorized into 0) no reaction; 1) mild erythema; 3) moderate erythema; 4) severe erythema.

To determine the effect of fluoride patch in the blood, One Way ANOVA was employed. To investigate the effect of Na F patch on the viability of macrophage cells the independent t test was used and to determine the effect of Na F patch towards response of the skin tissue, Mann Whitney test was conducted.

RESULTS AND DISCUSSIONS

The differences of the physical appearance of a surface containing Na F patch and the one does not contain Na F is observable as shown in Figure 1. On the skin containing Na F patch is seen coarse grains of Na F powder as the patch is physically easy to be stuck on the skin surface. The optimal Na F patch is a patch of 750 ppm concentration based on research before⁽⁹⁾.

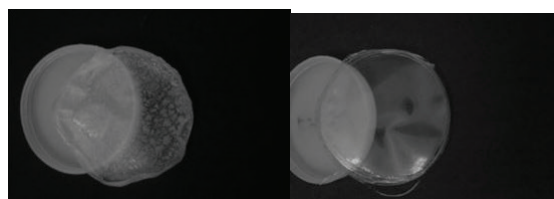


Figure 1: The different surface between Na F and no Na F Patches

Acute haemolysis test was one of toxicity test aiming to identify the tissue response up to cellular level toward the exposure to an organism or unidentified object, in this case, Na F patch exposure to the blood. Fluoride would absorb into the skin tissue and penetrate the blood vessels. A blood erythrocyte fit test towards fluoride exposure was used to examine the erythrocytes lysis after exposure to fluoride. This study found there was no difference in erythrocytes lysis between red blood cells given Na F patch and the one without Na F patch. This phenomenon proves that fluoride is compatible with erythrocytes (blood vessels). These results were consistent with the research which found suitability in fluoride implant to the blood⁽¹¹⁾.

The percentage of lysis erythrocyte cells after being exposed to Na F patch and non-Na F patch is observable on Table 1. The independent t test results indicated no significant result was showing that there was no difference in the percentage of erythrocyte lysis of blood between the one given Na F patch and the one not provided.

Table 1: Percentage of lysis erythrocyte cells after being exposed to Na F and non-Na F patch

Sample	Percentage of lysis erythrocyte cells		Significance
	Na F Patch	Non-Na F Patch	
1.	3.023%	2.532%	0.285
2.	3.398%	1.92%	
3.	2.502%	2.98%	
Mean	2.97%	2.48%	

Haemolysis is the breaking up of the erythrocyte membrane so that haemoglobin is released into the surrounding medium (plasma). The damage to the erythrocyte membrane may be caused by the addition of hypotonic or hypertonic solutions into the blood,

decreased surface pressure of the erythrocyte membrane, certain substances/chemicals, heating or cooling, and brittle due to age in the blood circulation. If the medium around the erythrocytes becomes hypotonic (due to the addition of a hypotonic Na Cl solution), the medium (plasma and solution) gets into the erythrocytes through a semi permeal membrane and causes the erythrocyte cell to swell. If the layer is not strong enough to withstand the pressure inside the erythrocytes itself, the cell will break apart; consequently, haemoglobin will be released in the surrounding medium.

Macrophage cells planted in sterile tubes that have been mixed with slices of Na F patch and no- Na F patch were counted after incubation for 24 and 48 hours. Data on the viability of macrophage cells in the group given Na F and not given Na F plaster were presented in Table 2.

Table 2: Mean of viable macrophage cells between Na F patch and non-Na F patch

	Na F patch	Non-Na F patch	Independent t test significance
Viable cell amount	16	8	0.865
	6	12	
	6	10	
	9.3	10	

Macrophages were derived from monocytes present in the blood circulation which become mature and differentiated and then migrate to the tissues. Macrophages can be found in large numbers, especially in the connective layer, such as those linked to the gastrointestinal tract, in the lungs (in body fluids and alveoli). They are also found along certain blood vessels in the liver such as Kupffer cells, and to the entire spleen where the damaged blood cells are recycled out of the body.

Macrophages can migrate out of the vascular system by traversing the cell membrane from the capillary vessels and entering the area between the cells being targeted by the pathogen. Neutrophils are the most efficient phagocytes followed by macrophages and can digest significant amounts of bacteria or other cells. Binding of bacterial molecules to macrophage surface receptors triggers the process of swallowing and destruction of bacteria through “respiratory attacks,” leading to the release of reactive oxygen species (ROS). Pathogens also stimulate macrophages to produce chemokine, which calls other phagocyte cells around the infected

region. In addition to acting as phagocytes, macrophages can also serve as antigen-presenting cells (APC). The role of macrophages as APC appears in effector function but is less significant in lymphocyte activation.

The response test of skin tissue using rabbit is due to the surface of rabbit's skin most closely look like the human skin. The number of rabbits taken was five. After the rabbit was well adapted to the environment, the fur was shaved in left and right side surfaces with a diameter of approximately 5 cm. The response of rabbit skin surface tissue after application of Na F plaster and controlled plaster is displayed in Table 3.

Table 3: Rabbit skin surface tissue response after Na F patch and control applied

Rabbit's Number	Rabbit's back tissue response after Na F patch applied	Rabbit's back tissue response after non-Na F patch applied
1.	0 (no reaction)	0 (no reaction)
2.	0 (no reaction)	0 (no reaction)
3.	0 (no reaction)	0 (no reaction)
4.	1 (mild erythema)	0 (no reaction)
5.	0 (no reaction)	0 (no reaction)

Upon experiment, the surface of rabbit skin on one rabbit had mild erythema characterized by a slightly reddish rabbit skin surface whereas other rabbit skin surfaces were under normal conditions.

The significance value of Mann Whitney test was 0.317 confirming there was no difference in surface tissue response of rabbit skin after application of Na F patch and no- Na F piece.

Skin irritation are symptoms of inflammation that occurs in the skin or mucous membranes immediately after prolonged or repeated treatment with chemicals or other materials. Skin irritation caused by a substance can take place in any person resulting from several factors such as the surface state of the skin, the duration of the material in contact with the skin, and the concentration of the material used. Some common symptoms that can occur in the event of irritation are caused by dilation of blood vessels in the affected area indicated with the emergence of redness in the skin area (erythema)⁽¹²⁾. In this study, the state of irritation does not occur, due to levels of fluoride within the safe boundary that contact with the skin surface.

CONCLUSION

Upon completion the testing on rabbits revealed no difference in some blood erythrocytes, the number of viable macrophage cells and rabbit skin surface before and after plastering of Na F and no Na F patch for 14 days. These initial results indicated the feasibility of further testing on the human to use the model as a new means of transporting the fluoride in dental care.

Conflict of Interest: The authors have no conflict of interests related to the performing and reporting of this research.

Source of Funding: Source of the fund for this project was by Ministry of Health, Indonesia.

Ethical Clearance: Before conduct of the study written permission was obtained from Health Polytechnic Ministry of Health, Semarang, Indonesia.

REFERENCES

1. Ensanya Ali Abov Nell, Anas Aljabo, Adam strange, Salwa Ibrahim, Melanie Coathup, Anne M Young, Laurent Bozec, Vivek Mudera, 2016, Demineralization-remineralization dynamic in teeth and bone, International J Nanomedicine, 11, 4743-63.
2. Featherstone JDB, 2000, The Science and practice of caries prevention. Journal of American Dental Association 131: 887 – 899.
3. Ellwood R, Fejerskov O, Cury JA, Clarkson B, 2008, Fluoride in caries control. In : Dental Caries : the disease and its clinical management. Fejerskov O, Kidd E, editors. Blackwell Munksgaard, 287-323.
4. WHO, 2008, Water fluoridation statistics for 2006, Division of Oral Health, National Centre for Chronic Disease Prevention and Health Promotion, CDC <http://cdc.gov/fluoridation/statistics/2006stats.htm>
5. Ekstrand J, 2000, Fluoride in plaque fluid and saliva after NaF or MFP rinses. European J Oral Science 105 (5) : 478-84.
6. Fatmasari D, 2002, Investigation of Water Fluoridation in the Area of Semarang, Central Java, Indonesia, Master Thesis, University of Melbourne Australia Available Online at

- https://blogs.unimelb.edu.au/indonesiaforum/files/2014/03/theses_1954_20061-110266f.pdf
7. Scheindlin S, 2004, Transdermal Drug delivery: past, present, future, Reflections 4(6).
 8. Fatmasari, D., Prahasto, I.W., Nugroho, A.K. and Widjijono. 2005, NaF formulation and transport test to determine fluoride diffusion via mouse as membrane (transdermal in vitro test), International Journal of Science and Research (IJSR), online ISSN: 2319-7064, <http://www.ijsr.net/archive/v4i6/SUB156045.pdf>
 9. Fatmasari D, Eko Ningtyas EA, Subekti A, 2015, Pengaruh Variasi Berat Polimer dan Obat terhadap sifat Fisik *Patch* Natrium Fluorida, Research unpublished.
 10. Anusavice KJ, 2013, Phillips Buku Ajar Ilmu Bahan Kedokteran Gigi, Ed 11, Alih bahasa Johan Arif Budiman, Jakarta, EGC.
 11. Widjijono, 2010, The effect of monofluorophosphate implant in white rat mothers towards the level of fluor in the incisor of their young babies, Dental Journal Majalah Kedokteran Gigi, 43 (2): 72-75
 12. Irsan., Manggau, A.M., Pakki, E. dan Usmar, 2013, Uji Iritasi Krim Antioksidan Ekstrak Biji Lengkeng (*Euphoria Longuna Stend*) Pada Kulit Kelinci (*Oryctolagus Cuniculus*). Majalah Farmasi dan Farmakologi. Vol.17 (2), pp 55 <http://www.e-jurnal.com/2015/05/uji-iritasi-krim-antioksidan-ekstrak.html>

Spatial Distribution Characteristics and Differences Larva Habitat *An. Barbirostris* and *An. Subpictus* in the District Bulukumba

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ABSTRACT

Bulukumba is one area where malaria is endemic in South Sulawesi with cases of malaria reported each year where *An.barbirostris* and *An. subpictus* as a potential vector of malaria in the area. This study aimed to analyze the differences in the characteristics of larval habitats *An. barbirostris* and *An. subpictus* as well as analyze and determine the spatial distribution of larvae of *Anopheles* in Bulukumba. The method used was observational using ecological survey design with a *cross sectional* approach using environmental samples larval habitats of *Anopheles*. Data were analyzed with the application of *Statistical Product and Service Solutions* (SPSS) and Arc Gis 10.1. The result of the research shows that there are significant differences in physical environment, ie water flow ($p = 0,034$), biological environment ($p = 0,044$) and predator type ($p = 0,022$) and chemical environment salinity ($p = 0,011$). In addition, there are also statistically significant difference from the differences in the spatial distribution of habitats between *An. barbirostris* and *An. Subpictus*. Studies ecological characteristics and composition of the species of *Anopheles* are needed to plan for malaria control program

Keywords: *Spatial Distribution, Environmental characteristics, An barbirostris and An subpictus.*

INTRODUCTION

Malaria is one of the public health problems that can cause death, especially in high-risk groups. Besides direct malaria causes anemia and can reduce labor productivity.¹ Indonesia in 2012 had a *mortality rate* of malaria amounted to 3.8 per 100,000 population, the 2012 API of 1.69 and a 2013 API of 1.38.²

The Bulukumba Health Office records the number of malaria cases based on API values from 2009-2013. In 2009 the API in Bulukumba Regency amounted to 4.29, the year 2010 API value increased to 5.3, In 2011 the value of API decreased to 0.29, 2012 and 2013 the value of API decreased by 0.13. Impairment API due to *the global fund* programs in malaria control.³

Environmental factors have a very important role in acting as habitat *Anopheles health*. Research conducted by the Ahmad *et al* about mapping mosquito breeding sites in endemic areas shows that there are more than 80% of habitat *An. maculates* as vectors On a 100-400 m buffer.⁴

Research conducted by Asniar in 2012 about entomology confirmation of malaria cases in Bulukumba there are six species of *Anopheles* potential as vectors of transmission are: *An. Barbirostris*, *An. Vagus*, *An. Subpictus*, *An. Indefinitus*, *An. Hyrcanus* and *An. kochi*. Of the *Anopheles* mosquito species that has potential as a vector in on *An. barbirostris* and *An. subpictus* become the most potential as vector-borne malaria.⁵

Studies ecological characteristics and composition of the species of *Anopheles* are needed to plan for malaria control program. Research carried out by the Authority Flag Dewantara *et al* on Bio Ekologi mosquito *anopheles sundaicus* in Ciamis also be the basis for this study.^{6,7}

The purpose of this study was to analyze differences in habitat characteristics and spatial distribution of larvae of *An. barbirostris* and *An. subpictus* in Bulukumba.

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RESEARCH METHOD

Research design: The study design using the observational design with ecological study design with a *cross-sectional* approach that aims to determine the relationship between some of the variables in environmental samples such as larval habitats. As an information system used in this research is to create a picture of a map of the location and the type of habitat of various species of mosquito breeding habitats *An. barbirostris* and *An. subpictus*.

The population of all *Anopheles* mosquito breeding habitat in Bulukumba. While the sample is habitat for breeding of *Anopheles* mosquitoes in the area of data collection. The sampling method was done by *purposive sampling* that is by making the criteria for the selection of the sample. Sample criteria were Selected samples were all samples were found at the time of doing research that could be reached and can be done.

Research Instruments: The instrument used in this study is the observation sheet, survey equipment, and laboratory equipment in the form field detention, pipettes, containers larvae, larval net, gutters, digital altimeter, pH meter, label paper, food and equipment Larva writing.

Data Collection Method: A determination is done by scooping the body of water, where for the narrow body of water carried out as much as 10 times while for the water body wide is done more than 10 times. If the result of detention containing the larvae, the larvae were observed in the species (*Anopheles* or not). If the larvae position parallels to the surface of the water, then it is the *Anopheles larvae*. How to calculate larva density by formula

A breeding place to be a research sample is measured based on physical, biological and chemical variables that become research variables.

Processing and Analysis of data: Analysis of the observed data and entomological surveys conducted by univariate analysis in tables and charts with the narrative as an explanation, bivariate analysis conducted to determine differences characteristic *A larval habitats. Barbirostris* and *An. subpictus* in Bulukumba.

Distribution and Spatial analysis are done using *the overlay* method were then plotted with a map of the district and the Arc Gis buffer method to calculate the feature point at a certain radius.

RESULT

Spatial distribution of Anopheles larvae Habitat:

Figure 1 shows as many as 103 habitat points examined in the study area. The distribution of cases and various types of habitat types are seen within a 500-meter radius. Spatial analysis using *the buffer* cases the aim to describe the type of habitat either positive or negative within a radius of 500 meters from the house cases. The results of the buffer analysis show that the positive habitat in Bulukumpa and Bontobahari sub-districts are located at a radius of 500 meters so that there is a potential risk of transmission.

Figure 2 shows the distribution of the species *Anopheles* larvae in Bulukumba. Distribution of larvae found in habitats breeding as follows: in District Ale Rilau Bulukumpa and found the larvae *An. barbirostris*, *An. vagus*, *An. indefinite* and *An. Hyrcanus*, District Ujung Bulu found larvae of *An. barbirostris* and *An. subpictus* District Ujung Loe is found *An. Barbirostris*, *An. subpictus*, *An. vagus* and *An. indefinitus*, District Bontobahari finds, *An. subpictus* and *An. vagus*, District Bontotiro found *An. vagus* and *An. indefinitus*.

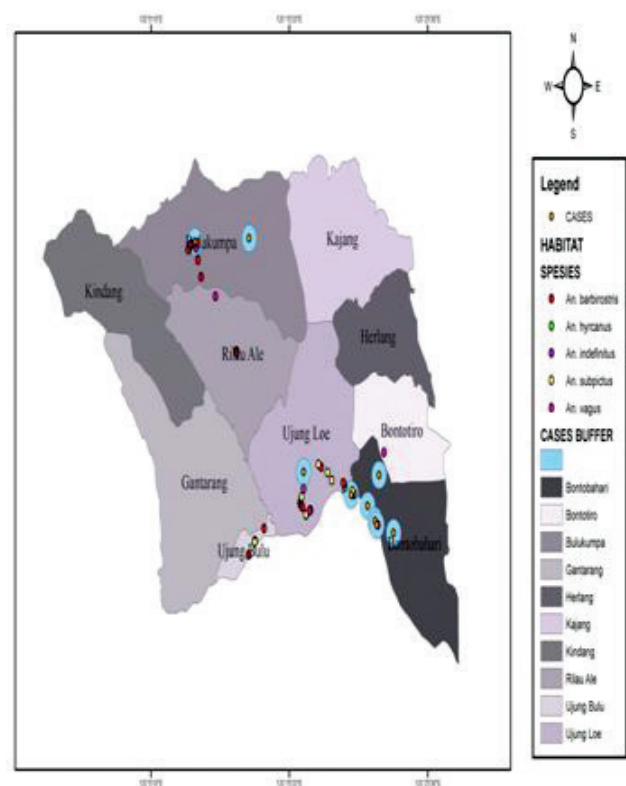


Figure 1: Map of Buffer Cases with Positive and Negative Habitats in Bulukumba District.

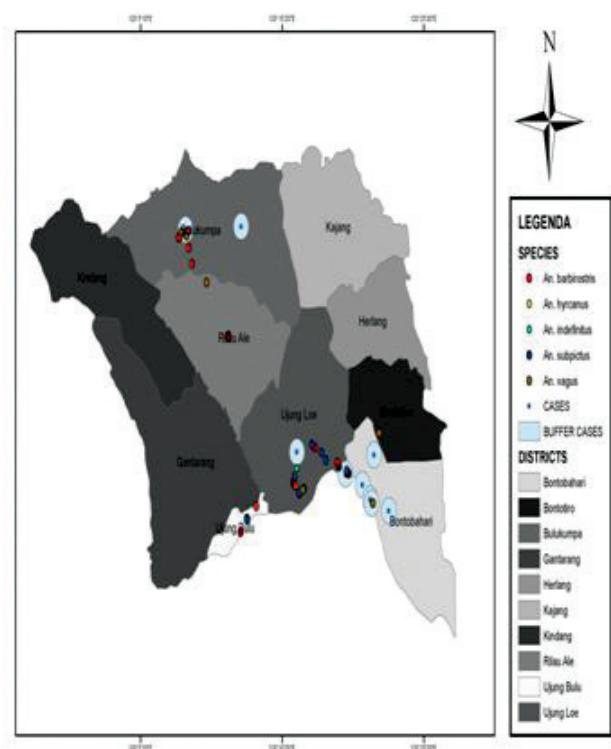


Figure 2 : Distribution of anopheles species in Bulukumba district

Differences Bivariate Analysis Environmental Characteristics *An. barbirostris* and *An. subpictus* in Bulukumba

Table 1: Differences in Environmental Characteristics Physical, Chemical and Biological *An. barbirostris* and *An. subpictus* in Bulukumba

Environment Characteristics	Variable	P-value
Physical environment	Habitat type	0.093
	Nature of habitat	0.677
	Water flow	0.034
	Water temperature	0.850
	Intensity of sunlight	0.712
	Depth	0.328
Environmental Biology	The existence of water plants	0.322
	Types of water plants	0.069
	Plants around	0.044
	Shade Plant	0.154
	Density of aquatic plants	0.315
	Predators	0.056
Chemical Environment	Type of predator	0.022
	Turbidity	0.591
	PH	0.285
	Salinity	0.011

Table 1 shows that for physical environmental factors, variable water flow has a significant characteristic differences between *An. barbirostris* and *An. subpictus* in Bulukumba. For biological environmental factors, variables surrounding plants and predators have a significant characteristic differences between *An. barbirostris* and *An. subpictus* and for chemical environmental factors, variable salinity water has a significant characteristic differences between *An. barbirostris* and *An. subpictus* in Bulukumba.

DISCUSSION

An. barbirostris spatial distribution shows that are found on the uplands and areas. The study found that the study habitat was focused within a 500-meter radius of the malaria case house with a considerably limited flight distance of the mosquitoes over a range of 400 meters. Positive habitat is within 500 meters. So there is a potential risk of transmission. This research is relevant to the research by Ahmad *et al.* ⁸ there are linkages between the distance from the housing case with breeding habitat. In the study that the highest density at a distance of 200 meters.

This study shows that *An. barbirostris* is a potential vector on Sulawesi Island. *An. barbirostris* commonly found in hilly areas and paddy fields in the district that are predominantly found Tanete, Rilau Ale, Ujung Bulu and Ujung Loe. This is relevant to the research conducted by Ndoen *et al.* ⁹, the results of these studies showed that *An. barbirostris* in Central Java were more common in the area in the highlands, while the Eastern region of the West, NTT is more commonly found in coastal areas.

An. subpictus significant found in the coastal areas in the District Bontobahari to habitat characteristics in the form of ponds and in the District of Ujung Loe is also available in the rice fields at an altitude of 8-100 m. It is relevant to research conducted by Ndoen that *An. subpictus* associated with lagoons, brackish water and mangrove forests that get direct sunlight. ⁹

While *An. subpictus* in Central Java found in hilly rice fields, whereas in the Eastern region of West predominantly found in coastal areas. This shows that the topography of the region stay has an influence on the spread of the species *Anopheles sp.* Topography has a strong influence on the presence of *Anopheles* where topography showed that *An. barbirostris* can be found on

all altitudes while *An. subpictus* predominantly found in coastal areas such as research that is done by Ndoen *et al* whereas *An. subpictus* at an altitude of 0-200 Meters.⁹

Different characteristics of the habitat for the physical environment variables *An. barbirostri* and *An. subpictus* in Bulukumba is water flow. For *An. barbirostri* dominant like water currents do not flow but in this study also found larvae of *An. barbirostri* who like are water at medium speed. But for *An. subpictus* all found in the current stagnant water. This water current is related to habitat type because of *An. barbrostris* commonly found in rice fields and habitat types on small river stream, while *An. subpictus* found in ponds and lagoon.

The water plant breeding habitat was instrumental to the presence of *Anopheles* larvae. This is because water plants can serve as a place of time mosquito on the water surface. Plants or vegetation found at the study site for *An. barbirostri* in research areas such as grass, rice, algae and water hyacinth. The presence of vegetation can cause an increase in larva density as it provides hiding and food spots so larva can survive. Rahman Shows that there is a relationship between the presence of vegetation and larva density. Plants such as moss, foliage, and mangrove trees affect the life of mosquito larvae. Can also be protective larval habitat or shade that is not exposed to direct sunlight which can cause an increase in water temperature as well as disturbance of predators that can reduce the population of mosquito larvae in breeding habitats.¹⁰

Plant or aquatic vegetation found in the larval breeding habitats *An. subpictus* form of moss and grass. The presence of vegetation or aquatic plants can increase the density of the larvae because the water vegetation becomes the hiding place of the larvae of the predator and protects the habitat from direct sunlight so as to lower the water temperature. This study is relevant to the research conducted by Hasanuddin which shows the relationship between the vegetation to increase the density of larvae of *Anopheles* Ishak and Indriani.¹¹ **Predators** are part of the variable *Anopheles* larvae predators. The dominant predators found in breeding habitat *An. barbirostri* animals such as snails and other aquatic animals were found in the rice fields, while *An. subpictus* predators found an unusual fauna found in ponds and typical of coastal areas such as fish and shrimp. This shows that this type of breeding sites of each species of *Anopheles* has a relationship with predatory larvae.

Water salinity contrast to *An. subpictus* where the average salinity of the breeding habitat of *An. barbirostri* 0%. **Salinity** at each larval breeding habitats *An. barbirostri* and *An. subpictus* vary. In the salinity pond found in the range of 0.05 0.8 which shows the habitat of brackishwater breeding species. As for *An. barbirostri* is found at high altitudes in salinity are at 0% while in the coastal areas in the District Ujung Bulu and Ujung Loe were found ranged from 0.02 to 0.28%, which is a type of freshwater and brackish water.

The condition shows that *An. subpictus* more tolerant to salt that can be found in the breeding habitats that have a fairl high salt content. In contrast to *An. barbirostri* that can be found in fresh water conditions but not very tolerant to high salinity.

Anopheles mosquito habitats that have low salinity levels, but some species of *Anopheles* as *An. subpictus* can live in areas with high salinity such as in ponds and coastal areas. This study is relevant to the research conducted by Soelamani *et al.*¹² that there is strong correlation between salinity density of *Anopheles* larvae. It is in line also with the research conducted by Mc Keonn *et al*¹³ that there is a positive correlation between salinity with an abundance of *Anopheles* larvae. It is also consistent with studies conducted by Mareta¹⁴ that different salinity levels on various types of breeding habitat affect the density of larvae of *An. subpictus*

The fundamental difference in Ujung Loe puskesmas area where *An. barbirostri* and *An. subpictus* can be found in the region. This is due to the geographical conditions Ujung Loe which vary during the perpetration of such research breeding habitats such as rice fields and ponds that were found in this area that shows larval breeding habitats *An. barbirostri* and *An. subpictus*.

The topography of the District Ujung Loe located in the lowlands aprovides information that *An. barbirostri* can also be found in low-lying areas as compared to *An. subpictus* that can only be found in low-lying areas, where *An. subpictus* not found in the sub-district and Rilau Bulukumpa Ale which is a plateau region. These results are relevant to the research ndoen *et al* and Stoops *et al*¹⁵ that there are differences between the characteristics of the habitat and *An. barbirostri* and *An. subpictus*

CONCLUSIONS

Conclusions from this research that *An. barbirostris* and *An. subpictus* different topography and habitat characteristics. *An* area's topography. *Barbirostris* located on the uplands and lowlands, while *An. subpictus* predominantly found in coastal areas. For habitat characteristics that the water flow, surrounding plants, types of predators and salinity differ significantly.

Conflict of Interest: None

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Ethical Clearance: The study was approved by the ethical committee of Hospital Dr. Moewardi Solo. All subjects were fully informed about the procedures and objectives of this study and each subject prior to the study signed an informed consent form.

REFERENCES

- Laihad, F. j., *Et al.* (2011). Malaria Epidemiology Bulletin in Indonesia. *Ministry of Health of the Republic of Indonesia*, 1-10.
- Ditjen PP and the PL. (2014). *Health Profile of the Republic of Indonesia*. Ministry of the Health Republic of Indonesia: Jakarta.
- District Health Office Bulukumba. (2015). *Malaria report*. Bulukumba.
- Ahmad, R., *et al.* (2010). Habitat Characterization And Mapping Of Anopheles Maculatus (Theobald) Mosquito Larvae In Malaria Endemic Areas In Kuala Lipis, Pahang, Malaysia. *SOUTHEAST ASIAN J TROP MED PUBLIC HEALTH*, 1-10.
- Asniar, A., *et al.* (2012). Confirmation of Entomology of Malaria Case in Ten Areas of Puskesmas In Bulukumba District. *repisitori Unhas*.
- Dhewantara, PW, *et al.* (2012). BIOECOLOGY STUDY OF Anopheles sunaicus IN SUKARESIK VILLAGE OF SIDAMULIH CIAMIS. *Loka Research P2B2 Ciamis*, 27-28.
- Kassiri, H., & Amani, H. (2012). Bionomics and Breeding Places of the Genus Anopheles (Diptera: Culicidae) in Mahroo and Sepid-Dasht Districts, Luristan Province, Western Iran. *zjmrs journaling*, 11-12.
- Ahmed, R., *et al.* (2011). Mapping Of Mosquito Breeding Sites In Malaria Endemic Areas In Pos Lenjang, Kuala Lipis, Pahang, Malaysia. *Malaria Journal*, 1-12.
- Ndoen, E., *et al.* (2010). Relationships between anopheline mosquitoes and topography in West Timor and Java, Indonesia. *Malaria Journal*, 4-9.
- Rahman, RR, *et al.* (2013). Relationship of Environmental Characteristics of Breeding Site with Anopheles Larvae Density In Working Area of Puskesmas Durikumba Kecamatan Karossa Kab. Mamuju Tengah. *repisitori Unhas*, 1-14.
- Ishak, H., & Indriani. (2014). *Ecological Characteristic Habitat And Distribution Anopheles Larvae Density In Selayar Island Indonesia*. Unpublished Thesis. Makassar: Postgraduate Program-UNHAS.
- Soleimani-Ahmadi, M., *et al.* (2013). Environmental characteristics of anopheline mosquito larval habitats in a malaria endemic area in Iran. *Asian Pacific Journal of Tropical Medicine (Elsevier)*, 512-514.
- McKeon, S. N., Schlichting, C. D., Povoia, M. M., & Conn, J. E. (2013). Ecological Suitability and Spatial Distribution of Five Anopheles Species in Amazonian Brazil. *Tropical Medicine*, 1079-1086.
- Mereta, ST, *et al.* (2013). Physico-chemical and biological characterization of anopheline mosquito larval habitats (Diptera: Culicidae): implications for malaria control. *Parasites & Vectors*, 1-16.
- Stoops, CA, *et al.* (2008). Environmental factors associated with spatial and temporal distribution of Anopheles (Diptera: Culicidae) larvae in Sukabumi, West Java, Indonesia *Journal of Medical Entomology*, 1.

Prevalence and Pattern of Anxiety and Depressive Disorders in Pregnant Women Attending Antenatal Clinic

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ABSTRACT

Introduction: Managing perinatal depression and anxiety is important for maternal, as well as infant, well-being. Persistent maternal stress, depression and anxiety can result in detrimental effects on infant development; both during pregnancy and postnatal. The aim was to study the prevalence, pattern of anxiety and depressive disorders in pregnant women attending antenatal clinic and the various socio-demographic factors, obstetric factors and other factors related to Anxiety and Depressive disorders in pregnant women.

Materials and Method: This was a cross-sectional study conducted at Antenatal clinic (ANC). Hospital Anxiety and Depression Scale (HADS) was used as screening tool. Those participants who scored 11 in each of the item of HADS were further evaluated by psychiatric history and mental status examination for psychiatric morbidity. Final diagnosis of Psychiatric disorder was established by applying diagnostic and statistical manual-V text revision (DSM-V TR) diagnostic criteria.

Results: Out of 200 pregnant women 15% women were suffering from various Anxiety Disorders, 7% were suffering from Depressive disorders and 2.5% suffered from combined Anxiety and Depressive disorders. Depression or Anxiety was more prevalent among those women who were unwilling for the current pregnancy, those who had high risk obstetric and medical complications during the pregnancy and also among those who had history of domestic violence.

Conclusions: This study also indicates the need to incorporate screening for anxiety and depression in antenatal programs and providing practical support to women during pregnancy. High risk factors need to be focused and interventions related to it need to be taken.

Keywords: Depressive disorders; Depression; Anxiety

INTRODUCTION

Major depression is twice as common in women as in men and frequently clusters during the childbearing years¹. Although pregnancy has traditionally been considered a time of emotional well-being for women conferring protection against psychiatric disorders, at least one prospective study describes rates of major

and minor depression as approximating 10%^{2,3}. Other studies also note clinically significant depressive symptoms during pregnancy, particularly in the setting of antidepressant discontinuation⁴. The risk increases with a past history of mood disorder^{5,6,7}. However, it has also been observed that in about one third of depressed pregnant women, this represents the first episode of major depression⁸.

Studies indicate that 19% of men and 31% of women will develop some type of anxiety disorder during their lifetime⁹. Some studies however, have shown an increase in both panic disorder and OCD in pregnant women, especially in the postpartum period^{10,11}. Hormonal changes during pregnancy, such as increased

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prolactin, oxytocin and cortisol may contribute to the suppression of stress response that occurs during this period⁹. Hence recognition and management of anxiety disorders in pregnant women may be of interest in the prevention of postnatal depression¹². Studies have also shown that the mothers of babies who demonstrated poor neonatal adaptation reported higher levels of anxiety and depression at study entry than did mothers of healthy babies¹³. High antenatal maternal anxiety was found to be related to attention-deficit hyperactivity disorder symptoms, externalizing problems, and anxiety in 8-9 year olds¹⁴. Childbirth qualifies an extreme traumatic stress or that can result in post-traumatic stress disorder¹⁵. The reported prevalence of post-traumatic stress disorder after childbirth ranges from 1.5 to 6%¹⁶.

Studies from developed countries have reported that depression is the most prevalent psychiatric disorder during pregnancy ranging from 10 to 25%^{17, 18, 19}. Rates of depression especially during the second and third trimesters of pregnancy have been reported substantially high¹⁹. Rates of various anxiety disorders during pregnancy ranged from 10 to 35%²⁰⁻²².

Despite being an important public health issue, most Indian studies of maternal depression have focused on post-natal depression, and there is paucity of data on depression and anxiety during pregnancy^{22,33}. Hence, this study was conducted with an aim to find the prevalence of depression and anxiety disorders during pregnancy and its association with certain socio demographic, obstetric, risk factors in pregnant women attending tertiary care hospital in the institution, India.

MATERIALS AND METHOD

Study design and population: This was a cross-sectional study in clinical setting without use of any normal control group. Institutional ethical committee approval was taken before commencement of the study. The study was done during the period from Aug 2016 to Feb 2017. It was carried out at Anti natal clinic (ANC), O.P.D., under department of obstetrics and gynaecology, of the institution. Performa was made and then administered on 200 pregnant women. Sample size was

determined by using statistical methods of confidence level (95%) and confidence interval (4.99).

Data collection: For collecting socio-demographic data, obstetric history and data related to home environment in uniform and standard manner, standard socio-demographic, Obstetric, Family Relationships, and Home Environment data sheet was prepared and the related questions were asked to the participants. Then the participants were screened by hospital anxiety depression Scale. Those participants who scored 11 in each of the item of HADS were further evaluated by psychiatric history and mental status examination for psychiatric morbidity. Final diagnosis of psychiatric disorder was established by applying DSM-V TR diagnostic criteria²⁹.

Data Analysis: All the collected data were appropriately tabulated and data was analyzed to find out statistical significance with the help of Chi-square (χ^2) test. Probability value less than 0.05 is taken as statistically significant and value less than 0.01 was taken to be highly significant.

RESULTS

The total number of pregnant women analyzed in this study was 200. The mean age of the sample was 23.91 years. Prevalence of various anxiety disorders was found to be 15%, of depressive disorders was 7% and of combined anxiety and depressive disorders was 2.5% [Table 1].

The pregnant women were dichotomized into those having depression and / or anxiety disorders ($n = 49$) and those who were non-depressed and non anxious ($n = 151$) based upon the HADS cut-off value of 11. The comparisons and analysis of depressed and anxious women with non-depressed and non anxious pregnant women in our sample and their correlations with various socio demographic, obstetric risk factors and family relationships and home environment related variables are shown in the table [Table 2, 3, 4]. Depression and anxiety disorders during pregnancy was significantly associated with variables like unwillingness for current pregnancy ($P=0.033$), presence of current high risk obstetric complications ($P=0.0306$) and medical complications ($P=0.0121$). There was high significant association with history of abuse (p value= 0.000005).

Table 1: Prevalence of various Depressive and Anxiety disorders

Depression & Anxiety related variables		Frequency (n)	%
Prevalence of Anxiety in participants according to HADS scale	Non case	120	60
	Borderline case	36	18
	Case	44	22

Conted...

Prevalence of Depression in participants according to HADS scale	Non case	131	65.5
	Borderline case	44	22
	Case	25	12.5
Various diagnosis in Anxiety & Depressive disorders found in participants	Anxiety(NOS)	18	9
	GAD	9	4.5
	Panic disorder	3	1.5
	M. Depression	10	5
	Depression(NOS)	4	2
	Combined Depression & Anxiety disorders	5	2.5

Table 2: Comparison of Socio-demographic variables in Participants With Depression and/or Anxiety Disorders Vs Without Depression and/or Anxiety Disorders

Socio-demographic variables		No. of patients with Depression or Anxiety disorders N (%)	No. of patients without Depression or Anxiety disorders N (%)	Total N (%)	X ² (D & A Vs No D & A)
		49(24.5%)	151(75.5%)	200	
Age(Years)	≤19	4(57.14)	3(42.86)	7(100)	X ² = 4.653, df = 2, P = 0.09
	20-29	42(24)	133(76)	175(100)	
	≥30	3(20)	15(80)	18(100)	
Domicile	Urban	37(33.04)	112(75.16)	149(100)	X ² = 0.526, df = 2, P = 0.768
	Suburban	6(20)	24(80)	30(100)	
	Rural	6(28.57)	15(71.43)	21(100)	
Religion	Hindu	42(24.85)	127(75.15)	169(100)	X ² = 0.073, df = 1, P = 0.787
	Muslim	7(22.58)	24(77.42)	31(100)	
Education	Illiterate	9(24.32)	28(75.68)	37(100)	X ² = 3.62, s2 df = 4, P = 0.46
	Primary Education	29(28.43)	73(71.57)	102(100)	
	Secondary education	11(20.37)	43(79.63)	54(100)	
	Graduate	0(0)	6(100)	6(100)	
	Post Graduate	0(0)	1(100)	1(100)	
Occupational status	Housewife	40(23.95)	127(76.05)	167(100)	X ² = 0.164 df = 1 P = 0.685
	Working	9(27.27)	24(72.73)	33(100)	
Family type	Nuclear	19(27.53)	50(72.47)	69(100)	X ² = .525, df = 1, P = 0.469
	Joint	30(22.90)	101(77.1)	131(100)	
Per capita monthly family income	Class 1	3(27.27)	8(72.73)	11(100)	X ² = 2.317 df = 4, P = 0.71
	Class 2	13(20)	52(80)	65(100)	
	Class 3	17(23.94)	54(76.06)	71(100)	
	Class 4	15(29.41)	36(70.59)	51(100)	
	Class 5	1(50)	1(50)	2(100)	

according modified Prasad's classification (In INR per month)

Table 3: Comparison of Pregnancy related variables in patients With Depression and/or Anxiety Disorders Vs Without Depression and/or Anxiety Disorders

Pregnancy related variables		No. of patients with Depression and Anxiety disorders N (%)	No. of patients without Depression and Anxiety disorders N (%)	Total N (%)	X ² (D & A Vs No D & A)
		49(24.5)	151(75.5)	200	
Gravida	Primi	19(23.46)	62(76.54)	81(100)	X ² = 0.219 df = 2, P = 0.896
	Second	20(26.32)	56(73.68)	76(100)	
	Multi	10(23.26)	33(76.74)	43(100)	
Trimester of pregnancy	1 st	14(27.45)	37(72.55)	51(100)	X ² = 1.304 df = 2, P = 0.521
	2 nd	12(19.35)	50(80.65)	62(100)	
	3 rd	23(26.44)	64(73.56)	87(100)	
Willingness for pregnancy	Yes	27(20)	108(80)	135(100)	X ² = 4.547 df = 1, P = 0.033*
	No	22(33.85)	43(66.15)	65(100)	
Used Family Planning methods	Yes	15(25.86)	43(74.14)	58(100)	X ² = 0.0802 df = 1, P = 0.78
	No	34(23.94)	108(76.06)	142(100)	
Current obstetric high risk pregnancy	Yes	25(32.89)	51(67.11)	76(100)	X ² = 4.67, df = 1, P = 0.0306*
	No	24(19.35)	100(80.65)	124(100)	
Current medical high risk pregnancy	Yes	20(37.04)	34(62.96)	54(100)	X ² = 6.286, df = 1, P = 0.0121*
	No	29(19.86)	117(80.14)	146(100)	
H/O AB& SB in last pregnancy	Present	14(31.11)	31(68.89)	45(100)	X ² = 1.336 df = 1, P = 0.25
	Absent	16(21.62)	58(78.38)	74(100)	

* indicates statistically significant difference P<0.05,

** indicates highly statistically significant difference P<0.01

Table 4: Comparison of Family Relationships and Home Environment related variables With Depression and/or Anxiety Disorders Vs Without Depression and/or Anxiety Disorders

Other variables		No. of patients with Depression and Anxiety disorders N (%)	No. of patients without Depression and Anxiety disorders N (%)	Total	X ² (D & A Vs No D & A)
		49(24.5%)	151(75.5%)	200	
Household decision making	Self	1(25%)	3(75)	4(100)	X ² = 1.555 df = 3, P = 0.764
	Husband	5(29.41)	12(70.59)	17(100)	
	In laws	19(27.94)	49(72.06)	68(100)	
	Combined	24(21.62)	87(78.38)	111(100)	
History of Abuse (psychological, physical or sexual)	Yes	9(81.82)	2(18.18)	11(100)	X ² = 20.674 df = 1 P = 0.000005**
	No	40(21.16)	149(78.84)	189(100)	

* indicates statistically significant difference P<0.05,

** indicates highly statistically significant difference P<0.01

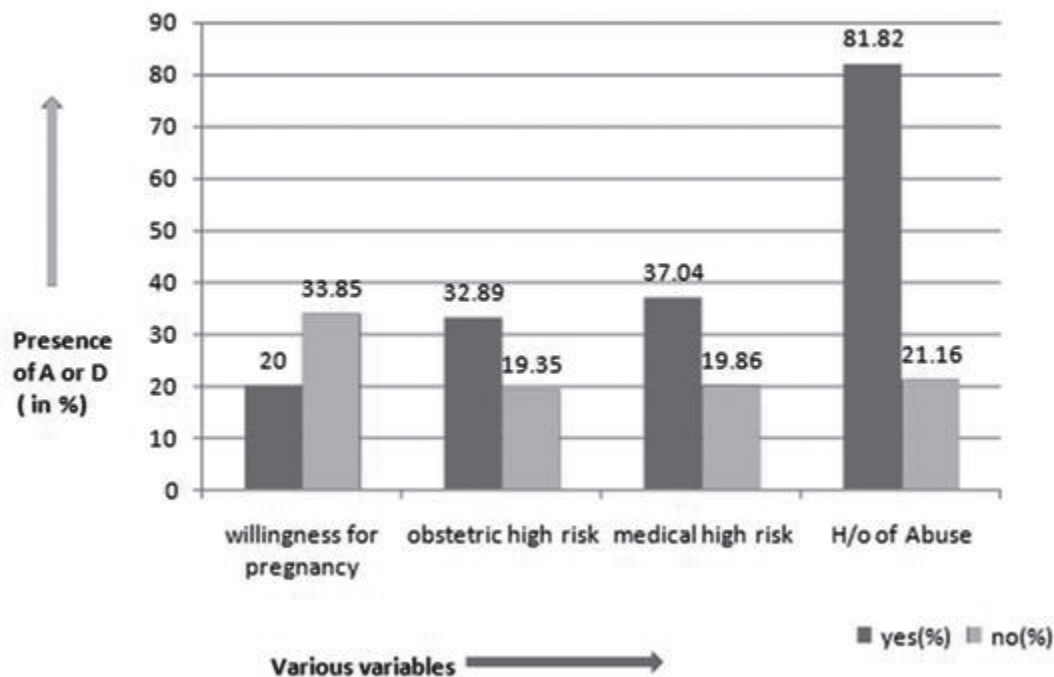


Figure 1: It shows the correlation of various variables with the presence of either Anxiety and/or Depressive Disorders in pregnant women in our study

DISCUSSION

Several risk factors predispose to depressive and anxiety disorders during pregnancy revealed from a study in Aga Khan University Hospital, Pakistan²³. In a study conducted on pregnant women attending Çorum State Hospital, Turkey a statistically significant difference was found between mean depression scores and family type, number of the pregnancy, spontaneous abortion, desired pregnancy and harmony between spouses²⁴. In the study conducted in 2 major hospitals in sub urban Melbourne, Australia, findings suggested that Antenatal depression was significantly predicted from the seven risk factors largest, those being low self-esteem, antenatal anxiety, poor social support, low income, history of abuse, major life events and negative Cognitive Style²⁵. For depression, the results of multiple logistic regressions indicated that unwanted pregnancy low self-esteem, low perceived social support at first trimester low marital satisfaction was associated with increased risk of depression²⁶. Depression during pregnancy was significantly found to be associated with multigravidas, unplanned pregnancy, obstetric complications during current pregnancy, previous history of obstetric complications and a previous history of abortions studied in tertiary care hospital in Navi-Mumbai²⁷.

This study of 200 pregnant women, prevalence of various anxiety disorders was 15%, of depressive disorders was 7% and of combined anxiety and depressive disorders was 2.5%. Another Indian study that had similar result as to this study, was the study done by Ajinkya et al where they found the prevalence of depression during pregnancy as 9.18%¹⁷ using BDI cut-off value of 17 or more in their study which was almost comparable to the finding of this study i.e. 9.5% (7%+2.5%)²⁷. Qiao Y et al found the prevalence of antenatal depressive and/or anxiety was 11.0% using HADS as scale. Other studies had broad range of prevalence of anxiety disorders ranging from 10% to maximum of 54%³¹. Similarly for Depressive disorders the prevalence ranged from 11.8% to maximum prevalence of 49.7%.

Various studies showed correlations between above variables with anxiety and depressive disorders^{20-22, 26-27}. The studied variables like willingness for current pregnancy, presence of current high risk obstetric complications and medical complications and history of domestic violence were found to be statistically significant (i.e. P value <0.05) in influencing the prevalence of anxiety and depressive disorders [Fig 1].

Unwillingness for the current pregnancy leads to higher rates of depression or anxiety during pregnancy²⁷.

Studies showed statistically significant relationship between abuse (physical, verbal or sexual) and anxiety or depression, the results being similar to this study^{20, 24, 25, 26, 30}. Ajinkya et al study revealed that depression during current pregnancy was related to presence of obstetric complications during pregnancy which was also a finding in our study²⁷.

CONCLUSION

The study indicates the necessity of screening for anxiety and depression in antenatal programs and as well referral of such patients who are positive to such screening tests for psychiatric evaluation and management to ensure the health of both mother and baby.

Competing Interest: The authors declare that they have no financial or personal relationship(s).

REFERENCES

1. Van de Bergh BRH, Mulder EJH, Mennes M, Glover, V. Antenatal maternal anxiety and stress and the neurobehavioural development of the fetus and child: links and possible mechanisms: A review. *Neuroscience and Bio behavioral Reviews*. 2005; 29: 237-258.
2. Zajicek E. Psychiatric problems during pregnancy. In: Wolkind S, Zajicek E (eds). *Pregnancy: a psychological and social study*. London: Academic Press.1981:57-73.
3. Kendell RE, Wainwright S, Hailey A et al. The influence of childbirth on psychiatric morbidity. *Psychol Med*. 1976; 6:297-302.
4. Altshuler LL, Cohen L, Moline M et al. The Expert Consensus Guideline Series: treatment of depression in women. *Postgrad Med*. 2001; (Spec No.1) 1-107.
5. O'Hara MW. *Post-partum depression: causes and consequences*. New York, Springer Verlag, 1995.
6. Evans J, Heron J, Francomb H, Oke S, Golding J. Cohort study of depressed mood during pregnancy and after childbirth. *BMJ*. 2001; 323:257-60.
7. Gotlib IH, Whiffen VE, Mount JH, Milne K, Cordy NI. Prevalence rates and demographic characteristics associated with depression in pregnancy and the post-partum period. *J Consult Clin Psychol*. 1989; 57:269-74.
8. Newport DJ, Wilcox MM, Stowe ZN. Maternal depression: a child's first adverse life event. *SeminClin Neuropsychiatry*. 2002; 7:113-9.
9. Ginsberg DL. Women and anxiety disorders: implications for diagnosis and treatment. *CNS Spectr*. 2004; 9:1-16.
10. Cohen LS, Sichel DA, Faroane SV, Robertson LM, Dimmock JA, Rosenbaum JF. Course of panic disorder during pregnancy and the puerperium: a preliminary study. *BiolPsychiatry*. 1996; 39:950-4.
11. Buttolph ML, Holland A. Obsessive compulsive disorders in pregnancy and childbirth. In: Jenke M, Baer L, Minivhiello WE (eds). *Obsessive Compulsive disorders: theory and management*. Chicago: Year book Medical Publishers. 1990; 89-95.
12. Sutter-Dallay AL, Giaccone- Marcesche V, Glatigny-Dallay E et al. Women with anxiety disorders during pregnancy are at increased risk of intense postnatal depressive symptoms: a prospective survey of the MATQUID cohort. *Eur Psychiatry*. 2004; 19:459-63.
13. Misri S, Oberlander TF, Fairbrother N et al. Relation between prenatal maternal mood and anxiety and neonatal health. *Can J Psychiatry*.2004; 49:684-9.
14. Van den Bergh BR, Marcoen A. High antenatal maternal anxiety is related to ADHD symptoms, externalising problems, and anxiety in 8 and 9 year olds. *Child Dev* 2004; 75:1085-97.
15. Beck CT. Post-traumatic stress disorder due to childbirth: the aftermath. *Nurs Res* 2004; 53:216-24.
16. Costa D. Da, Larouche J, Dritsa M, Brender W. Psychosocial correlates of prepartum and postpartum depressed mood. *Journal of Affective Disorders*. 2000; 59(1):31-40.
17. Evans J, Heron J, Francomb H, Oke S, Golding J. Cohort study of depressed mood during pregnancy and after childbirth. *British Medical Journal*. 2001; 323(7307):257-260.
18. Bennett H.A, Einarson A, Taddio A, Koren G, Einarson TR. Prevalence of depression during

- pregnancy: systematic review. *Obstetrics and Gynecology*. 2004; 103(4):698-709.
19. Kim H. G, Mandell M, Crandall C, Kuskowski MA, Dieperink B, Buchberger RL. Antenatal psychiatric illness and adequacy of prenatal care in an ethnically diverse innercity obstetric population. *Archives of Women's Mental Health*. 2006; 9(2):103-107.
 20. Nasreen HE, Kabir ZN, Forsell Y, Edhborg M. Prevalence and associated factors of depressive and anxiety symptoms during pregnancy: a population based study in rural Bangladesh. *BMC Women's Health*. 2011; 11(22):2011.
 21. Gausia K, Fisher C, Ali M, Oosthuizen J. Antenatal depression and suicidal ideation among rural Bangladeshi women: a community-based study. *Archives of Women's Mental Health*. 2009; 12(5):351-358.
 22. Chandran M, Tharyan P, Muliyl J, Abraham S. Postpartum depression in a cohort of women from a rural area of Tamil Nadu, India. Incidence and risk factors. *British Journal of Psychiatry*, 2002; 181:499-504.
 23. Niloufer SA, Iqbal SA, Badar SA, Ghurnata T, Sana SM. Frequency and Associated Factors for Anxiety and Depression in Pregnant Women: A Hospital-Based Cross-Sectional Study. *The Scientific World Journal*. 2012, Article ID 653098, 9 pages.
 24. Duman NB. Socio-Demographic and Obstetric Factors Associated With Depression during Pregnancy in Turkey. *American International Journal of Contemporary Research*. 2012; 2(11):17-26.
 25. Leigh B and Milgrom J. Risk factors for antenatal depression, postnatal depression and parenting stress. *BMC Psychiatry*. 2008; 8(24):1-11.
 26. Lee AM, Lam SK, Lau SM, Sze ML, Stephanie MB, Chong CS, Chui HWM, Fong DYT. Prevalence, Course, and Risk Factors for Antenatal Anxiety and Depression. *Am J ObstetGynecol*. 2007; 110(5):1102-1112.
 27. Ajinkya S, Jadhav PR, Srivastava NN. Depression during pregnancy: Prevalence and obstetric risk factors among pregnant women attending a tertiary care hospital in Navi Mumbai. *Ind Psychiatry J*. 2013; 22(1):37-40.
 28. Patel V, Rodrigues M, DeSouza N. Gender, poverty, and postnatal depression: A study of mothers in Goa, India. *Am J Psychiatry*. 2002; 159:437.
 29. Abiodun OA. A validity study of the Hospital Anxiety and Depression Scale in general hospital units and a community sample in Nigeria. *Br J Psychiatry*. 1994; 165:669-72.
 30. Hartley M, Tomlinson M, Greco E, Comulada WS, Stewart J, Roux II, Mbewu N, Mary JRotheram-Borus. Depressed mood in pregnancy: Prevalence and correlates in two Cape Town peri-urban Settlements. *Journal of Reproductive Health*. 2011; 8(9):1-7.
 31. Qiao Y, Wang J, Li J, Wang J. Effects of depressive and anxiety symptoms during pregnancy on pregnant, obstetric and neonatal outcomes: a follow-up study. *J ObstetGynaecol*. 2012; 32(3):237-40.

Dental Treatment Demands, Needs and Utilization among Geriatric Patients: A Tertiary Health Care-Based Retrospective Study

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ABSTRACT

Aim: The purpose of the study was to determine the various complaints for which older patients seek dental treatment and to identify the reason for the presenting chief complaint. Other oral health issues as well as the utilization of comprehensive oral health also to be evaluated.

Materials and Method: The hospital records of the newly registered elderly patients in a dental school in Mangalore, India were accessed to obtain data relating to the wants, needs, and utilization of services of older patients.

Results: The most frequent complaint with which older patients visited the dental hospital was pain (31.1%). When the data was analysed, it was observed that there was no association between utilization and the nature of the complaint. Other than the chief complaint, 49.4% patients were found to have prosthetic requirements as their normative need.

Conclusions: Pain was the most common complaint with which elders reported to the dental hospital. However, there was no significant difference in the utilization patterns in the pain and non-pain category. In addition, the patient's normative needs were far ahead of their expressed needs indicating their neglect towards oral health and emphasizes the requirement for regular dental check-up among the older individuals.

Clinical significance: There is a neglect of oral health among elderly individuals; therefore it is important to organize and plan oral health services for geriatric patients.

Keywords: dental pain, demands, geriatric patients, treatment needs, utilization

INTRODUCTION

An emerging significant health issue of the 21st century is the concept of ageing. The advancement of technology and increasing human awareness have jointly resulted in higher proportion of elderly people (60 years and above).¹ India is now known as an aging nation with over 8% population comprising of elderly people, and this rate is expected to increase to 50% by 2050.²

Elders have health problems as a result of this aging process, which calls for special consideration.³ A crucial aspect of general health and well-being is a well maintained oral health. The mouth is a reflection of a person's health through his life. They also share common risk factors and since the chronic diseases advance with

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age, it is essential to examine the interplay of these diseases and their added impact on the overall health among elders.⁴ Diminished oral function especially caries and periodontitis represents as one of the most common and potentially serious problem causing the deterioration in the quality of life of the elderly population.⁵

It is extremely important to understand the health care demands and needs of the elderly population. This will aid in assessing the requirements for the training of the health care providers as well as in the organization of the health care services.⁶ So the purpose of the present study was to provide an insight for the oral health care providers the various dental needs in geriatric patients so that the approach towards treating these individuals can be improved. Hence, the following study was undertaken to a) Determine the various complaints for which older patients (60 years and above) seek dental treatment b) The reason for the presenting chief complaint and the department to which the individual has been referred. c) The presence of oral health issues other than the chief complaint. d) Assess whether the patient has availed comprehensive oral health care or not.

METHODOLOGY

The present retrospective study obtained the data relating to the wants, needs, and utilization of services of elderly patients (aged 60 years or older) who attended the Dental Hospital from the hospital records. The hospital records of the newly registered elderly patients for the past one year were accessed from the Medical Records Department (MRD) of a dental college and hospital in Mangalore, India.

The hospital registration number, the age, and gender of the patient along with their demand i.e. chief complaint and the primary reason for the same was recorded. The department to which they had been referred was also noted down.

Patients complaining of pain and sensitivity was taken as “pain related complaints” wherein it was considered as tooth related only when it is because of either caries, non-carious tooth lesions, pulpitis or trauma, whereas pain due to any other reason was taken as “other reasons for pain”. The patients expressing needs other than these were considered as “other problem”.

The pattern of the utilization of the services along with other oral health issues, if any, was also taken into

account. It was considered as the service being availed when the patient visited the dental hospital two or more times for two or more different reasons. Now, in cases when the subject was diagnosed with 2 or more other oral health issues and if all of them had been availed, it was considered as completely availed, whereas even if any one of them has not been availed it was categorized as partially availed.

The data thus obtained was analysed and the descriptive statistic was calculated. The statistical test was carried out by applying chi-square test, where P value <0.05 was taken as statistically significant.

RESULTS

A total of around 1900 patients records were assessed from the Medical Records Department; 267 records were selected for the inclusion in the study out of which 160 (59.9%) of them were males and 107 (40.1%) were females. The mean age of males was 67.65±5.90 years whereas the mean age of females was 66.13±5.79 years, overall mean age being 67.04± 5.90 years.

The most frequently expressed chief complaint was pain which accounted for about 31.1% followed by missing tooth as illustrated by Table 1 and the maximum workload was seen in the Department of Periodontology, whereas the next most commonly referred department was prosthodontics (Figure 1). Other complaints with which the patients presented included difficulty in opening the mouth, burning sensation, white patch in the mouth.

When the data were analysed, it was observed that there was no association between utilization and the nature of the complaint as given in Table.2. Also, there was no statistical difference seen in the utilization of the services between the men and women (Table 3) (chi-square value 0.49, p= 0.30).

Other than the chief complaint, 49.4% patients were found to have prosthetic requirements as their normative need whereas no other treatment needs other than the chief complaint was diagnosed in 23.6% subjects as depicted in Figure 2. It was also observed that only 27% of the elderly individuals availed the comprehensive care whereas the majority did not. (Table 4)

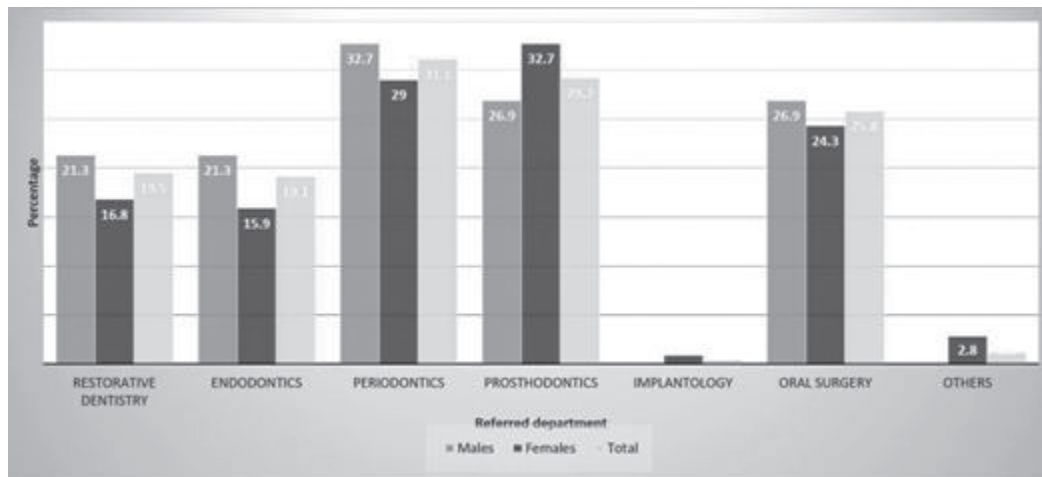


Figure 1: Referral pattern according to their expressed needs

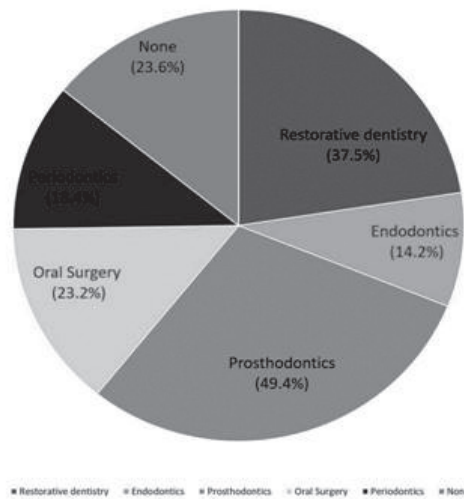


Figure 2: Graphical representation of the departments to which the elderly patients were referred based on their normative needs

Table 1: Gender wise expressed needs of elderly patients

Expressed need	Males	Females	Total
Pain	53 (33.1)	30 (28)	83 (31.1)
Sensitivity	6 (3.8)	11 (10.3)	17 (6.4)
Food lodgement	4 (2.5)	2 (1.9)	6 (2.2)
Broken/ fractured teeth	7 (4.4)	4 (3.7)	11 (4.1)
Cavity/Hole/Decay	15 (9.4)	6 (5.6)	21 (7.9)
Dislodged filling	6 (3.8)	6 (5.6)	12 (4.5)
Tooth discoloration	1 (0.6)	1 (0.9)	2 (0.7)
Swelling	1 (0.6)	1 (0.9)	2 (0.7)
Bleeding gums	1 (0.6)	1 (0.9)	2 (0.7)
Deposits	16 (10)	4 (3.7)	20 (7.5)
Mobility	17 (10.6)	5 (4.7)	22 (8.2)
Aesthetic problem	1 (0.6)	0	1 (0.4)
Tooth spacing/ crowding	1 (0.6)	0	1 (0.4)

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Missing tooth	19 (11.9)	19 (17.8)	38 (14.2)
Denture related problems	11 (6.9)	12 (11.2)	23 (8.6)
Check up	8 (5)	5 (4.7)	13 (4.9)
Others	11 (6.9)	8 (7.5)	19 (7.1)

*% in parenthesis

Table 2: Association between utilization and the nature of the complaint

Utilization	Pain related to teeth	Other reasons for pain	Other complaints	P value = 0.39
Yes	59 (84.3)	24 (80.0)	152 (89.9)	
No	11 (15.7)	6 (20.0)	17 (10.1)	

% in parenthesis; chi-square value = 0.27

Table 3: Gender wise pattern of utilization of the treatment provided for their respective chief complaints

Utilization	Males	Females	Total
Yes	139 (86.9)	96 (89.7)	235 (88)
No	21 (13.1)	11 (10.3)	32 (12)

% in parenthesis; chi square value = 0.49, p= 0.30

Table 4: Gender wise statistics on availing comprehensive care

Comprehensive care	Males	Females	Total
Not required	31 (19.4)	31 (29)	62 (23.2)
Availed	42 (26.3)	30 (28)	72 (27)
Partially availed	31 (19.4)	13 (12.1)	44 (16.5)
Not availed	56 (35)	33 (30.8)	89 (33.3)

% in parenthesis

DISCUSSION

The need of an individual which he/she considers important is referred to as expressed need whereas the need defined by the professional in a given situation is called the normative need. The normative needs greatly surpass the expressed needs.⁷ Addressing the overall need of the patient is important for the improvement in the oral health-related quality of the life.⁸ The present study was conducted in a dental hospital attached to a dental school where most elderly patients who visit, reside in the community and are functionally independent. However, a handful of them are dependent, who are either admitted to the hospital or are institutionalized. The treatment provided in the dental school by undergraduate students

include simple dental procedures and is free of cost. On the other hand, complex cases are usually handled by post-graduate students or faculty where the patients have to pay subsidized charges.

The result of this study revealed that the most frequently expressed complaint causing the patients to seek the dental treatment was 'pain'. This is in accordance with the findings from previous studies carried out at Sri Lanka⁹ and Tanzania.¹⁰ The reason for no difference in the utilization pattern in the pain and the non-pain category of expressed needs could be because of the subsidized charges levied on some complex treatment procedures or because of the multifactorial aetiology of dental pain where patients have to go from one department to the

other. Also, there was no significant pattern observed in the utilization of the treatment provided amongst the males and the females. This is in contrast to the findings of previous studies where more males sought treatment as compared to the females.¹¹

Following this, the next most commonly expressed need was the replacement of their missing teeth. The loss of teeth could be considered as a cumulative result of years of neglect of oral health. Studies have shown that the demand among elders for replacement of missing tooth is mostly aesthetics rather than functionality. Edentulism is the result of unmet treatment needs for dental caries and periodontal diseases.¹² Since the study was carried out at a multi-specialty dental hospital, as per the hospital protocol, all the patients were first referred to the department of periodontology as a prophylactic measure whereas those with the emergency were sent directly to the concerned department.

Even though the treatment rendered in the hospital is subsidized, majority of the geriatric patients fail to utilize the services. This could probably be because most of them require complex treatment with a multidisciplinary approach and find it difficult to cough up these subsidized amounts for dental needs which they consider trivial.^{3,7,13} Moreover, since there is no specific geriatrics department, they are treated alongside with others and have to move from one department to the other to address their overall dental health issues.

A few patients also showed up with potentially malignant disorders like leucoplakia and oral submucous fibrosis. The prevalence of oral mucosal lesions has been found to be higher in older patients than in the younger population.¹⁴ As the age advances, the protective function of the oral mucosa declines and it becomes more prone to external carcinogens because of its increased permeability to the toxic substances. But since only a limited number of patients were recorded to have the mucosal lesions, it indicates the lack of proper screening which is necessary for the early detection and adequate treatment of the underlying cause.

It was also observed that the patient's normative needs were far ahead of their expressed needs which is in line with the study carried out by Bijjargi S and Chowdhary R¹⁵ and the need for prosthodontic rehabilitation was recorded the maximum. Tooth loss can cause a considerable impact on the quality of life.

Decrease in the number of teeth causes a deterioration in the masticatory function and the person shifts from the well-balanced diet to a softer diet which has a high carbohydrate content. This not only increases the risk of dental diseases and deficiencies of various nutrients but also has a direct effect on the individual's general quality of life. Therefore, it is necessary that the tooth loss be avoided as much as possible. On the other hand, where the teeth have already been lost, prosthodontic rehabilitation should be availed to restore the function and stabilize the arch.¹⁶ Even then, it was recorded that the majority of them did not utilize the treatment provided. The poor utilization of dental prosthetic treatment could be attributed either to the ignorance of the patients on the importance of prosthetic rehabilitation or because of the barriers in obtaining the treatment.

Under the light of this study the following recommendations can be put forth for the improvement in the oral health and in turn the overall health of elderly patients;

- Price subsidy for dental treatment for senior citizens
- Adequate training of oral health care providers on geriatric dentistry
- Improving the ease of access to dental care with a separate geriatric department.
- Thorough screening for potentially malignant disorders should be carried out

CONCLUSION

The following conclusions can be drawn from the present study:

- The pain was the most common complaint with which elderly patients reported to the dental hospital. However, there was no significant difference in the utilization pattern in the pain and non-pain category.
- The patient's normative needs were far ahead of their expressed needs which signifies their negligence of their oral health and highlights the importance of regular dental check-up.
- The most common department to which patients were referred based on their normative needs was prosthodontics but most often the treatment was not availed.

- Most of the elderly patients did not avail the comprehensive care which may indicate that oral health is of least priority to them.

Ethical Clearance: Taken from Institution Ethics Committee, Manipal College of Dental Sciences, Mangalore, India

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. Singh A, Purohit BM. Addressing geriatric oral health concerns through national oral health policy in India. *Int J Health Policy Manag* 2014;4(1):39-42.
2. Ingle GK, Nath A. Geriatric health in India: Concerns and solutions. *Indian J Community Med* 2008;33(4):214-218.
3. Razak PA, Richard KM, Thankachan RP, Hafiz KA, Kumar KN, Sameer KM. Geriatric oral health: a review article. *J Int Oral Health* 2014;6(6):110-116.
4. Griffin SO, Jones JA, Brunson D, Griffin PM, Bailey WD. Burden of oral disease among older adults and implications for public health priorities. *Am J Public Health* 2012(3);102:411-418.
5. Gaszynska E, Szatko F, Godala M, Gaszynski T. Oral health status, dental treatment needs, and barriers to dental care of elderly care home residents in Lodz, Poland. *Clin Interv Aging* 2014;9:1637-1644.
6. National Research Council (US) Panel on Statistics for an Aging Population: The Aging Population in the Twenty-First Century: Statistics for Health Policy, D.M. Gilford (Ed.), National Academies Press, Washington DC, 1988.
7. Smith JM, Sheiham A. Dental treatment needs and demands of an elderly population in England. *Community Dent Oral Epidemiol* 1980;8(7):360-364.
8. Gil-Montoya JA, de Mello AL, Barrios R, Gonzalez-Moles MA, Bravo M. Oral health in the elderly patient and its impact on general well-being: a non-systematic review *Clin Interv Aging* 2015;10:461-467.
9. Warnakulasuriya S. Demand for dental care in Sri Lanka. *Community Dent Oral Epidemiol* 1985;13(2):68-69.
10. Van Palenstein Helderma WH, Nathoo ZA. Dental treatment demands among patients in Tanzania. *Community Dent Oral Epidemiol* 1990;18(2):85-87.
11. Maheswaran T, Ramesh V, Krishnan A, Joseph J. Common chief complaints of patients seeking treatment in the government dental institution of Puducherry, India. *J Indian Acad Dent Spec Res* 2015;2(2):55-58.
12. Goel P, Singh K, Kaur A, Verma M. Oral healthcare for elderly: identifying the needs and feasible strategies for service provision. *Indian J Dent Res* 2006;17:11-21.
13. Slack-Smith L, Lange A, Paley G, O'Grady M, French D, Short L. Oral health and access to dental care: a qualitative investigation among older people in the community. *Gerodontology* 2010;27(2):104-113.
14. Patil S, Doni B, Maheshwari S. Prevalence and distribution of oral mucosal lesions in a geriatric Indian population. *Can Geriatr J* 2015;18(1):11-14.
15. Bijjargi S, Chowdhary R. Geriatric dentistry: is rethinking still required? A community-based survey in Indian population. *Gerodontology* 2013;30(4):247-253.
16. Shah N, Parkash H, Sunderam KR. Edentulousness, denture wear and denture needs of Indian elderly--a community-based study. *J Oral Rehabil* 2004;31(5):467-476. Table 4: Gender wise statistics on availing comprehensive care

Nurses' Knowledge and Practice Toward Oral Care for Intubated Patients

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ABSTRACT

Purpose: The purpose of this study was to assess Iraqi nurses' knowledge and practice toward oral care for intubated patients.

Method: A purposive sampling method was used to survey 143 Iraqi nurses who met the sampling criteria in this cross-sectional study.

Results: The results showed that the average percentages representing nurses' knowledge and practice were 61% and 63% respectively.

Conclusion: Encourage Iraqi nurses to participate in continuing-education seminars regarding oral care can increase their knowledge and enhance their practice.

Implications: Having a standardized protocol for oral care and increasing Iraqi nurses' knowledge within the continuing education in the Iraqi hospitals can improve their practice toward oral care.

Keywords: oral care, intubated patients, nurses' knowledge, nurses' practice, Iraqi nurses

INTRODUCTION

Oral care is important in order to prevent ventilator-associated pneumonia (VAP) which is the most common complication in ICUs¹. This complication delays the recovery, extends patients' hospitalization, increases health care costs, and raises the rate of patients' mortality^{1,2,3}. Based on the literature^{3,4,5}, some factors may influence the quality of oral care for intubated patients. These factors can be nurses' age and sex; their years of experience in ICUs; if they have been educated regarding standardized oral care procedures; if they have sufficient time to provide oral care; and their shift work. VAP is associated with high mortality in ICUs^{6,7}. Lin et al.³ declared that nurses may know the risk of VAP in ICUs, but they have a lack of knowledge regarding preventing it.

The conceptual framework that is used in this study was generated from the Johnson's Behavioral System Model⁸. Johnson defined the patient as a behavioral system, which any imbalance in the behavioral subsystem causes disequilibrium⁹. Based on this theory, the role of nurses is to assist the patient to return to the equilibrium¹⁰. This study aimed to assess Iraqi nurses' knowledge and practices toward oral care for patients who breath mechanically via ventilators in ICU. This was approached in this study from the perspective of improving oral care to reduce the incidence of VAP. Johnson's Model supports that nurses should use the behavioral system as their knowledge base, which foster the effective behavioral functioning in the patient to prevent illness. Therefore, applying the Johnson's Behavioral System Model in this study may increase the quality of nursing care regarding oral care and decrease the incidence of VAP in intubated patients.

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METHODOLOGY

Research Hypothesis: The author hypothesized that
1) most of Iraqi nurses who work in ICUs do not have

enough knowledge regarding oral care for intubated patients, 2) they do not give oral care based on standards, and 3) they provide care based on what senior nurses do.

Setting and Data Collection: One hundred forty-three Iraqi nurses in nine different hospitals distributed in four different provinces (Baghdad, Najaf, Al-Qadisiyah, and Al- Muthanna) who met the inclusion criteria were questioned to participate in this study. Each participant was provided with a written informed consent to be signed after the purpose of the study was explained. Approximately 10 to 15 minutes were needed to complete the survey.

Ethical consideration: This study was reviewed and permitted by the Center of Staff Development and Scientific Research in the Iraqi Ministry of Health. The purpose of the study was explained to the participants in the informed consent minutely. The informed consent was given to every participant in order to guarantee the anonymity, provide confidentiality, and protect participants' privacy.

Participants: Nurses who work in Iraqi hospitals are the population in this study. The target population that provided the sample data is a group of Iraqi nurses in Iraq who met the sampling criteria. The sampling criteria for this study include nurses who work in ICUs in Iraqi hospitals. All nurses with different educational levels were included in this study. Also, nurses who work in night shifts as well as morning shifts were included in this study.

Design and Sample: This study was a cross-sectional study, and surveyed 143 Iraqi nurses who were chosen via a purposive sampling method. Since not all Iraqi nurses have an equal chance to be surveyed in this study, the non-probability (purposive) sampling method would be proper to select the subjects from the target population. Iraqi nurses who currently work in ICUs, both morning and night shifts, were included in this study.

Instrument: A self-administered questionnaire was adopted based on the literature and clinical experiences. The questionnaire was reviewed by seven experts to ensure the content validity. To measure the reliability, the test-retest reliability was used. The result of the correlation coefficient between test and retest showed that the questionnaire is reliable ($r = 0.89$). The questionnaire includes three parts: nurses' demographics, questions to assess nurses' knowledge and practice

Data Analysis: The Statistical Package for the Social Sciences (SPSS) 18 software was used to perform the statistical analysis. Nurses' demographics and their knowledge and practice were analyzed with descriptive statistics. Spearman's rho, Independent Samples T-test, Pearson's r , One-way ANOVA, and Bonferroni tests were used to in inferential statistics.

RESULTS

One hundred forty-three nurses agreed to participate in this study. However, only 126 (88.1%) completed the survey; these subjects are included in the data analysis. The mean of age of the nurses was 27.3 with a range from 18 to 52 years old. 59.5% of the participants were male and 40.5% were female. Regarding their highest educational level, 0.8% had master's degree, 52.4% of the participants had a bachelor's degree, 26.2% were nursing institute graduates, and 20.6% were nursing high school graduates (see Table 1). Most of the nurses (81.7%) were working in the morning shift, and 18.3% were working in the night shift (see Table 1). The mean of work experience in ICUs was 3.5 years, while the mean of total work experience as a nurse was 5.4 years in the study sample. Regarding the sources of information about oral care for intubated patients, as shown in Table 1, 50.8% of the study sample reported that they got the information from more experienced nurses.

The results in this study indicated that the average percentage regarding nurses' knowledge and practice were 61% and 63% respectively. Table 2 shows the correlation between nurses' knowledge and practice toward oral care for intubated patients in ICUs that was measured by Spearman's rho. The results showed that there is a significant correlation ($r = 322$, $p = 0.000$) between nurses' knowledge and practice, which means the higher knowledge the best performing oral care practices.

Regarding nurses' age, there was no significant correlation (Spearman's rho $r = -0.055$, $p = 0.542$) between nurses' age and their knowledge, while the correlation was negatively significant (Spearman's rho $r = -0.264$, $p = 0.003$) between nurses' age and their practice. The results in Table 3 show that there is a significant correlation (Spearman's rho = 225, $p = 0.011$) between nurses' educational levels and their knowledge toward oral care for intubated patients. However, the results indicated that there is no significant correlation (Spearman's $r = 0.07$, $p = 0.438$) between nurses' educational levels and their practice toward oral care for intubated patients.

The significant differences between the participants' shift work concerning their knowledge and practice toward oral care for intubated patients were tested by Independent Samples T-test. The result highlighted that there is a significant difference ($t = 3.73, p = 0.000$ and $t = 4.27, p = 0.000$) between shift work (morning and night) and nurses' knowledge and practice respectively toward oral care for intubated patients. Table 4 shows the strength of associations (correlation analysis) between the nurses' years of experience in the ICU and hospital and their knowledge and practice toward oral care for intubated patients, which represents by Pearson's r . The results showed that the strength of associations between nurses' years of experience in ICU and their knowledge and practice are not significant ($r = -0.061, p = 0.501$ and $r = -0.115, p = 0.199$) respectively. Also, the results

showed that the strength of associations between nurses' total years of experience in hospitals and their knowledge is not significant ($r = -0.138, p = 0.125$). However, the results highlighted that there is a significant negative association ($r = -0.287, p = 0.001$) between nurses' total years of experience in hospitals and their practice toward oral care for intubated patients.

Regarding the sources of information about oral care for intubated patients, the results of the One-way ANOVA test showed that there is a significant difference ($F = 5.19, p = 0.001$) between sources of information and nurses' knowledge. Bonferroni test, in Table 5, showed that nurses who got their knowledge from more experienced nurses were significantly differ ($p = 0.032$ and $p = 0.034$) than others.

Table 1: Nurses' demographics

	Groups	Frequency	Percent	Cum. Percent
Gender	Male	75	59.5	59.5
	Female	51	40.5	100
Levels of Education	Nursing School	26	20.6	20.6
	Institute	33	26.2	46.8
	Bachelor	66	52.4	91.2
	Master	1	0.8	100
Shift work	Morning	103	81.7	81.7
	Night	23	18.3	100
Sources of Information	More Experienced Nurses	64	50.8	50.8
	During Academic Years	37	29.4	80.2
	Within Continuing Education in the Hospital	13	10.3	90.5
	Reading Books and Articles	9	7.1	97.6
	Workshops Outside the Hospital	3	2.4	100

Table 2: The correlation between nurses' knowledge and practice

		Knowledge	Practice
Spearman's rho	Knowledge	Correlation Coefficient	1.000
		Sig. (2-tailed)	.000
		N	126
	Practice	Correlation Coefficient	.322**
		Sig. (2-tailed)	.000
		N	126

** . Correlation is significant at the 0.01 level (2-tailed).

Table 3: The correlation between nurses' knowledge and practice and their educational level

			Educational Level	Knowledge	Practice
Spearman's rho	Educational Level	Correlation Coefficient	1.000	.225*	.070
		Sig. (2-tailed)	.	.011	.438
		N	126	126	126

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4: Associations between the nurses' years of experience and their knowledge and practice

		Knowledge	Practice	Years of experience in ICU	Years of experience as a nurse
Knowledge	Pearson Correlation	1	.353**	-.061	-.138
	Sig. (2-tailed)		.000	.501	.125
	N	126	126	126	126
Practice	Pearson Correlation	.353**	1	-.115	-.287**
	Sig. (2-tailed)	.000		.199	.001
	N	126	126	126	126
Years of experience in ICU	Pearson Correlation	-.061	-.115	1	.771**
	Sig. (2-tailed)	.501	.199		.000
	N	126	126	126	126
Years of experience as a nurse	Pearson Correlation	-.138	-.287**	.771**	1
	Sig. (2-tailed)	.125	.001	.000	
	N	126	126	126	126

** . Correlation is significant at the 0.01 level (2-tailed).

Table 5: Significant differences among nurses' sources of information regarding their knowledge

Bonferroni						
(I) Source of Information	(J) Source of Information	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
More Experienced Nurses	During Academic Years	-.08084	.04489	.742	-.2092	.0475
	Within Continuing Education in the Hospital	-.16964	.06613	.115	-.3587	.0195
	Reading Books and Articles	-.23313*	.07739	.032	-.4544	-.0118
	Workshops Outside the Hospital	-.38393*	.12841	.034	-.7511	-.0167
During Academic Years	More Experienced Nurses	.08084	.04489	.742	-.0475	.2092
	Within Continuing Education in the Hospital	-.08880	.07009	1.000	-.2892	.1116
	Reading Books and Articles	-.15230	.08079	.618	-.3833	.0787
	Workshops Outside the Hospital	-.30309	.13049	.219	-.6762	.0701

Conted...

Within Continuing Education in the Hospital	More Experienced Nurses	.16964	.06613	.115	-.0195	.3587
	During Academic Years	.08880	.07009	1.000	-.1116	.2892
	Reading Books and Articles	-.06349	.09426	1.000	-.3330	.2060
	Workshops Outside the Hospital	-.21429	.13924	1.000	-.6124	.1838
Reading Books and Articles	More Experienced Nurses	.23313*	.07739	.032	.0118	.4544
	During Academic Years	.15230	.08079	.618	-.0787	.3833
	Within Continuing Education in the Hospital	.06349	.09426	1.000	-.2060	.3330
	Workshops Outside the Hospital	-.15079	.14492	1.000	-.5652	.2636
Workshops Outside the Hospital	More Experienced Nurses	.38393*	.12841	.034	.0167	.7511
	During Academic Years	.30309	.13049	.219	-.0701	.6762
	Within Continuing Education in the Hospital	.21429	.13924	1.000	-.1838	.6124
	Reading Books and Articles	.15079	.14492	1.000	-.2636	.5652

*. The mean difference is significant at the 0.05 level.

DISCUSSION

In this study, the average percentages of nurses' knowledge and practice of oral care were 61% and 63% respectively. Higher scores on oral care practice indicate that nurses do more than they know. The reason can be the source of information, which more than a half of nurses in this study (50.8%) mentioned that they got their information from more experienced nurses. In addition, there were significant differences between nurses who got their knowledge from more experienced nurses with others. This means they do what senior nurses do more than they do based on their own knowledge. Also, the results showed that there is a significant correlation between nurses' educational levels and their knowledge, which the result is supported by Chan and Ng⁵ with a sample of Asian nurses, but not supported by Alotaibi et al.⁴ with a sample of Saudi nurses. More experienced nurses are the source of knowledge for most Iraqi nurses in this study. This is consistent with Lin et al.³ which they found that most of the Thai nurses, in their study, got their knowledge from senior nurses.

In this study, there was a significant correlation between Iraqi nurses' knowledge and their practice toward oral care. Nurses who have more knowledge perform more ideally. This was supported by several studies^{3,11}. Age had a significant correlation negatively with nurses' practice, and this is consistent with^{3,12}. Younger nurses performed better than older nurses, which was supported by Lin et al.³. This may be related to new graduates' potential to work as a nurse.

Regarding nurses' shift work, the results in this study indicated that nurses' knowledge and practice differed significantly based on nurses' shift work. The reason can be the absence of a standard protocol for oral care in Iraqi hospitals. Chan and Ng⁵ found that, in ICUs with specific guide for oral care, nurses' knowledge did not differ based on the type of shift work. Regarding years of experience, the results in this study showed that there is no significant association between nurses' years of experience and their knowledge regarding oral care. This result was supported by^{11,13}. They found that length of service as a nurse had no effect on nurses' knowledge regarding oral health care. This highlights the importance of continuing education to increase nurses' knowledge and improve their practice.

CONCLUSION

The average percentages representing nurses' knowledge and practice were 61% and 63% respectively. Absence of a standardized guideline regarding oral care for intubated patients in Iraqi ICUs made most of Iraqi nurses to practice what senior nurses do. On the other hand, only 10.3% of the study sample reported that they got their knowledge about oral care within continuing education. Based on these indicators, the author recommends promoting seminars about oral care within continuing education to increase nurses' knowledge and enhance their practice toward oral care for intubated patients. Also, oral care based on a standardized guideline is recommended.

Implications for Nursing Knowledge: Having a standardized protocol for oral care and increasing Iraqi nurses' knowledge within the continuing education in the Iraqi hospitals can improve their practice toward oral care and decrease the incidence of VAP in ICUs.

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REFERENCES

1. Soh KL, Ghazali SS, Soh KG, Raman RA, Abdullah SS, Ong SL. Oral care practice for the ventilated patients in intensive care units: a pilot survey. *The Journal of Infection in Developing Countries*. 2011 Nov 30;6(04):333-9.
2. Kalil AC, Metersky ML, Klompas M, Muscedere J, Sweeney DA, Palmer LB, Napolitano LM, O'grady NP, Bartlett JG, Carratalà J, El Solh AA. Management of adults with hospital-acquired and ventilator-associated pneumonia: 2016 clinical practice guidelines by the Infectious Diseases Society of America and the American Thoracic Society. *Clinical Infectious Diseases*. 2016 Sep 1;63(5):e61-111.
3. Lin YS, Chang JC, Chang TH, Lou MF. Critical care nurses' knowledge, attitudes and practices of oral care for patients with oral endotracheal intubation: a questionnaire survey. *Journal of clinical nursing*. 2011 Nov 1;20(21-22):3204-14.
4. Alotaibi AK, Alotaibi SK, Alshayiqi M, Ramalingam S. Knowledge and attitudes of Saudi intensive care unit nurses regarding oral care delivery to mechanically ventilated patients with the effect of healthcare quality accreditation. *Saudi journal of anaesthesia*. 2016 Apr;10(2):208.
5. Chan EY, Ng IH. Oral care practices among critical care nurses in Singapore: a questionnaire survey. *Applied Nursing Research*. 2012 Aug 31;25(3):197-204
6. Hajibagheri A, Azizi Fini I. Mouth Care in Patients Receiving Mechanical Ventilation: A Systematic Review. *Nurs Midwifery Stud*. 2012;1(2):51-61.
7. Wagner BV, Alves EF, Brey C, Waldrigues MC, Caveião C. Knowledge of nurses about the intervention for the prevention of pneumonia associated with mechanical ventilation. *Journal of Nursing UFPE on line*. 2015 Apr 17;9(5):7902-9.
8. Johnson DE. The behavioral system model of nursing. *Conceptual model for nursing practice*. New York: Appleton-Century-Crofts, 1980:207-216.
9. Alligood MR. *Nursing theorists and their work*. Elsevier Health Sciences; 2014.
10. Johnson DE. The behavioral system model for nursing. ME Parker (Ed.), *Nursing theories in practice*, New York: National League for Nursing. 1990:23-32.
11. Javadinia SA, Kuchi Z, Saadatju A, Tabasi M, Adib-Hajbaghery M. Oral care in trauma patients admitted to the ICU: Viewpoints of ICU nurses. *Trauma monthly*. 2014 Apr;19(2).
12. El-Aziz MA. Effect of educational program on nurses, knowledge and skills about oral care for traumatized patients. *Al-Azhar Assiut Medical Journal*, 2014 Jan;12(1).
13. Sharif S, Saddki N, Yusoff A. Knowledge and Attitude of Medical Nurses toward Oral Health and Oral Health Care of Pregnant Women. *The Malaysian journal of medical sciences: MJMS*. 2016 Jan;23(1):63.

Association of Food Patterns, Central Obesity Measures and Metabolic Risk Factors for Coronary Heart Disease in Adult Men

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ABSTRACT

The association of central obesity measures with food patterns and metabolic risk factors as a risk in the development of coronary heart disease (CHD) was studied among thirty seven adult men (≥ 30 years), purposively selected from Bareilly, India. Body mass index (BMI), waist circumference (WC), waist hip ratio (WHR) and conicity index (CI) were assessed as central obesity measures. Total cholesterol (TC), fasting triglyceride (FTG), fasting plasma glucose (FPG), high density lipoprotein cholesterol (HDL-c), low density lipoprotein cholesterol (LDL-c) and very low density lipoprotein cholesterol (VLDL-c) were assessed as metabolic risk factors. The food consumption pattern was assessed through self-designed questionnaire, food frequency questionnaire and three days food record. Correlation coefficient was computed between central obesity measures and food pattern variables as well as metabolic variables. The frequency of consumed egg, fried snacks and sweets had a positive and significant correlation with WC, WHR and CI, suggesting that such foods can cause ill effects on health. All central obesity measures had a significant and positive correlation with FTG, FPG and VLDL-c indicating that among the subjects, central body fat distribution was more atherogenic as compared to overall adiposity.

Keywords: *Coronary heart disease (CHD), central obesity measures, metabolic risk factors, conicity index, food pattern*

INTRODUCTION

Cardiovascular diseases, specifically CHD are rampant in India. About 17% of total deaths and 26% of adult deaths were caused due to CHD in this country during 2001-2003 and rose to 23% of total and 32% of adult deaths during 2010-2013 as stated by Registrar General of India¹. There is a lack of prospective studies in India determining the risk factors for CHD². Increased urbanization along with lifestyle changes observed in past two decades has resulted in rapid rise in coronary risk factors in the country³.

Prospective researches conducted on large scale have reported a significant and independent relation between BMI and CHD. Contradicting this, BMI is debated for

not reflecting body fat distribution adequately which can be a more important indicator of obesity⁴. Generalized obesity is measured by BMI and is categorized by excessive content of total body fat deprived of any specific fat concentration in the specified body area. Central obesity is described as excessive deposition of fat in the abdominal area and is assessed generally by three measures, WC, WHR and CI⁵. Many risk factors including genetic, metabolic, early-life, conventional and non-conventional factors have caused increasing number of CHD morbidity and mortality rates among Indians⁶. A rapid increase in unhealthy lifestyles is a risk factor that includes smoking, non-smoked tobacco use, sedentary lifestyles, low fruits and vegetables diet, high dietary saturated fat and trans fat intake and alcohol use².

The current research was conducted among urban adult men with the objective to study the central obesity measures, metabolic risk factors and food consumption pattern of the subjects and subsequently study the relationship of central obesity measures with food pattern variables and metabolic risk factors as well.

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MATERIALS AND METHOD

Study population: This study included 37 male volunteers and their age ranged between 30-70 years based on convenience sampling. This study was conducted in urban area of Bareilly (Uttar Pradesh, India). The subjects were involved in the study when they came for general health checkup in a reputed hospital of the city. Ethical considerations given by ICMR (2006)⁷ based on Helsinki Declaration were adhered to and the hospital authority granted permission for data collection after ascertaining the same. Written consents about their willingness to participate were taken from all subjects prior to beginning of study. Information related to occupation, family history, food habits and diet pattern was gathered using a questionnaire.

Anthropometric measurements: Height, weight, waist circumference and hip circumference were measured using standard techniques. BMI and WHR were calculated using the standard formulae:

$$\text{BMI} = \text{Weight (kg)} / \text{Height}^2 \text{ (m}^2\text{)}$$

$$\text{WHR} = \text{Waist circumference (cm)} / \text{Hip circumference (cm)}$$

$$\text{CI} = \text{Waist circumference (m)} / (0.109) \times \sqrt{[\text{Weight (kg)} / \text{Height (m)}]}$$

Metabolic variables: Metabolic variables were estimated through fasting blood sample collected from subjects after an overnight fast (≥ 12 hours) sustained by them. Total cholesterol and high density lipoprotein were estimated by enzymatic method⁸. Triglycerides were estimated by enzymatic Glycerol Phosphate Oxidase-Peroxidase method⁹. Fasting glucose level was estimated by GOD/POD enzymatic method based on end point calorimetric¹⁰. Additional parameters like LDL-c and VLDL-c were calculated using standard formula given by Freidewald¹¹. Levels of total cholesterol ranging from 200-239 mg/dl and >240 mg/dl are considered to be borderline high and high¹². The level of HDL if <40 mg/dl for men is interpreted to be low¹². Levels for fasting triglycerides ranging from 150-199 mg/dl, 200-499 mg/dl and >500 mg/dl are categorized as borderline high, high and very high¹². Level of blood glucose ranging from 100-125 mg/dl is considered to be impaired fasting glucose and >126 mg/dl is for diabetes¹³. As per the classification devised by NCEP (2001)¹², levels of LDL,

130-159 mg/dl, 160-189 mg/dl and >190 mg/dl are considered to be borderline high, high and very high; the VLDL-c level if >30 mg/dl is considered to be high.

Food pattern variables: A questionnaire was designed to collect relevant information related to general information, dietary behavior like meal pattern of the subjects, food preferences, frequency of eating outside and types of food eaten in between meals. Data for dietary habits related to obesity like consumption of extra salt, tea/coffee, sweets intake and processed and fried foods was also obtained. Smoking habits of the subjects in terms of number of cigarettes smoked, frequency of smoking, drinking habits and its frequency were acquired as well.

Food record and food frequency methods were used for collection of information on dietary habits and food intake of the subjects. Food frequency questionnaire was prepared in which number of subjects consuming food from each food category, viz., cereals, pulses, green leafy vegetables, roots and tubers, other vegetables, fruits, milk and milk products, nuts, oil and fats, eggs, was counted for the frequencies such as daily, four to five times a week, two to three times a week, once a week, once in a forth night, once a month, more than two months and never and their percentages were calculated. Three day food record was collected of the subjects to keep a record of food eaten by them for varying length of time. Average daily consumption of various food items was estimated with the data obtained. The nutrient intake of subjects including energy, protein, fat and vitamin C were calculated. The mean nutrient intake of the subjects was calculated¹⁴ and compared with the recommended dietary allowances for Indians¹⁵.

Statistical analysis: All statistical analysis were performed with the Statistical Package for the Social Sciences (SPSS) base 16.00, $p < 0.05$ established as the level of statistical significance. To find the correlation of food pattern variables with central obesity measures, Spearman's correlation was used. Pearson's correlation was implemented to derive the correlation among central obesity measures with metabolic variables.

RESULTS

Age ranged from 30-70 years with the mean age being 49.9 (± 0.56) years. Results for the age wise distribution

of anthropometric measurements of the subjects are depicted in table 1. With respect to BMI (WHO, 2004)¹⁶, 15 subjects fell in the category of pre-obese and 2 subjects in the category of obese class I. Measures of general and abdominal obesity are associated with CVD risk factors and incident CVD events¹⁷. The IDF (2006)¹⁸ has provided recommendations for cut offs for WC being >90 cm for men. In the present study, 6 subjects were in the category of >90 cm and 31 subjects in <90 cm category. Abdominal obesity is defined as measure of WHR above 0.90 for males and related with substantially high risk of metabolic complications¹⁹. Results for WHR revealed that 31 subjects fell in the <0.90 category and 6 subjects in >0.90 category. Fifteen subjects had borderline high cholesterol level ranging between 200 and 239 mg/dl (table 2). A high cholesterol level was observed among 6 subjects. FTG was borderline high ranging from 150-199 mg/dl in maximum (n=23) subjects. FPG was above 125 mg/dl in 17 subjects, was 100-125 mg/dl in 10 subjects and <100 mg/dl in 9 subjects. The results for HDL-c indicated that this lipoprotein ranged between 40 and 59 mg/dl in majority of subjects (n=20). LDL-c had the normal value (lesser than 100 mg/dl) in greater number of subjects (n=14). Six subjects were found with near optimal level of LDL-c that ranged between 100 and 129 mg/dl and 9 subjects with borderline high level of LDL-c with values ranging between 130-159 mg/dl.

The number of subjects eating thrice daily was 34. The subjects who reported skipping of a meal were 32. Twenty seven subjects reported following a lacto vegetarian diet habits and the rest were non-vegetarian. The number of subjects adding extra salt to their diet was 30. With respect to consumption of breakfast, 12 subjects had Dalia porridge, 12 had cornflakes and 13 subjects had oats. Use of Saffola refined oil was reported by 34 subjects and of olive oil by the remaining. Daily water consumption was reported to be 2-3 glasses (n=15), 3-5 glasses (n=12) and 6-7 glasses in 10 subjects. Six subjects took multivitamin supplement and 4 subjects consumed protein supplement. Eighteen persons consumed alcohol regularly and 16 subjects were smokers. Among the 18 subjects consuming alcohol, ten preferred beer while eight had wine regularly.

Frequency of cereal products consumption indicated that 28 and 9 subjects consumed wheat based food products daily and 3-4 times a week respectively.

Chapati, dalia and bread were popularly consumed wheat based food products. For majority of the subjects, the pulse consumption frequency was once in a fortnight. Five subjects reported 'rare' pulse consumption. Out of the 10 non-vegetarian subjects, one third consumed egg 2-3 times a week. Green leafy vegetables were being consumed 3-4 times a week by 19 subjects. Over half of the subjects reported daily consumption of roots and tubers. Frequency of consumption of fruits was 2-3 times a week by 15 subjects and the remaining consumed fruits at a lower frequency. Banana and apple were the predominant fruit choices. None of the subjects had milk daily, 28 had it 2-3 times in a week. Frequently consumed milk product was curd which was taken on daily basis by 22 subjects. *Paneer* intake was reported to be low. Consumption of cheese was rare in more than half of the subjects. Ghee and hydrogenated fat intake was reported to be either on the monthly basis or rarely by the subjects. Vegetable oil was consumed daily by more than half of the subjects (n=21). Consumption of miscellaneous foods was frequent in the case of nuts and *namkeen* which were being consumed at a rate of 2-3 times a week by 26 subjects. Nineteen persons preferred tea 3-4 times a week while snack foods like cookies, chats, wafers and chocolates were consumed rarely or monthly.

The mean daily nutrients intake was 2325.9±17.01 kcal energy, 65.9±0.85 g protein, 36.5±1.35 g fat and 46.4±0.45 mg vitamin C. These revealed that the consumption of calories was high.

Food pattern variables were included in the model as independent variables against each of central obesity measures. The consumption frequency of egg, fried snacks and sweets had a positive and significant correlation ($p<0.05$) with all central obesity measures (WC, WHR and CI). Central obesity measures were included as independent variables in the model against each metabolic variable. All central obesity measures had a significant and positive correlation with FTG, FPG and VLDL-c ($p<0.05$). The correlation of central obesity measures with HDL-c was non-significant ($p>0.05$). WHR was not significantly correlated with LDL-c. TC was not significantly correlated with BMI and WC.

Table 1: Anthropometric measurements of the subjects

Measurements	Age group (years)				Total subjects
	30-40	40-50	50-60	60-70	
	Mean ± SD				
Height (cm)	163.88±6.05	161.42±8.22	163.75±10.16	164.11±6.07	163.29±1.97
Weight (kg)	65.44±5.47	62.14±7.12	70.41±12.99	66.77±6.18	66.19±3.43
BMI (kg/m ²)	24.37±1.76	23.83±1.88	26.18±3.46	24.88±2.85	24.81±0.81
WC (cm)	84.68±4.21	82.35±4.13	86.78±5.16	86.35±3.57	85.04±0.65
HC (cm)	101.32±5.31	97.61±3.22	100.95±3.92	100.18±2.85	100.01±1.08
WHR	0.83±0.07	0.85±0.05	0.84±0.04	0.86±0.04	0.84±0.02
CI	1.25±0.08	1.21±0.08	1.21±0.06	1.24±0.06	1.22±0.02

Table 2: Metabolic variables of the subjects

Variables (mg/dl)	Age group (years)				Total subjects
	30-40	40-50	50-60	60-70	
	Mean±SD				
TC	201.32±82.52	186.14±53.30	219.91±54.97	196.77±84.40	201.03±16.96
FTG	130.45±94.19	114.14±84.67	132.58±79.11	175.77±84.57	138.23±16.26
FPG	125.67±33.16	141.00±62.89	138.91±67.14	141.66±57.81	136.81±15.21
HDL-c	47.67±20.38	44.57±22.38	42.75±10.43	44.34±16.57	44.83±5.25
LDL-c	110.67±46.89	102.85±32.27	130.08±31.97	126.00±55.82	117.4±11.68
VLDL-c	41.36±42.07	32.82±47.89	44.78±48.55	27.64±17.48	36.65±14.63

DISCUSSION

A study reported that cardiovascular mortality was significantly and positively correlated with obesity, visible fat consumption, and sugar/jaggery consumption and was negatively correlated with intake of fruits and vegetables²⁰. The increasing heart disease prevalence in India can be accredited to high lipoprotein presence, environmental and lifestyle risk factors in population of India^{21,22}. Predisposition to metabolic syndrome is the other vital cause for greater rates of CVD in population of India²¹. BMI may not accurately reflect obesity in Indian population because obesity is categorized by higher levels of waist-hip ratios and higher body fat percentage levels at given level of BMI.

It has been reported that excessive energy-dense foods consumption high in fat, particularly saturated fat, and high in refined carbohydrates can result in weight gain, obesity and increase the risk for non-communicable diseases²³.

Asian Indians have a higher predisposition to abdominal obesity and accumulation of visceral fat which

is termed as “Asian Indian Phenotype”²⁴. The results of the present study depicted that all central obesity measures had a significant and positive correlation with FTG, FPG and VLDL-c. There is a strong correlation between greater abdominal adiposity and amplified levels of metabolic risk factors in South Asians²⁵.

CONCLUSION

The study comes out with the fact that there is an association among dietary food patterns, metabolic variables and central obesity measures. Inappropriate dietary pattern, higher central obesity measures along with metabolic complications may lead to predisposition of subjects towards CHD.

Source of Funding: Self

REFERENCES

- Gupta R, Mohan I, Narula J. Trends in coronary heart disease epidemiology in India. *Ann Glob Health*. 2016;82(2):307-315.

2. Gupta R, Guptha S, Sharma KK, Gupta A, Deedwania P. Regional variations in cardiovascular risk factors in India: India heart watch. *World J Cardiol.* 2012;4(4):112-120.
3. Krishnan MN. Coronary heart disease and risk factors in India- On the brink of an epidemic? *Indian Heart J.* 2012;64(4):364-367.
4. Khan RJ, Harvey DJ, Leistikow BN, Sirajul Haque KMHS, Stewart CP. Relationship between obesity and coronary heart disease among urban Bangladeshi men and women. *Integr Obesity Diabetes.* 2015;1(3):49-55.
5. Ghosh A, Bose K, Chakravarti S, Chaudhuri ABD, Chattopadhyay J, Dasgupta G, Sengupta S. Adiposity measures and their relationship with metabolic risk factors for coronary heart disease in Bengalee Hindu men of Kolkata, India. *Anthropol Sci.* 2004;112(2):115-119.
6. Vamadevan SA, Prabhakaran D. Coronary heart disease in Indians: Implications of the INTERHEART study. *Indian J Med Res.* 2010;132(5):561-566.
7. Ethical guidelines for biomedical research on human participants. Indian Council of Medical Research, New Delhi [Internet]; 2006 [cited 2017 Jan 4]. Available from: http://icmr.nic.in/ethical_guidelines.pdf
8. Chatterjee S, Mendez D. A comparative and correlated study of direct LDL assay with Friedwald's formula in rural Kolar population. *J Clin Biomed Sci.* 2011;1(4):158-163.
9. Sudha K, Prabhu AK, Hegde A, Marathe A, Kumar KAM. Effect of serum triglycerides on LDL estimation by Friedewald formula and direct assay: A laboratory based study. *Int J Biomed Res.* 2015;6(03):189-191.
10. Basak A. Development of a rapid and inexpensive plasma glucose estimation by two-point kinetic method based on glucose oxidase-peroxidase enzymes. *Indian J Clin Biochem.* 2007;22(1):156-160.
11. Nigam PK. Calculated low density lipoprotein-cholesterol: Friedewald's formula versus other modified formulas. *LSMR.* 2014;4(2):25-31.
12. NCEP Cholesterol Guidelines. NCEP, ATP III Executive Summary. Third Report of the National Cholesterol Education Program (NCEP) [Internet]; 2001 [cited 2017 Jan 28]. NIH Publication No. 01-3670. Available from: <http://www.scymed.com/en/smnxdj/edzr/edzr9610.htm>
13. American Diabetes Association. Diagnosis and classification of diabetes mellitus. *Diabetes Care.* 2011;34(Suppl 1):S62-S69.
14. Gopalan C, Sastri BVR, Balasubramanian SC. Nutritive value of Indian foods. National Institute of Nutrition, Indian Council of Medical Research. Hyderabad: India; 2007.
15. ICMR. Nutrient requirements and recommended dietary allowances for Indians. A report of the Expert Group of the Indian Council of Medical Research, 2009. National Institute of Nutrition [Internet]. Hyderabad: India; 2010 [cited 2017 Jan 25]. Available from: http://icmr.nic.in/final_rda-2010.pdf
16. WHO Expert Consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet.* 2004;363(9403):157-163.
17. Huxley R, Mendis S, Zheleznyakov E, Reddy S, Chan J. Body mass index, waist circumference and waist: hip ratio as predictors of cardiovascular risk- A review of the literature. *Eur J Clin Nutr.* 2010;64(1):16-22.
18. The IDF Consensus worldwide definition of the metabolic syndrome. International Diabetes Federation (IDF) [Internet]; 2006 [cited 2017 Jan 10]. Available from: https://www.idf.org/webdata/docs/MetS_def_update2006.pdf
19. World Health Organization. The global burden of disease: 2004 update. World Health Organization [Internet], Geneva; 2008 [cited 2017 Jan 25]. Available from: http://www.who.int/healthinfo/global_burden_disease/GBD_report_2004update_full.pdf
20. Gupta R, Gupta KD. Coronary heart disease in low socioeconomic subjects in India: An evolving epidemic. *Indian Heart J.* 2009;61(4):358-367.
21. Enas EA, Singh V, Munjal YP, Gupta R, Patel KCR, Bhandari S, et al. Recommendations of the second

- Indo-U.S. health summit on prevention and control of cardiovascular disease among Asian Indians. *Indian Heart J.* 2009;61(3):265-274.
22. Gupta S, Gudapati R, Gaurav K, Bhise M. Emerging risk factors for cardiovascular diseases: Indian context. *Indian J Endocrinol Metab.* 2013;17(5):806-814.
23. Gadiraju TV, Patel Y, Gaziano JM, Djoussé L. Fried food consumption and cardiovascular health: A review of current evidence. *Nutrients.* 2015;7(10):8424-8430.
24. Pradeepa R, Anjana RJ, Joshi SR, Bhansali A, Deepa M, Joshi PP, et al. Prevalence of generalized & abdominal obesity in urban & rural India-The ICMR-INDIAB Study (Phase-I) [ICMR-INDIAB-3]. *Indian J Med Res.* 2015;142(2):139-150.
25. Misra A, Khurana L. Obesityrelated non-communicable diseases: South Asians vs White Caucasians. *Int J Obes.* 2011;35(2):167-187.

Screening of *Chlamydia trachomatis* Infection among Childbearing Age Group Women in a Tertiary Center in South India

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ABSTRACT

To screen the prevalence for *Chlamydia trachomatis* in sexually active childbearing age women who attending a tertiary care center with the compliance of the infertility, dyspareunia, cervical discharge, miscarriage, etc. About 465 patients had endocervical swabs taken during pelvic examination, after an informed consent, to perform the CCT and NAAT testing has been performed. Blood specimens were also collected to screen the antibody level of CT through ELISA test. Among 76 (16%) patients were shown overall prevalence of CT infection. There is a high prevalence of *C. Trachomatis* predominantly increases every year, though the awareness among the public to be created. The significant value for the current study explains < 0.003 . It is warrants to introduce the routine screening methods in the laboratories and the hospitals.

Keywords: *Chlamydia trachomatis* (CT), *Chlamydia clearview test* (CCT), *Nucleic Acid, Amplification Test* (NAAT) methods, *ELISA, Endocervical swabs*.

INTRODUCTION

Worldwide one of the most common genital infection causing pathogens is HIV, HbsAg, *Chlamydia trachomatis* (CT), etc^{1,2}. Among this the CT took a silent and vital role in pelvic inflammatory disease, infertility, abortions, ectopic pregnancy, preterm labour are the main outcome of the infection³⁻⁵. There also increased morbidity and mortality among neonates of infected women. Maternal Chlamydia infection leads to newborn prematurity and low birth weight. About 50–75% of infants were born with one or more sites of infections like conjunctiva, nasopharynx, vagina, etc from the infected mothers⁶ Furthermore, the available Indian data show a wide variation from 3.3% to 33% based on the population, CT prevalence and methods of laboratory

confirmation⁷⁻¹⁶ (Table 1). The prevalence of CT in childbearing age group women in India has been differs from various geographic regions. Current obstetric practice in southern India does not include universal prenatal screening for CT. According to the CDC screening of CT must be performed from prenatal visit to 3rd trimester. Furthermore the screening and diagnosis by Clear view Chlamydia Test (CCT)Kit H (Inverness, Houston, TX 77038) is one of the few FDA approved rapid diagnostic tests (RDT) for CT but a wide range of sensitivity (53–73%) and specificity (68–99%) on endocervical specimens have been reported¹⁷⁻²¹. Newer NAAT technology using the Roche AmplicorH CT/NG test (Roche Molecular Systems, Inc., Branchburg, NJ 08876) shows higher sensitivity of 93.3% and specificity of 99.7% on endocervical specimens²². ELISA (Calbio tech in CA) has been performed to screen the CCT positive cases based on the manufactures guidelines²³. The current study conducted in Sri Lakshmi Narayana Institute of Medical Science, Pondicherry in 2016.

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Table 1: Prevalence of CT Studies in India

Area	Year	Age group	Study population	No.	Sample	Test	Prevalence	Ref
Vellore, India	1993	Not available	Pregnant women	273	Endocervical swab	Chlamydiazyme kit (Abbott, USA)	3.3% (95% CI: 1.2%–5.4%)	7
New Delhi, India	1995	Mean Age: 34 yrs	Generally healthy women, Gynaecological clinic, (outpatient department)	257	Endocervical swab	Chlamydiazyme kit (Abbott, USA)	23.3%	16
Mumbai, Inner City	1998	35 yrs	Suspected PID, Infertility	446	Endocervical swab	ELISA, PCR	0.2 - 0.5%	9
Mumbai	2001	18–42 yrs	Gynaecological clinic, Complications associated with reproductive health	123	Endocervical swab	ELISA, Chlamydiazyme kit	1.7 to 20% among different risk categories	13
New Delhi	2003	18–40 yrs	Symptomatic women Gynaecological clinic	280	Endocervical swab	NAAT	28% (18–25 yrs)	15
New Delhi	2003	19–36 yrs	Pregnant women	350	Endocervical swab	DFA & PCR	18.8% (95% CI 14.76–22.96%)	14
Tamilnadu, South India	2004	15–45 yrs	Healthy adult population, clinic	1066 (serum), 841 (urine) Female samples	Serum, urine	IgM-ELISA, urine NAAT, PCR	3.3% ELISA, 1.1% PCR (95% CI: 0.4–1.8%)	10
Chennai	2005	N/A	STI clinic (high risk)	143 men & women	Serum, genital swab endocervical/urethral	Culture/nested PCR (MOMP); CT Serum: IgG	30.8% by nested PCR (MOMP)	11
Aligarh, North India	2009	18–40 yrs	Obstetric clinic, secondary infertility, pregnant women (control subjects)	70	Endocervical swab	Cell culture, ELISA	55%–2uninfertility; 5.5% pregnant women	12
Karnataka State, South India	2010	Mean age: 30.7 yrs	Symptomatic women Gynecological clinic	450	Urine, Endocervical Swab	NAAT, PCR	0.88–2.6%, vaginal discharge; 1.8–5.9 vaginal discharge with clinical cervicitis	8
Kolkatta	2012	18–45 yrs	Gynecological and STD clinic	34	Serum, Endocervical swab	ELISA, PCR	28.7	24
Vellore	2016	25–35 yrs	Both Symptomatic and Asymptomatic Women	99	Endocervical swab	NAAT	10% Vaginal discharge;	25

MATERIALS AND METHOD

In this cross-sectional study, we enrolled women who had the history of infertility, dyspareunia, cervical discharge, miscarriage, etc and attending the Gynaecology out Patient Department (OPD) of Sri Lakshmi Narayana Institute of Medical Science, Pondicherry. The Outpatients are from Pondicherry and Tamilnadu. Outpatient were randomly chosen and explained about the procedure. Of those who were willing to the test with well informed written consent and follow-up 465 patients had an endocervical swab and blood. (Table 2) With the help of sterile bivalve speculum cervix the cervix was visualized, before doing a digital examination. Endocervical swabs were then collected chlamydia swab (Inverness, Houston, TX 77038). On the same day the sample was processed in

the Microbiology and Immunology laboratories. The Chlamydial antigen was detected using the Clearview Chlamydia Test (CCT) kit (Inverness, Houston, TX 77038) as per the manufacturer's instructions. CCT principle based on enzyme immune assay, this is a rapid point of care immunochromatographic tests^{19,20}. The NAAT samples were tested using the Roche AmplicorH CT/NG test for Chlamydia trachomatis (Roche Molecular Systems, Inc., Branchburg, NJ 08876). The test was performed according to the instructions has mentioned. Internal positive controls all tested positive. Screening of antibodies (IgM and IgG) has been processed in ELISA from the blood sample collected from the patients. With help of SPSS 16.0 statistics software (Released 2007. SPSS for Windows, Version 16.0. Chicago, SPSS Inc.) The results were analysed. The study was approved by the Institutional Review Board and Ethics Committee.

Table 2: Sample received from the Childbearing Age Group Patients

S. No	Clinical Group	Participants (n = 465)		Age in Yrs		Test Positive for CT*		
		No.	%	Range	Median	Test	No.	%
1.	Asymptomatic	83	18	18-40	30	ELISA	12	15
2.	Infertility	157	34	16-45	28	NAAT	24	16
3.	Dyspareunia	76	16	20-40	26	NAAT	08	11
4.	Cervical discharge	80	17	20-30	27	CCT	19	24
5.	Miscarriage	69	15	19-35	28	CCT, NAAT	13	19

*P< 0.003

Notes: CT- *Chlamydia trachomatis*, CCT - Chlamydia Clearview Test, NAAT - Nucleic Acid Amplification Test methods, ELISA- Enzyme Linked Immuno Sorbent Assay.

RESULTS

The study was conducted at Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry from Mar 2015 –Apr 2016. 76 (16%) subjects out of 465 recruited tested positive with the CCT. The participants were between 16 to 45 years old with a median age of 29 yrs were married with duration of 2 to 10 yrs. Among 76 subjects out of 12 were shown asymptomatic patients positive for the tests. The number of women in asymptomatic clinical histories like Lower abdominal pain, low back ache, pelvic pain, dyspareunia, and cervical discharge, etc. Data were analyzed using Statistical Analysis Systems software (SPSS 16.0). T-tests, means and standard deviations were used to compare means of normally distributed data. Chi-square tests were used to

assess differences in proportions. P values, < 0.003 were considered statistically significant.

DISCUSSION

The screening of the CT by the Rapid methods plays a main part for the early detection and treatment. *Chlamydia trachomatis* infection in healthy childbearing women in a setting using NAAT technique has been proven in past years. The overall prevalence of genital chlamydial infection in the present study shows was 16%. Tissue culture is the gold standard method to screen the CT though high range of technical issues are predominant and most of the hospitals are not available with the culture methods, hence serological methods and rapid, cost effective, time saver and simple to

perform. The Prevalence study of the CT is based on the demographic area, according to the previous studies in India the ratio of the prevalence is differs from 3.3% to 33 %, hence the prevalence ratio in Tamilnadu is 10 to 30% has reported but the current prevalence study shows the CT infections is about 16% in and around Puducherry. It shows that the prevalence of the CT is predominantly increases every year. Most commonly the CT infections higher in sexually active patients among the age group of 20-30. Based on the clinical manifestations direct correlation has been performed in this current study and co-infections were excluded. Totally 76 (16%) patients were reported as a positive for CT in that 12 patients were asymptomatic but shows positive result from the diagnostic method. All asymptomatic patients had history of adverse sequelae associated with chlamydial infection, with all symptoms of pelvic inflammatory disease (PID), vaginal discharge, etc. About 64 patients had symptomatic history of lower abdominal pain, low back ache, pelvic pain, dyspareunia, and cervical discharge. Among the 64 patients few of them had with combinations of various symptoms. These findings could suggest, statistically significant of current *C. Trachomatis* infection among childbearing individuals. All the 76 patients have shown positive for all the tests. The statistical analysis was performed with the help of SPSS 16.0 version of the software. Based on the Chi square test various proposition has been identified and calculated the significant value. Present study describes < 0.003 significance. IT shows that the awareness among the STD is predominately less in CT while comparing to the other STD like HIV, HbsAg, Syphilis, etc.

CONCLUSION

Study findings suggest that current *C. trachomatis* infection among childbearing age group women's was statistically significant. The asymptomatic patients also involved in the screening for the better management and to provide proper knowledge about the infection. This study also reveals the awareness among the public and also warrants the physicians to involve the routine screening in the OPD of the hospital and the laboratory too. This study concludes that it provide enough knowledge to the society and view the serious threats of the infections and prevalence of *C. trachomatis* in future.

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REFERENCES

1. Global Prevalence and Incidence of Selected curable Sexually Transmitted Infections-Overviews and estimates. Geneva: World Health Organization; 1st February, 2001.
2. World Health Organization , Sexually Transmitted Diseases – Chlamydia trachomatis, 2010.
3. Bébéar C, de Barbeyrac B. Genital Chlamydia trachomatis infections. Clin Microbiol Infect. 2009; 15(1):4-10.
4. Darville T, Hiltke TJ. Pathogenesis of genital tract disease due to Chlamydia trachomatis. J Infect Dis. 2010;201(2):114-125.
5. Haggerty CL, Gottlieb SL, Taylor BD, Low N, Xu F, Ness RB. Risk of sequelae after Chlamydia trachomatis genital infection in women. J Infect Dis. 2010;201(2):134-155.
6. Chen CJ, Wu KG, Tang RB, Yuan HC, Soong WJ. Characteristics of Chlamydia trachomatis infection in hospitalized infants with lower respiratory tract infection. J Microbiol Immunol Infect. 2007;40(3): 255–259.
7. Alexander R, Mathai E, Nayyar V, Mathew M, Jasper P. Low prevalence of chlamydial endocervical infection in antenatal south Indian women. Genito urin Med. 1993;69(3): 240–241.
8. Becker M, Stephen J, Moses S, Washington R, Maclean I. Etiology and determinants of sexually transmitted infections in Karnataka state, south India. Sex Transm Dis. 2010; 37(3): 159–164.
9. Brabin L, Gogate A, Gogate S, Karande A, Khanna R. Reproductive tract infections, gynaecological morbidity and HIV seroprevalence among women in Mumbai, India. Bull World Health Organ. 1998; 76(3): 277–287.
10. Joyee AG, Thyagarajan SP, Rajendran P, Hari R, Balakrishnan P. Chlamydia trachomatis genital infection in apparently healthy adult population of Tamil Nadu, India: a population-based study. Int J STD AIDS. 2004;15(1): 51–55.
11. Joyee AG, Thyagarajan SP, Reddy EV, Venkatesan C, Ganapathy M. Genital chlamydial infection in STD patients: its relation to HIV infection. Indian J Med Microbiol. 2005; 23(1): 37–40.

12. Malik A, Jain S, Rizvi M, Shukla I, Hakim S. Chlamydia trachomatis infection in women with secondary infertility. *Fertil Steril*. 2009; 91(1): 91–105.
13. Mania-Pramanik J, Meherji PK, Gokral JS, Donde UM. Chlamydia trachomatis infection in an urban setting. *Sex Transm Infect*. 2001; 77(2): 141.
14. Rastogi S, Das B, Salhan S, Mittal A. Effect of treatment for Chlamydia trachomatis during pregnancy. *Int J Gynaecol Obstet*. 2003; 80(2): 129–137.
15. Singh V, Salhan S, Das BC, Mittal A. Predominance of Chlamydia trachomatis serovars associated with urogenital infections in females in New Delhi, India. *J Clin Microbiol*. 2003; 41(6): 2700–2702.
16. Singh V, Sehgal A, Satyanarayana L, Gupta MM, Parashari A. Clinical presentation of gynecologic infections among Indian women. *Obstet Gynecol*. 1995; 85(2): 215–219.
17. Blanding J, Hirsch L, Stranton N, Wright T, Aarnæs S. Comparison of the Clearview Chlamydia, the PACE 2 assay, and culture for detection of Chlamydia trachomatis from cervical specimens in a low-prevalence population. *J Clin Microbiol*. 1993; 31(6): 1622–1625.
18. Hislop J, Quayyum Z, Flett G, Boachie C, Fraser C. Systematic review of the clinical effectiveness and cost-effectiveness of rapid point-of-care tests for the detection of genital chlamydia infection in women and men. *Health Technol Assess*. 2010;14(29): 1–97.
19. Kluytmans JA, Goessens WH, Mouton JW, van Rijsoort-Vos JH, Niesters HG. Evaluation of Clearview and Magic Lite tests, polymerase chain reaction, and cell culture for detection of Chlamydia trachomatis in urogenital specimens. *J Clin Microbiol*. 1993; 31(12): 3204–3210.
20. Saison F, Mahilum-Tapay L, Michel CE, Buttress ND, Nadala EC Jr. Prevalence of Chlamydia trachomatis infection among low- and high-risk Filipino women and performance of Chlamydia rapid tests in resource-limited settings. *J Clin Microbiol*. 2007; 45(12): 4011–4017.
21. Yin YP, Peeling RW, Chen XS, Gong KL, Zhou H. Clinic-based evaluation of Clearview Chlamydia MF for detection of Chlamydia trachomatis in vaginal and cervical specimens from women at high risk in China. *Sex Transm Infect*. 2006; 82(5): 33–37.
22. Livengood CH, Wrenn JW. Evaluation of COBAS AMPLICOR (Roche): accuracy in detection of Chlamydia trachomatis and Neisseria gonorrhoeae by coamplification of endocervical specimens. *J Clin Microbiol*. 2001; 39(8): 2928–2932.
23. Divekar AA, Gogate AS, Shivkar LK, Gogate S, Badhwar VR. Disease prevalence in women attending the STD clinic in Mumbai (formerly Bombay), India. *Int J STD AIDS*. 2000;11(1):45-48.
24. Sawhney MP, Batra RB Chlamydia trachomatis seropositive during pregnancy *Indian Journal of Dermatology Venereology Leprology* 2003;69:394-395.
25. Nandeibam Y, Laishram S, Lionel J. Prevalence of Chlamydia trachomatis in a tertiary center in South India. *J Med Soc* 2016;30:31-34.

Problem Focus Coping Model to Face Working Environment Stressors Prevents Unsafe Action among Workers in a Steel Construction Plant

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ABSTRACT

Social Security Employment Agency East Java also reported that deaths from occupational accidents were mostly in Gresik where 43 people died out of 310 who died in the entire region of East Java. According to Baker (2011), one of the causes of accidents is job stress. One cause of job stress is heavy work pressure.

This study developed a problem focus coping model mechanism against environmental stressors to prevent unsafe work action in steel construction workers at production line. Design used in this study was cross sectional. Respondents studied were as many as 150 individuals who conducted unsafe action, mostly in moderate category, comprising 64 respondents (42.67%). Indicators of workplace stressors was in moderate category, in which managerial characteristic comprised 90 persons (60%) and interpersonal relationships of 100 persons (66.67%). Effect of coping mechanisms against unsafe action was highly significant with structural coefficient of -0.236.

Problem focus coping mechanisms negatively affect unsafe action in respondents at production section of the steel construction, meaning that the higher the coping mechanism, the lower the unsafe action experienced by respondents at production section of the steel construction.

Keywords: *problem focus coping model, environment stressors, unsafe action, workers construction*

INTRODUCTION

Workplace accidents are mostly caused by unsafe behavior. The percentage of causes of accidents, namely 3% for reasons which can not be avoided (such as natural disasters), besides 24% due to environment or equipment that do not qualify, and 73% due to unsafe behavior or human factors (Suma'mur, 1989).

The human factor has a role where the men as the actors work has many shortcomings, such as lack

of knowledge, lack of skills, motivation is not good, physical and mental stress, cause workplace accidents occur, so that not only the working conditions, but human beings as well as operators who have a lot of weakness.¹

Social Security Agency (BPJS) Employment of East Java Province reported on in 2013 in East Java reached 310 people died from workplace accidents of 17 360 cases of accidents. Workers who suffered permanent disability and disabled people as much as 6 476 workers function of the 1,875,951 workers who are actively working. Employment BPJS East Java also reported that deaths from occupational accidents most was Gresik which 43 people died of the 310 workers who died in the entire region of East Java and accident cases was mostly in the age range between 21 years to 35 years.²

According to research Baker³ one of the causes of accidents are the source of job stress. One cause of work stress is the pressure of work. Heavy work pressure and pressed for time to finish the job can be stressful work

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so that these events can decrease the body’s resistance to disease.

Work stress experienced by each individual differently depending on the individual how to deal with stress is called coping. Folkman⁴ define coping strategies as changes in thought and behavior that is used by a person who in the face of pressures from outside and inside caused by the transaction between a person and the environment are assessed as a stressor. Coping will consist of efforts undertaken to reduce the presence of stressors. Coping has been known as a mediator of the demands of work and workers. Coping done to resolve the problem and balance the emotions of individuals in stressful situations.

METHOD

This study develops a model problem focus coping mechanisms to stressors working environment,

prevent unsafe action on steel construction workers on the production line. Design used in this study was cross sectional. In the same period, some activities that analyze the stressors in the work environment that includes managerial characteristics, design work, interpersonal relationships, roles and responsibilities, career development, and working environment (noise, work climate, and dust). This research was conducted in the steel construction company Gresik on all workers in the Fabrication.

RESULTS

Respondents’ characteristics: The research was conducted on a steel construction worker on the production line. Mild stress levels were experienced by as many as 80 workers, stress was as many as 65 workers, and severe stress as much as 5 workers. The characteristics of the research subjects or respondents are presented in Table 1.

Table 1: Characteristics of Respondents, Workers of Production Section in a Steel Construction

No.	Subjects’ characteristics	Notes	Freq. (f)	Percentage (%)
1.	Education	a. Bachelor	5	3.33
		b. Diploma	5	3.33
		c. Vocational School	60	40
		d. High School	80	53.33
2.	Tenure	a. < 3 Years	80	53.33
		b. 4 – 6 Years	20	13.33
		c. 7 – 9 Years	20	13.33
		d. 10 – 12 Year s	20	13.33
		e. >12 Years	10	6.67
3.	Age	a. 21 years sd 30years	80	53.33
		b. 31 years sd 40 years	40	26.67
		c. 41 years sd 50 years	25	16.67
		d. > 50 years	5	3.33
4.	Stress level	a. High	14	9.33
		b. Moderate	86	57.33
		c. Low	50	33.33

Table 1 shows that the respondents in this study mostly educated well enough that senior high school, but the number that most are educated high school is 80 (53.33%) of workers, while vocational amounted to 60 (40%) workers. Judging from his past is still relatively low when compared with the longest tenure is 15 years. Jobs in the company of heavy equipment is at risk of an accident steel construction work, so this should be a reliable worker skills. Age-owned steel construction workers in this study pertained mostly young adults are in the age range 21 years to 30 years as many as 80 workers (53.33%), thus psychologically emotional still prominent, and the results of the study are mostly located in stress levels were respectively 86 people (57.33%).

Table 2. Frequency Distribution of Unsafe Actions in Steel Construction Workers

No.	Score Interval	Category	Frequency	
			N	Percentage (%)
1.	3.26-4.00	High	6	4
2.	2.51-3.25	Moderate	64	42.67
3.	1.76-2.50	Less	60	40
4.	1.00-1.75	Low	20	13.33
	Total		150	100

Table 2 shows that of the 150 respondents surveyed who perform unsafe acts the most in the category of moderate, namely 64 respondents (42.67%).

Environmental Stressors In Steel Construction Workers at Production Section

Table 3: Respondents' Response Distribution On Stressor Indicators

Working Environment Stressor Indicators	Respondents' response								Total	
	High		Moderate		Less		Low			
	n	%	N	%	n	%	N	%	n	%
Managerial characteristics	21	14	90	60	29	19.33	10	6.67	150	100
Work design	18	12	85	56.67	37	24.67	10	6.67	150	100
Interpersonal relationship	20	13.33	100	66.67	15	10	15	10	150	100
Role and responsibility	5	3.33	52	34.67	78	52	15	10	150	100
Career development	8	5.33	20	13.33	118	78.67	4	2.67	150	100

Table 3 shows that of the 150 respondents obtained information that the response of employment to environmental stressors of work on indicators of the characteristics of managerial largely being of 90 respondents (60%), while the indicator of the design work of most of the respondents have a response with moderate levels of 85 respondents (56.67%). Indicators of interpersonal relationships most respondents had a moderate level of 100 (66.67%), while the roles and responsibilities of the majority of the respondents have less than 78 responses (52%). Responder indicator career development largely ie 118 respondents (78.67%) had a response less.

Job Stress in Steel Construction Workers at Production Section

Table 4: Distribution Of Respondents Response To Job Stress Indicators

Job Stress Indicators	Respondents' response								Total	
	High		Moderate		Less		Low			
	N	%	n	%	N	%	n	%	N	%
Physical symptoms	29	19,33	66	44	25	16,67	30	20	150	100
Behavioral symptoms	28	18,67	72	48	35	23,33	15	10	150	100
Emotional symptoms	22	14,67	78	52	30	20	20	13,33	150	100

Table 4 shows that respondents to job stress on indicators of physical symptoms mostly have feedback was that 66 respondents (44%), as well as on indicators of behavioral symptoms showed respondents in the medium category, which is 72 respondents (48%), as well as on indicators of emotional symptoms most of the respondents had a moderate response, namely 78 respondents (52%).

Coping Mechanisms in Steel Construction Workers at Production Section

Table 5: Frequency Distribution of Coping Mechanisms in Steel Construction Workers

No.	Score Intervals	Categories	Frequency	
			N	Percentage (%)
1.	3.26-4.00	High	38	25.33
2.	2.51-3.25	Moderate	87	58
3.	1.76-2.50	Less	15	10
4.	1.00-1.75	Low	10	6.67
	Total		150	100

Table 5 shows that the respondents to the distrubusi coping mechanisms are mostly located at a moderate level, namely 87 respondents (58%). The above table explains that most of the respondents have a response to the mechanism of problem focused coping are in the range of scores from 2.51 to 3.25. Problem focused coping done by respondents in the face of environmental stressors tend to work to resolve the problem by seeking information to others, in this case the co-workers, supervisors, and people are more aware of these issues (safety officer).

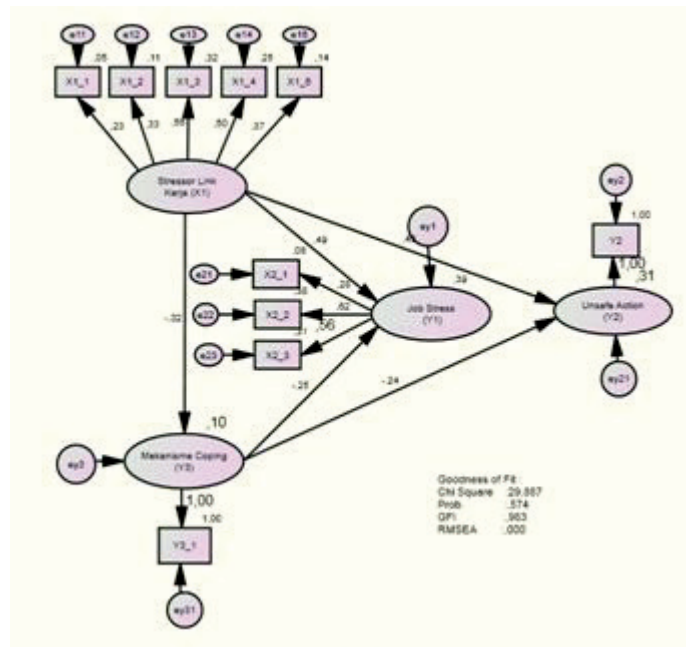


Figure 1: Analysis of standardized solution model test

The image above describes the unsafe action models due to job stress test analysis model of standardized solution. As for the view factor loading of each indicator in the latent variables (constructs) can be explained in Table 6.

Table 6: The Results of Factor Loading of Each Latent Variable Indicators

Latent variables (Construct)	Variable Indicators (Observed)	λ	p_λ	δ	p_δ	Notes
Working environment stressor	Managerial characteristics	0.228	0.000	0.150	0.000	Valid and Reliable
	Work design	0.329	0.005	0.165	0.000	Valid and Reliable
	Interpersonal relationship	0.562	0.002	0.144	0.000	Valid and Reliable
	Role and responsibility	0.495	0.002	0.274	0.000	Valid and Reliable
	Career development	0.374	0.004	0.234	0.000	Valid and Reliable

Conted...

Job Stress	Physical symptoms	0.282	0.000	0.250	0.000	Valid and Reliable
	Behavioral symptoms	0.619	0.000	0.215	0.000	Valid and Reliable
	Emotional symptoms	0.555	0.000	0.372	0.000	Valid and Reliable

Table 6 explains that all the indicators that make up the construct stressors working environment consists of indicators of managerial characteristics, design work, interpersonal relationships, the burden and responsibility, and career development is declared valid and reliable. In the construct of job stress all indicators are also declared valid and reliable. The effect of each construct the steel construction workers on the production can be seen in Table 7.

Table 7: Factors Affecting Unsafe Action

Independent variables (X)	Dependent variables (Y)	Structural coefficient	p	Notes
Working environment stressor	Coping mechanisms	-0,323	0,006	Significant
	Job Stress	0,494	0,019	Significant
	Unsafe Action	0,433	0,003	Significant
Problem focus coping mechanisms	Job Stress	-0,250	0,014	ignificant
	Unsafe Action	-0,236	0,000	Significant

Table 7 describes the effect of each construct. At construct stressor effect on the working environment problem focus coping mechanisms. It is shown that the P value $p = 0.006$, workplace stressor significantly affect job stress and significantly affect the unsafe action with a P value > 0.05 . Problem focus coping mechanisms have a very significant influence on job stress and unsafe actions, with a value of $p = 0.014$ and $p = 0.000$, the overall value of $P > 0.05$.

The results of the analysis of the data in Table 7 shows the data that the effects of environmental stressors working with unsafe action is very significant with $P = 0.003$ and the value of structural coefficient was 0.433. The higher the working environmental stressors, the higher the working attitude is not safe or unsafe incident action on workers. Suma'mur¹ says that the work environment a major effect on worker morale. Factors important state work environment in an industrial accident consists of a household maintenance (housekeeping).

Effect of Working Environmental Stressors on Problem Focused Coping Mechanisms in Workers of Production Section in a Steel Construction: Results loading factor analysis in Table 6 explains that interpersonal relationships contribute most to environmental stressors that work $\lambda = 0.562$. Interpersonal relationship in question is the relationship of workers with coworkers, superiors and clients.

Roles and responsibilities in the work environment stressor also donated substantial work with the value $\lambda = 0.439$.

Effect of Working Environmental Stressors on Job Stress in Workers of Production Section in a Steel Construction: Distribution of respondents to job stress can be seen by several indicators, namely physical symptoms, symptoms of behavioral and emotional symptoms. Based on the research results can be seen in Table 4 data showed that the indicators of physical symptoms most of the respondents have a poor response of 25 respondents (16.67%). This can occur because workers are still lacking or may not even know about the symptoms that occur that can lead to job stress, especially about the physical symptoms of job stress. Workers may also not realize that they had experienced the symptoms that lead to job stress.

Conditions of high workload at the production of steel construction will certainly lead to workers in that section experiencing work stress

The results of the analysis of Table 7 shows that the working environment stressor significant effect on job stress, $P = 0.019$ and 0.494 structural coefficient. Increasingly there are many sources of stress in the workplace, the more the symptoms of stress caused by workers. As well as the beginning of the explanation, the symptoms of stress is very much no physical symptoms, symptoms of behavioral and emotional symptoms.

According to research conducted by Suharto⁷ says that the stressor physical environment has an indicator which can influence the job stress of a worker, namely the design workspace, design work, lighting systems, air circulation system, the level of visual privacy. While the measuring job stress can be measured through a stomach ache in the works, headache at work, boredom at work, tension in the work, procrastinate, often smoke in the work, often absent from work. This shows that the indicators on the physical environmental stressors variables can give the effect of causing job stress on steel construction workers on the production line.

Effect of Coping Mechanisms on Unsafe Action in Workers of Production Section in a Steel Construction:

In Table 5, of the 150 respondents who are at coping mechanism categories were as many as 87 respondents (58%) are at the level of action being unsafe. Effect of problem focus coping mechanisms against unsafe action is very significant structural coefficient -0, 236, which its mean when someone is having a problem focus coping rate mechanism of high means the individual can cope with stress in the workplace, the unsafe action taken is lower.

Coping is any individual efforts to set environmental demands and conflicts arising, reducing mismatches/ perception gap between the demands of stressful situations in the individual's ability to meet these demands. Sarafino⁶, problem focused coping (PFC) is a form of coping are more geared to the effort to reduce the demands of stressful situations. artinyacoping that appears focused on individual problems that will cope with stress by studying ways new skills.

CONCLUSIONS

1. Unsafe action undertaken by respondents at production section in a steel construction tended to violate the SOP, followed by not using PPE (personal protective equipment) or using PPE with improper functions with physical exposure to working environment.
2. Working environment stressors, including managerial characteristics, work design, interpersonal relationships, roles and responsibilities at work and physical factors of work environment, have positive effect on job stress among respondents at production section of the steel construction. The higher the working

environmental stressors, the higher the coping mechanisms of the respondents at production section of the steel construction.

3. Working environment stressors, including managerial characteristics, work design, interpersonal relationships, roles and responsibilities in employment and career development, have positive effect on respondents' unsafe action against construction steel in production. The higher the workplace stressors, the higher the unsafe action in respondents at production section of the steel construction.
4. Problem focus coping mechanisms negatively affect unsafe action in respondents at production section of the steel construction, meaning that the higher the coping mechanism, the lower the unsafe action experienced by respondents at production section of the steel construction

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REFERENCES

1. Suma'mur. 2009, Higiene Perusahaan dan Kesehatan Kerja (Hiperkes), Sagung Seto: Jakarta.
2. BPJS kesehatan. 2013. Pedoman Administrasi Pelayanan Kesehatan BPJS Kesehatan
3. Baker, Roger. 2011. Understanding Panic Attack and Overcoming Fear. Lion Hudson plc, England.
4. Folkman S, Lazarus RS. An analysis of coping in a middle-aged community sample. Journal of health and social behavior. 1980 Sep 1:219-39.
5. Robbins, Stephen. 1990. Organization Theory: Structure, Design and Applications, Prentice Hall, Inc., Englewood Cliffs, New York., 1996, Organizational Behavior: Concepts, Controversies, Applications, 7th ed, Prentice Hall, Inc., Englewood Cliffs, New Jersey

6. Sarafino, E. P. 1997, *Health Psychology: Biopsychology*. USA
7. Suharto, Ari. (2014). Pengaruh Stressor Lingkungan Kerja terhadap Kinerja Karyawan melalui Job Stress. *Jurnal. Fakultas Ekonomi & Bisnis Universitas Brawijaya*.
8. Suma'mur. 1989. *Higene Perusahaan dan Kesehatan Kerja*. PT. Toko Gunung Agung. Jakarta.
9. Suma'mur. 2009, *Higiene Perusahaan dan Kesehatan Kerja (Hiperkes)*, Sagung Seto: Jakarta.
10. Bird FE & Germain GL 1986, *Practical Loss Control Leadership*, International Loss Control Institute, Loganville, Georgia College, New York.
11. Cooper, C. L, et al 2010, *Organizational Stress Management*, Palgrave Macmillan, New York
12. Cooper, C. L. & Williams, S. (1998). "Measuring Occupational Stress: development of the Pessure Management Indicator", *Journal of Occupational Health Psychology*, vol. 3, no. 4, pp. 306-321
13. Cooper, D. 2001 *Improving Safety Culture: A Practical Guide*. Hull: Applied Behavioural Science.
14. Cooper, M. D., (2000). *Towards a Model of Safety Culture*. Safety Science.
15. Keputusan Menteri Tenaga Kerja Nomor 04/MEN/1987 tentang Panitia Pembina Keselamatan dan Kesehatan Kerja.
16. Widajati, Noeroel. 2015. *Model Unsafe Action Akibat Job Stress Pada Pekerja Konstruksi Baja*

Knowledge and Attitude about Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome among Married Men in Kangrali, India: A Cross-Sectional Study

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ABSTRACT

Background and Objective: Acquired immune deficiency syndrome (AIDS) is an infectious disease, which lacks curative treatment as well as vaccine. The only option to halt the progression of human immunodeficiency virus (HIV) is to increase the knowledge of people regarding its modes of transmission and prevention and help people change their high-risk behavior. The present study has been undertaken in a rural area, Kangrali subcenter of Handignur, to determine the knowledge and attitude of rural married men regarding HIV/AIDS.

Materials and Method: A ten-month cross-sectional study was conducted among 400 married men residing in Kangrali, India selected randomly. Ethical clearance was obtained from the IEC. Socio-demographic data and knowledge about different aspects of HIV/AIDS was obtained using a predesigned, pretested questionnaire.

Results: Out of 400 selected married men, all had heard about HIV/AIDS. Majority (68.25%) of them learnt about AIDS from mass media. Majority (60.25%) knew that HIV/AIDS gets transmitted by sexual contact. Knowledge on prevention of HIV/AIDS by using condoms was known to only 10.25%; whereas prevention by avoiding multiple sex partners was known to 43.75% of participants. About 63% of men's attitude was to give support to HIV-positive patients, whereas 5.25% of men had negative attitude towards HIV-positive patients.

Conclusion: This study revealed that knowledge and attitude score about HIV/AIDS in married men was significantly associated with the age, literacy level, socioeconomic status, occupation, and type of family.

Keywords: HIV/AIDS, knowledge, attitude, married men, rural area

INTRODUCTION

India has the third-highest population with human immunodeficiency virus (PLWH).¹ The total number of PLWH in India is estimated to be 21.17 lakhs in 2015.² Women account for two-fifth (40.5%) of total HIV infections, while 6.54% of infections are among children (<15 years)² and the adult HIV prevalence

rate is estimated to be 0.27%.³ In Karnataka, the highest prevalence of AIDS has been accounted in the part of the state due to the "Devadasi" system⁴ and estimated number of population with HIV is found in the Karnataka 1.99 lakhs.²

People in the age-group of 15-49 years have been reported to be affected with HIV/AIDS.⁴ The epidemic of infection is moving into the general populations, although it largely concentrated on high-risk groups. For the effective prevention and treatment of HIV/AIDS, a significant research and knowledge on HIV and related stigma acts as an important tool in understanding the "hidden factors" of the epidemic HIV/AIDS. These findings when incorporated into national prevention

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strategies helps in reducing the transmission of virus in the population.⁵

HIV is considered as a unique when compared to other communicable diseases, as the disease is associated with ignorance, fear, misinformation, and denial, which is particularly more intense among the rural population where there is a weak referral health systems.^{6,7}

Hence, the present study was performed to know the knowledge and attitude of the married men 21-44 years residing in rural area toward HIV/AIDS.

MATERIALS AND METHOD

Study subjects: A cross-sectional study was conducted from March to December 2009 among married men aged between 21-44 years, voter list was used to identify the study population. Among 12,000 people in the Kangrali village, 1,425 men aged 21-44 years were identified.

Sample size was calculated by using formula $4pq/d^2$. Here p was taken as 50(% of married men knew about HIV/AIDS), d as 10 % of 'p'. Sample size came to 400. Study participant were selected randomly after preparing sampling frame. A pilot study was conducted and required changes were made. Information was collected regarding knowledge and attitude about HIV/AIDS. Written consent was obtained from the participants.

Two domains were considered in the study, which included the knowledge and the attitude domain. In knowledge domain, the participants were asked about their knowledge regarding modes of transmission and prevention about HIV/AIDS. In attitudes domain, the study participants were evaluated based upon their attitude towards the HIV infected person and about voluntary testing etc.

Scoring system: To know the correct knowledge and attitude scoring system was developed. The correct answer to the question was given 1 mark, zero mark for nonresponse, and -1 mark for incorrect answer.

Participant with mean score less than -1 SD score was considered to be having poor knowledge and a wrong attitude. The mean score ± 1 SD score was considered to be having average knowledge and attitude. Mean score $> +1$ SD score was considered to be having good knowledge and attitude

Statistical analysis: Statistical analysis was performed by using statistical software SPSS 16. Chi-square test was used to find the association of socio-demographic factors with knowledge, and attitude about HIV/AIDS.

RESULTS AND DISCUSSION

The mean age of study participants was 27 ± 5 years in which 92% were literates. Out of 400 participants, 40.25% were farmers and 5.75% were businessmen. Also, 72.50% of participants belonged to the nuclear families. Maximum number of the study participants (24.75%) had the habit of chewing tobacco.

Knowledge regarding HIV/AIDS: All of the participants were aware of AIDS, 68.25% of participants got information about HIV from mass media, least number of participant came to know about it from other sources. Lack of communication, education, and information might be the cause of lower percentage of awareness. However, the knowledge of HIV/AIDS among married men in Kangrali may be because of the frequent visit of the people to Belgaum city which is nearby. This was consistent with the studies conducted by Nubed et al. and Rohtak (1999).^{8,9} These studies depicted the role of mass media in spreading knowledge regarding HIV/AIDS.

Approximately 52.75% of participants knew that AIDS is infectious; however, more than 30% believed it is noninfectious. Also, 52.25% of participants knew that AIDS has no cure while 30.50% had no idea about it. In a cross-sectional study conducted among men in a rural population, Mugalur, 14% of respondents felt that there is a cure for AIDS while 24% were not sure.¹⁰

Majority (60.25%) of the participants knew that HIV is transmitted through sexual contact; however, only 1.50% thought it could be transmitted from mother to child. Approximately, 6.25% of participants had the misconception that HIV could be transmitted through mosquito bite.

A similar cross-sectional study in Mugalur revealed that 86% of participants knew that sexual transmission was the main mode of transmission of HIV, 77% knew about blood transfusion as one of the modes of transmission, 77% knew about unsterilized needles/syringes, and 74.5% knew that an infected pregnant mother could transmit the infection to her child.¹⁰

A study conducted by Nubed et al.⁹ also reported with misconceptions about routes of transmission. These studies showed that misconception regarding the HIV/AIDS transmission existed even though there was good knowledge about sexual transmission.¹¹

Knowledge regarding prevention of AIDS: About 43.75% of married men believed that there was availability of vaccine for HIV/AIDS while less than 7% thought vaccine is not available for AIDS. About 10.25% of married men felt use of a condom prevents HIV while avoiding multiple sex partners was known to 43.75% of the participants. (Table 1)

Table 1: Knowledge of married men regarding prevention of HIV/AIDS

Prevention by	Percentage
Avoiding multiple partner	43.25
Avoiding drug addiction	13.75
Using condom	10.25
Using sterilized needle	06.25
Don't know	27.30
Total	100

In a similar study conducted by Firoza et al., most of the respondents agreed that the usage of the condom is an important preventive measure of HIV transmission. Other methods were thought to be avoiding unsafe sex, sharing items such as blades, needles and syringes, and avoiding untested blood transfusion. However, most of the respondents answered correctly indicating their

good knowledge of the preventable measures of HIV (67.2%).¹²

Attitude of the married men towards HIV/AIDS: Approximately 63% of the participants agreed to give support to PLWH while 5. 25% of participants had a negative attitude toward the person with HIV/AIDS. When asked about their willingness to get their HIV test done, 79.25% of men were ready for the test and the rest refused for the test.

Approximately, 71.25% of the participants agreed to maintain a good friendship with a HIV-infected person while approximately 37.25% participants had a negative opinion on continuing the friendship with a HIV-infected individual. More than 64% of participants had a positive attitude on continuation of the job for a HIV infected person while 23.25% had a negative thinking about the same. When asked about their view on sending the children of HIV-positive children to school, approximately 60.25% of the participants expressed positive attitude while the rest (37.75%) expressed negative attitude.

A similar study was conducted by Shoban et al among men in a rural population. According to this study, 57% of men expressed that the person with HIV must be isolated and approximately 22% felt that they must be kept in prison.¹⁰ Another study performed among 153 English-speaking adults in Calcutta, showed that more than one-third of the study population refuses to have dinner or continue to work with a person infected with HIV and approximately 50% of them believed that all the HIV-positive patients must be quarantined.¹³

Table 2: Association between socio-demographic variation and knowledge and attitude score

Particulars	Number	Poor score, n (%)	Average score, n (%)	Good score, n (%)	χ^2	P value
Age (years)						
21-26	34	16 (66.67)	8 (23.53)	10 (29.41)	58.961	0.000
27-32	152	40 (26.32)	80 (52.63)	32 (21.05)		
33-38	88	16 (10.18)	72 (81.82)	0 (0)		
39-44	126	40 (31.75)	48 (38.10)	38 (30.16)		
Total	400	112	208	80		
Education						
Illiterate	32	32 (100)	0 (0)	0 (0)	188.231	0.000
Primary	64	40 (62.50)	24 (37.50)	0(0)		
Secondary	184	32 (17.39)	112 (60.87)	40 (21.73)		
Senior secondary	96	8 (08.33)	64 (66.67)	24 (25)		
Degree	24	0 (0)	8 (33.33)	16 (66.67)		
Total	400	112	208	80		

Conted...

Occupation						
Farmers	161	40 (24.85)	97 (60.25)	24 (14.91)	89.032	0.000
Govt. employee	72	24 (33.33)	40 (55.56)	08 (11.11)		
Nongovernment employees	48	32 (66.67)	08 (16.67)	08 (16.67)		
Businessmen	24	0 (0)	07 (29.17)	16 (66.67)		
Other	96	16 (16.67)	56 (58.33)	24 (25)		
Total	400	112	208	80		
Type of family						
Nuclear	290	96 (33.10)	146 (50.35)	48 (16.55)	16.634	0.0002
Joint	110	16 (14.55)	062 (55.36)	32 (29.09)		
Total	400	112	208	80		

Coolie, Watch men, Tailor etc.

A similar cross-sectional study showed the significant association of the age with the knowledge and the attitude score.¹⁴

In a similar cross-sectional study conducted of South India a significant association was observed between HIV knowledge and the gender, marital status, higher education, greater frequency of reading newspapers, listening to radio or watching television. The readiness to undergo HIV testing increased with better knowledge of HIV attitude score, and higher education status ($p < 0.01$)¹⁵ A similar study conducted among the rural South Indian community of Tirupathi found that knowledge was increased with literacy.^{5,16}

The association between the types of family with the knowledge and attitude was shown in the study conducted by Bounbouly et al.¹⁷

CONCLUSION

Education of people regarding HIV/AIDS is required to improve their knowledge about transmission and prevention of HIV.

Conflicts of Interest: None.

Source of Funding: None

Ethical Clearance: The study was conducted after obtaining ethical clearance from the Institutional Ethical Committee, and was in accordance with the Helsinki Declaration of 1975, as revised in 2000.

REFERENCES

1. Ngaihte PC, Santella AJ, Ngaihte E, Watt RG, Raj SS, Vatsyayan V (2016). Knowledge of human immunodeficiency virus, attitudes, and willingness to conduct human immunodeficiency virus testing among Indian dentists. *Indian J Dent Res*;27(1):4.
2. Statistics NNioM. India HIV estimations 2015. Ministry of health & family welfare; 2015. p. 3.
3. Organization NAC. State Fact Sheets 2013-2014. Department of AIDS Control, Ministry of Health and Family Welfare, Government of India; 2014.
4. Kishore J. National health programmes of India. New Delhi: 2012.
5. Hemamalini M ST, Angelin Dhanalakshmi, Geetha K, Kanniammal C (2016). Human immunodeficiency virus/acquired immune deficiency syndrome stigma and discrimination among the general public in selected rural community, kanchipuram district, india. *Asian journal of pharmaceutical and clinical research* 9(6).
6. Kipp W, Bajenja E, Karamagi E, Tindyebwa D (2007). AIDS-related stigma: perceptions of family caregivers and health volunteers in western Uganda. *World health & population*;9(2):5-13.
7. Valdiserri RO. HIV/AIDS stigma: an impediment to public health. *American Public Health Association*; 2002.
8. Ahmed M, Gaash B (2002). Awareness of HIV/AIDS in a remotely located conservative district

- of J&K (Kargil). Results of a community based study. *Indian J Comm Med*;27:12-8.
9. Nubed CK, Akoachere J-FTK (2016). Knowledge, attitudes and practices regarding HIV/AIDS among senior secondary school students in Fako Division, South West Region, Cameroon. *BMC Public Health*;16(1):847.
 10. Sobhan K, Kumar T, Kumar G, Kanth RR, Adarsha S (2004). HIV and AIDS-awareness and attitudes among males in a rural population. *Indian journal of community medicine*;29(3):4.
 11. Sangole S, Tandale B, Bagde P, Thorat D (2003). Evaluation of impact of health education regarding HIV/AIDS on knowledge and attitude among persons living with HIV. *Indian J Community Med*;28(1):30-5.
 12. Haffejee F, Ports KA, Mosavel M (2016). Knowledge and attitudes about HIV infection and prevention of mother to child transmission of HIV in an urban, low income community in Durban, South Africa: Perspectives of residents and health care volunteers. *health sa gesondheid*;21:171-8.
 13. Porter S (1993). Public knowledge and attitudes about AIDS among adults in Calcutta, India. *AIDS care*;5(2):169-76.
 14. Bhagavathula AS, Bandari DK, Elnour AA, Ahmad A, Khan MU, Baraka M, et al. (2015). A cross sectional study: the knowledge, attitude, perception, misconception and views (KAPMV) of adult family members of people living with human immune virus-HIV acquired immune deficiency syndrome-AIDS (PLWHA). *SpringerPlus*;4(1):769.
 15. Meundi AD, Amma A, Rao A, Shetty S, Shetty AK (2007). Cross-sectional population-based study of knowledge, attitudes, and practices regarding HIV/AIDS in Dakshina Kannada district of Karnataka, India. *J Int Assoc Physicians AIDS Care*;7(1):27-34.
 16. Balaganesh G, Chandrasekar V, Sai T, Babu V (1994). Survey on Public Awareness on AIDS in a Rural South Indian Community. *Indian J Community Med*;19(1):31-5.
 17. Thanavanh B, Harun-Or-Rashid M, Kasuya H, Sakamoto J (2013). Knowledge, attitudes and practices regarding HIV/AIDS among male high school students in Lao People's Democratic Republic. *Journal of the International AIDS society*;16(1).

A Study of Environmental Factors Affecting Nutritional Status of Under 5 Children in Rural Area of North India

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ABSTRACT

Background: Children are the future of a nation. The prime concern of a society is to ensure healthy growth and development. Normal Growth and development takes place only if there is optimum nutrition, safe environment to live in. 5.9 million children died in 2015 mainly due to preventable causes. 45% of under 5 deaths are attributable to undernutrition.

Aims And Objectives: To assess nutritional status of under 5 children and to study environmental factors affecting the nutritional status.

Methodology: A cross sectional study was conducted among 600 children in rural area of district Ambala, Haryana. In door to door house survey, anthropometric measurements of children were done z score was calculated to assess the nutritional status of children. Environmental factors were studied and correlated with nutritional status.

Results: 30.7%, 46.2% and 7.5% of children were found to be underweight, stunted and wasted respectively. Open defecation, having access to unsafe water and children living in kuccha houses were found to be more underweight.

Conclusion: Open defecation, unsafe water and living in kuccha houses are related with undernutrition in children. Proper sanitation of the drinking water should be promoted in the community to prevent the water born diseases in the children.

Keywords: Environmental factors, underweight, nutritional status, under 5.

INTRODUCTION

Children are the future of a nation. The main concern of a society is to ensure healthy growth and development of a child¹. Normal growth and development take place only if there is optimum nutrition, complete immunization, adequate birth weight, freedom from recurrent episodes of infections and also if there is freedom from genetic and environmental influences². Despite a dramatic decline in child mortality over the

past two decades, 5.9 million children died globally in 2015, mainly from preventable causes³.

Nutrition is the cornerstone of socio-economic development and is a core pillar of human development. The nutritional problems are multi-factorial with its roots in the sectors of education, demography, agriculture and development⁴. India is ranked highest in malnourished children according to world bank estimation⁵. Among all the factors child health is greatly influenced by his or her immediate environmental sanitation. The dictionary meaning of word Sanitation is 'the science of safe guarding health'².

Globally, more than three million children under five years of age die each year from environment related causes and conditions. This makes the environment one of the most critical contributors to the global toll of

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more than ten million child deaths annually as well as a very important factor in the health and well-being of their mothers⁶. Acute respiratory infections annually kill an estimated 1.6 million children under the age of five. As much as 60 percent of acute respiratory infections worldwide are related to environmental conditions. Diarrhoeal diseases claim the lives of nearly 1.5 million children every year. 80 to 90 percent of these diarrhoea cases are related to environmental conditions, in particular, contaminated water and inadequate sanitation⁷. In India children living in families who accessed drinking water from a safe source were less likely to die as compared to those who accessed drinking water from an unsafe source. Similarly, children living in families with access to an improved toilet were less likely to die as compared to those who do not have such an access⁸. A study to assess nutritional status of under 5 children and environmental factors influencing the nutritional status was planned in rural area of Ambala district, Haryana.

METHODOLOGY

Study Area: This was a cross sectional community based study conducted in rural area of district Ambala, Haryana.

Study Population: Children aged 12–59 months of age.

Inclusion Criteria:

1. All children 12 to 59 months of age.
2. Mothers of selected children.

Exclusion Criteria:

1. Children who were suffering from chronic systemic illness.
2. Mothers not willing to participate in the study.

Study Period: January 2016 to December 2016.

Sample Size: National Family Health Survey NFHS-3 (2005 TO 2006) reported the overall prevalence of underweight children as 38% in the state of Haryana⁹.

The sample size was calculated using the formula

$$N = Z^2P(100-P)/e^2$$

Where,

- N = sample size

- Z = level of confidence – 95%(1.96)
- P = prevalence
- e = margin of error (Absolute error of 4%)

It came out to be 566 which was rounded off to 600.

Sampling Technique: Ambala district is divided into six blocks. One block(Barara) was randomly selected and list of PHCs was taken from civil surgeon office. Out of all PHCs three PHCs(Barara, Nohani and Mullana) were randomly chosen. A list of anganwadis were obtained from CDPO office, Barara. Out of each selected PHC, four anganwadis were further selected randomly. Each selected Anganwadi was visited and list of children 12 to 59 months of age was obtained from the concerned Anganwadi worker. A minimum of 50 children were selected from each Anganwadi to reach the required sample size of 600.

Stud Strategy: The study was conducted by employing house to house survey technique. Data was collected on a self-designed, validated, semi-structured questionnaire pertaining to socio demographic characteristics, environmental, anthropometric characteristics and morbidity pattern of the child. Anthropometric measurements were done using standard methods and assessed as per WHO guidelines¹⁰. According to these criteria, the likelihood of malnutrition is defined using a cut-off point of -2SD.

Z score for all the three parameters of nutritional status viz WFA, HFA,WFH were calculated with the help of WHO anthro plus software version 3.2.2¹¹.

Informed consent was taken from each participant before the conduct of study.

Data Analysis: Appropriate data entry and statistical analysis were performed on SPSS (Statistical Package for Social Sciences) software version 20. Data was summarised using descriptive statistics. Continuous variables were presented as mean and standard deviation (SD) while categorical variables as number and percentage. 95% confidence interval was estimated for various point estimates. Univariate odds ratio was calculated for various environmental predictors of nutritional status. A p-value of < 0.05 was taken as statistically significant.

RESULTS

Table 1: Age and Sex Wise distribution of Study population

Age (in Months)	Male No. (%)	Female No. (%)	Total No. (%)
12-23	73 (12.2%)	86 (14.3%)	159 (26.5%)
24-35	83 (13.8%)	75 (12.5%)	158 (26.3%)
36-47	55 (9.2%)	59 (9.8%)	114 (19.0%)
48-59	67 (11.2%)	102 (17.0%)	169 (28.2%)
Total	278 (46.3%)	322 (53.7%)	600
Mean Age \pm SD	35.81 \pm 15.33	34.37 \pm 14.37	

The community based study revealed that there were 322 female children (53.7%) and 278 (46.3%) male children. Maximum number of children belonged to the age group 48 - 59 months (28.2%). Mean age of male child was 35.81 and that of female child was 34.37 months.(Table 1)

Table 2: Distribution of Children according to Environmental & Sanitation practices adopted by family

Environment & sanitation variables (n = 600)		No. (%)
Type of House	Kuccha	104 (17.3%)
	Pukka	441 (73.5%)
	Kuccha/Pukka	55 (9.2%)
Source of Water Supply	Tap Water	578 (96.3%)
	Tanker	9 (1.5%)
	Well	0 (0.0%)
	Hand Pump	11 (1.8%)
	Other	2 (0.3%)
Water Purification	Boiling	173 (28.8%)
	Filtration	170 (28.3%)
	None	257 (42.8%)
Presence of Flies	Yes	594 (99.0%)
	No	6 (1.0%)
Hand Washing	Yes	597 (99.8%)
	No	3 (0.2%)
Type of Latrine	Closed	506 (84.3%)
	Within house	503 (99.7%)
	Community	03 (0.6%)
	Open	94 (15.7%)
Type of Drainage	Open	598 (99.7%)
	Closed	2 (0.3%)

Majority of children were living in Pukka houses (73.5%). The source of water supply was seen to be tap water in 96.3% of families. None of the children's families were seen to draw water from village wells (0.0%). Maximum no. of families (42.8%) were not using any kind of water purification method. 28.8% of families were using boiling as water purification method and almost equal number (28.3%) used filtration. 84.3% were using closed type of latrines and majority (99.7%) of these were within house. Only 15.7% households were using open defecation. Houseflies were found to be present in 99.0% of households and 99.8% of families were washing their hands regularly.(Table 2)

Table 3: Distribution of children according to Nutritional status of Children

Nutritional Status (N = 600)		No. (%)
Weight For Age (WAZ)	Underweight (<-2SD)	184 (30.7%)
	Normal (>-2SD)	416 (69.3%)
Height For Age (HAZ)	Stunted(<-2SD)	277 (46.2%)
	Normal (>-2SD)	323 (53.8%)
Weight For Height (WHZ)	Wasted (<-2SD)	45 (7.5%)
	Normal (>-2SD)	555 (92.5%)

It was observed in table 3 that 30.7% were underweight (WAZ<-2SD), 46.2 % of children were stunted (HAZ<-2SD) & 7.5% of children were wasted (WHZ <-2SD) as calculated using WHO Anthro plus software.

Table 4: Association of environmental factors with nutritional status of children (WAZ)

Environmental Factors	Underweight No. (%)	Normal No. (%)	Odds ratio	95% CI for Odds ratio	p value
Water Purification					
Absent	88 (34.24%)	169 (65.76%)	1.340	0.945 - 1.900	0.100
Present	96 (27.99%)	247 (72.01%)			
Type of House					
Kuccha	40 (38.46%)	64 (61.54%)	1.528	0.984 - 2.372	0.058
Pukka or Kachha/Pukka	144 (29.03%)	352 (70.97%)			
Type of Latrine					
Open	35 (37.23%)	59 (62.77%)	1.421	0.897 - 2.251	0.133
Closed	149 (29.45%)	357 (70.55%)			

Table 4 shows the association of Environmental factors and found that water purification, type of house and type of latrines were not found to be significantly associated with nutritional status of the children though there was increased risk of malnutrition among children not having access to safe water, living in kuccha house or going for open defecation.

DISCUSSION

A community based cross sectional study was performed over a period of one year in which 600 children aged 12 months to 59 months were assessed for their nutritional status. A detailed evaluation of demographic factors, socio economic profile, maternal and environmental factors was done and correlated with nutritional status. The prevalence of underweight, stunting and wasting in the present study was 30.7%, 46.2% and 7.5% respectively. According to NFHS – 4, the prevalence of stunting is 38% and that of underweight is 36% at the national level and it has shown an improvement as compared to NFHS-3 data¹². Similarly

in a study done by Asfaw M et al¹³ prevalence of stunting, underweight, and wasting was 47.6%, 29.2% and 13.4% respectively. The present study showed that families using safe water supply had less number of underweight children as compared to families using unsafe water (OR: 1.340). Similar findings were observed by Mostafa KS et al¹⁴. In a study done by Kavosi E et al¹⁵ it was seen that residence in urban areas and poor water supply were significant risk factors of all three types of childhood under-nutrition. In the present study it was observed that children living in Kuccha houses were more underweight as compared to children living in Pukka houses(OR :1.528). It was also seen that children who had access to closed type of latrines, under nutrition was less as compared to children who were going for open defecation (OR: 1.421 and p=0.133). A Case Study from Goundam Cercle, Timbuktu Region also found that children whose family had latrine facility at their home shows prevalence of 27.8% of undernutrition, while those families with open air defecation had 40.7% of prevalence of undernutrition¹⁶. In a study done by Shukla Y et al¹⁷

the association between type of latrines and nutritional status was found to be highly significant ($R^2=92.9\%$). Study done by Rah JH et al¹⁸ observed that the inverse association between reported personal hygiene practices and stunting was stronger among households with access to toilet facility or piped water (all interaction terms, $p<0.05$). Safe water prevents the progression of water born diseases which together with sanitation and hygiene can improve the nutritional status in children. Bhavasar S et al¹⁹ studied the environmental factors and found that children having poor environmental conditions like kuccha house, open defecation practices, no tap water, had poor nutritional status.

CONCLUSION AND RECOMMENDATION

Open defecation, unsafe water and living in kuccha houses are related with undernutrition in children. Proper sanitation of the drinking water should be promoted in the community to prevent the water born diseases in the children. Universal access to safe drinking water must be ensured by government and population must be educated to use water from such sources only or people should be made aware of the methods of purification of water at household level. Open defecation must be discouraged and local leaders should come forward to motivate people to use sanitary latrines so as to contribute to national ongoing Swachh Bharat Abhiyan and make the country clean and free from preventable diseases. Regular growth monitoring of under 5 children must be ensured for timely management of undernutrition.

Ethics Consideration: Study was approved by Institutional ethics committee. Informed consent was taken from all the participants before the conduct of study.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. WHO. Child Health. Available from: http://www.who.int/topics/child_health/en/ [Last cited on 2017 May 20]
2. Park K. Park's Textbook of Preventive and Social Medicine. 23rd ed. Jabalpur: Bhanot Publishers; 2015.
3. WHO. Children Reducing Mortality 2016. Available from URL: <http://www.who.int/mediacentre/factsheets/fs178/en/> [Last cited on 2017 May 20]
4. Jood S, Bishnoi S, Sehgal S. Nutritional status of Rural Pre-school children of Haryana state. *Indian J Pediatr.* 2000;67(3):189-96.
5. World Bank. India: Undernourished Children: A call for action. Available from: <https://openknowledge.worldbank.org/handle/10986/7241> [Last cited on 2017 Jun 15]
6. WHO. Children's Environment Health: The environment and health for children and their mothers. Available from: <http://www.who.int/ceh/publications/factsheets/fs284/en/>. [Last cited on 2017 Jun 20]
7. WHO. Children's Environment Health. Available from: <http://www.who.int/ceh/en/> [Last cited on 2017 Mar 20]
8. Unicef. Infant and child Mortality in India. Fact Sheet. Available from: http://unicef.in/CkEditor/ck_Uploaded_Images/img_1364.pdf. [Last cited on 2017 Mar 20]
9. NFHS 3. Key indicators for Health for Haryana from NFHS-3 (2005 – 2006) Available from URL: <http://www.rchiips.org/nfhs/pdf/Haryana.pdf> [Last cited on 2015 Jul 20]
10. WHO. Child Growth Standards. Available from: http://www.who.int/childgrowth/standards/technical_report/en/ [Last cited on 2017 Mar 20]
11. WHO. Child Growth Standards. WHO Anthro(version 3.2.2). Available from: <http://www.who.int/childgrowth/software/en/> [Last cited on 2017 Jan 20]
12. NFHS 4. National Family Health Survey-4: India Fact sheet 2015-2016. Available from: <http://rchiips.org/NFHS/pdf/NFHS4/India.pdf> [Last cited on 2017 Feb 20]
13. Asfaw M, Wondaferash M, Taha M, Dube L. Prevalence of undernutrition and associated factors among children aged between six to fifty nine months in Bule Hora district, South Ethiopia. *BMC Public Health* 2015 Jan;15(1):41.

14. Mostafa KS. Socio-economic determinants of severe and moderate stunting among under-five children of rural Bangladesh. *Malays J Nutr.* 2011;17(1):105–18.
15. Kavosi E, Hassanzadeh Rostami Z, Kavosi Z, Nasihatkon A, Moghadami M, Heidari M. Prevalence and determinants of under-nutrition among children under six: a cross-sectional survey in Fars province, Iran. *Int J Health Policy Manag.* 2014;3(2):71–76.
16. Dramane Mariko, Carlyn Hughes, 'An Exploratory Analysis of Child Nutritional Status in the Sahel, the Goundam Circle Case Study- Timbuktu Region- Mali' West African Regional Food for Peace Office USAID/WEST Africa Professional Paper Series, December 2006 Series No 4.
17. Shukla Y, Tiwari R, Kasar PK, Tomar SP. Risk factors for severe malnutrition in under five children admitted to nutritional rehabilitation centre: a case-control study from Central India. *Int J Community Med Public Health.* 2016; 3(1): 121-127.
18. Rah JH, Cronin AA, Badgaiyan B, Aguayo VM, Coates S, Ahmed S. Household sanitation and personal hygiene practices are associated with child stunting in rural India: a cross-sectional analysis of surveys. *BMJ Open.* 2015;5(2).
19. Bhavsar S, Mahajan H, Kulkarni R. Maternal and Environmental Factors Affecting the Nutritional Status of Children in Mumbai Urban Slum. *International Journal of Scientific and Research Publications.* 2012;2(11).

Epidemiological Pattern of Hand Injuries and Impact of Machine-Cut Hand Injuries in a Tertiary Care Hospital in South India

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ABSTRACT

Hand injuries are the most common injuries. They account for 6.6% to 28.6% of all injuries and also constitute 5-10% of emergency department (ED) visits nationwide in the U. S. There is a lack of awareness of the significance of hand injuries across all sectors: business and industry, government and non-government sectors. Hand injuries impose a significant economic burden as about 11% of workers who sustain hand injuries never return to their jobs. Additionally, the social, economic and physical impact of disabilities (permanent or temporary) on the loss of productive working hours is a huge burden on the community.

Keywords: Hand injuries, machine cut injuries, epidemiology.

INTRODUCTION

The hand is among the most complex parts of the body. It helps in performing coarse as well as fine movements. The hand plays a major role in earning a livelihood for a person as it makes him a skilled and valuable worker. Hand injuries are the most common injuries. They account for 6.6% to 28.6% of all the injuries^{1,2} and also constitute 5-10% of emergency department (ED) visits nationwide in the U.S.³ Hand injuries occur mainly among professionally active young workmen up to the age of 40 years.^{4,5,6,7} About 11% of the workers with hand injuries never return to their jobs.⁸

There is a lack of awareness of the significance of hand injuries across all sectors: business, industry, government and non-government sectors. It is apparent that hand function is essential for all professions, including but not limited to labourers, white collar technicians, surgeons, nonsurgical physicians, typists, housewives, accountants, athletes and policeman.⁸ Despite all of this, a shift supervisor or a manager is unaware of the fact that morbidity is not determined by a wound size, i.e. seemingly minor injuries often have serious consequences.⁸ 70% of the major hand injuries are caused by machines and are preventable⁹.

In developed countries, hand injuries are mainly managed by plastic surgeons and orthopedicians, unlike in developing countries where they are managed by non-specialists with little or no experience and training in management of hand injuries¹⁰. If we assumed the current US ratio of hand surgeons to patients to be ideal, then for India to achieve this ratio, it would be necessary for India's medical colleges to train nothing other than the hand specialists until 2061¹¹. Various orthopedic surgeon: population ratios have been proposed, in the range of 4 to

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6 per 100,000 population¹². In India, registered orthopedic surgeons are between 12,000 to 15,000 in number: i.e. 0.8 to 1 orthopedic surgeon per 1 lakh population. But this does not really give an accurate picture of the extent of disparity in the availability of these services between urban and rural India, as most of these specialists are concentrated in bigger cities and urban agglomerations. The number of Hand surgeons in India is 515 (members registered in Indian Society of Surgery of Hand- ISSH).

Around 10,00,000 U.S workers undergo treatment for hand injuries in emergency department¹³. According to the U.S. Bureau of Labor Statistics survey of hand injuries, approximately 1,10,000 workers lose days from work annually due to hand and finger injuries¹³. Also, hand and finger injuries most commonly occurs due to fixed machinery where hands/fingers get caught in, between or under machinery¹⁴. Loss of a hand reduces functional ability to 40%¹⁵. Amputation through carpal bones reduces functional ability to 45%¹⁵. Loss of the index finger leads to a 15% loss of physical function.¹⁵.

RESEARCH DESIGN

Aim of the Study: Epidemiological pattern of hand injuries and measurement of financial burden in machine-cut hand injuries in a tertiary care hospital.

OBJECTIVES

1. To study the epidemiological patterns of hand injuries among patients presenting to a tertiary care trauma centre.
2. To assess the financial costs of the machine cut hand injuries to the patients visiting a tertiary care trauma centre.

METHODOLOGY

Study Design: Retro-prospective cross-sectional study

Study population: All the cases of hand injury who visited the trauma centre of Kasturba hospital from Jan 2015 to Dec 2015. This study included 785 patients (680 men and 105 women) treated for hand injuries by Department of Orthopedics at Kasturba Medical college and hospital, Manipal, Karnataka during the period between January 2015 to December 2015.

Kasturba hospital is a 2032 bedded teaching hospital which caters to the general and specialized needs of

the peripheral areas. Protocol approval was taken from the Institutional Ethics Committee, Kasturba Medical college and hospital, Manipal, Karnataka. Records of the patients of hand injuries were collected from the accident register of Trauma triage and hospital information system of the Medical records department. Phone numbers of the patients were retrieved from the Medical Records Department. Telephonic interview with patients with machine cut hand injuries was conducted using a structured questionnaire. Verbal consent of patients was taken. Questions asked included: income before and after injury; recovery period; whether expenses were paid out of pocket or by the employer and so on. (Annexure B)

Out of the 785 cases of hand injuries, 108 (13.75%) were machine-cut hand injuries, of which 37 (students and OPD patients) were excluded and 71 were included. The students were excluded because they were not in employment. Out of the 71 patients who were included, 56 patients responded. The following data was collected: Demographics (Age, Gender), causes of hand injuries and site of injury. Further, the following data was collected only for machine-cut hand injuries: Income before and after injury, recovery time, income during recovery period, return to same work, income lost per month, medical expenditure, source of payment of medical expenditure and average out of pocket expenditure.

Data analysis and observations

Gender: The total number of hand injury patients that came to the hospital from Jan 2015 to Dec 2015 were 785, out of which 680 (86.6%) were males and 105 (13.4%) were females. The burden of hand injuries is significantly higher in males.

Age: 1/3 of the hand injuries were in the age group of 21-30 years. 2/3 of the hand injuries were in the age group of 21-50 years.

Table 1: Frequency table for incidence of hand injuries across age groups

AGE (In years)	FREQUENCY (n = 783)	PERCENTAGE
0-10	18	2%
11-20	138	18%
21-30	265	34%
31-40	148	19%
41-50	104	13%

Conted...

51-60	64	8%
61-70	32	4%
71-80	14	2%
Total	783	100%

Causes of hand injuries: The most frequent cause of hand injury was road traffic accidents-524 (67%), followed by work-place related injuries-169 (21%), injuries at home-61 (8%), self-inflicted injuries-16(2%) and violence-16(2%)

Sites of injury: The right hand was affected more frequently as compared to the left hand(48% for right hand, 42% for left hand and 11% for both hands).

Out of the injuries that has occurred at work 169(21%),108 injuries accounts for machine-cut hand injuries and 61 injuries were caused due to other reasons i.e. from Fall, Sickle cut injuries, Heavy objects,Glass cut injuries etc. Therefore, machine-cut hand injuries accounted for 63.9% of all hand injuries.

Table 2 shows that machine-cut hand injuries constituted 13.8% of all hand injuries, making them the second most common cause of hand injury.

Table 2: Frequency table for machine-cut hand injury patients

Cause	Frequency	Percentage
At home	61	7.8
At work (others)	61	7.8
Machine cut	108	13.8
RTA	524	66.8
Self	16	2
Violence	15	1.9
Total	785	100

Analysis of machine cut hand injuries

Table 3: Frequency table for gender distribution of machine cut hand injuries

Gender	Frequency	Percentage
Male	53	95%
Female	3	5%
Total	56	100%

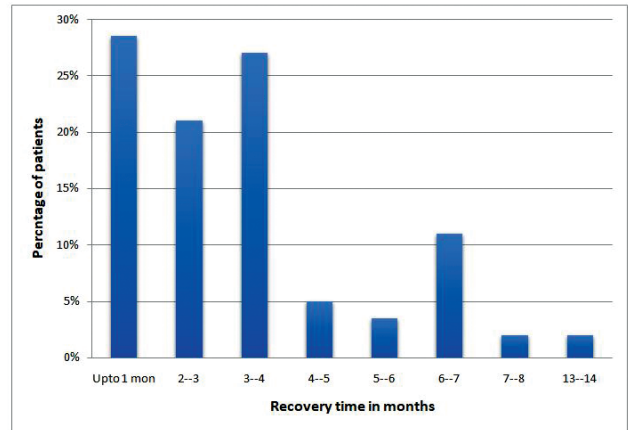


Fig. 1: Recovery time for machine-cut hand injuries

Figure 2: Frequency of recovery times for machine-cut hand injuries

Recovery Time (Months)	Frequency	Percentage
Upto 1 month	16	28.5%
2-3	12	21%
3-4	15	27%
4-5	3	5%
5-6	2	3.5%
6-7	6	11%
7-8	1	2%
13-14	1	2%
Total	56	100%

Income before Injury: On an average, the patients had an income of Rs.12,196 before injury with a standard deviation of Rs.13,335. On an average, the patients had an income of Rs.9,066 after the injury with a standard deviation of Rs.11,222.

Return to the same occupation after recovery from hand injury: Out of 56 patients, 71% were able to return to the same occupation whereas 29% were not able to return to the same occupation.

Number of patients with and without income in the recovery period: 33(58.9%) of patients had income in the recovery period while 23(41.1%) of patients had no income in the recovery period.

Return to the same occupation after recovery from hand injury: 41(71%) of patients were able to return to the same occupation whereas 15(29%) were not able to return to the same occupation after recovery from hand injury.

Income post recovery: 45(80%) of patients had income post recovery whereas 11(20%) did not.

Table 4: Percentage change in income post recovery

Percentage Change in Income Post Recovery	Frequency	Percentage
No change	27	48%
Decrease Up to 50 percent	14	25%
Decrease between 50 to 100 percent	13	23%
Increased	2	4%
Total	56	100%

Relationships between different types of machine cut injuries and return to earlier work, arrived at through Cross tabulations.

1. Amputations: The relationship between amputations and return to earlier work.

39%(7/18) of victims of amputations were unable to return to the same job.

61%(11/18) were able to return to the same job.

2. Lacerations: 33%(8/24) of victims of lacerations were unable to return to the same job.

67%(16/24) were able to return to the same job

3. Fractures: 33%(2/6) of victims of fracture were unable to return to the same job.

67%(4/6) were able to return to the same job.

4. Nail bed injury: 75%(3/4) of victims of Nail-bed injuries were unable to return to the same job.

25%(1/4) were able to return to the same job.

5. Crush injury: 50%(1/2) of victims of Crush injuries were unable to return to the same job.

50%(1/2) were able to return to the same job

6. Soft tissue injury: 100%(11/11) of victims of Soft tissue injuries were able to return to the same job.

7. Nerve Injury: 100%(1/1) of victims of Nerve injuries were able to return to the same job.

Medical expenditure on treatment of machine cut hand injuries.

Medical expenditure for machine-cut hand injuries ranged from Rs.880 to Rs.56,010.41% of patients incurred an expenditure of less than Rs. 10,000 on the treatment.38% of patients incurred an expenditure between Rs.10,000 and Rs.20,000.14% of patients incurred an expenditure between Rs.20,000 and Rs.30,000.4% of patients incurred an expenditure between Rs.40,000 and Rs.50,000 on the treatment.2% of patients incurred an expenditure between Rs.30,000 and Rs.40,000 on the treatment.2% of patients incurred an expenditure between Rs.50,000 and Rs.60,000 on the treatment.

Types of expenditure: Almost half(48%) of patients paid their expenses out of their pocket. On an average this was Rs.11,928.27% of patients were covered by insurance. Expenses of 12% of patients were paid by the employer. For 9% of patients, their families paid the medical expenses. For 4% of the patients, medical expenses were paid by a combination of family, insurance and employer.

The average income lost per month by victims of hand injury was Rs.7,459 rupees with a standard deviation of Rs.6,926.

RESULTS AND DISCUSSION

Men predominated in the patient group studied:680/785(87%). Patients belonging to the age group 21-30 years were affected the most. The incidence of injury was highest in the right hand(48%), followed by the left hand(42%) and both the hands(11%). The most common causes of hand injuries were road traffic accidents and machines.

Results for machine cut hand injuries: The overwhelming proportion of victims was male:53 out of 56 patients(95%). The average income before a machine-cut hand injury was Rs.12,196 and after the injury it was Rs.9,066.29% of patients healed within one month while 27% of patients healed after 1 month and before 3 months.59% of patients had a source of income in the recovery period.71% of patients in the study group were able to return to the same occupation.

80% of those surveyed had a current source of income.48% saw no change in income,25% saw a 50% fall in income,23% saw a fall in income between 50 and 100%,and 4% saw an average increase of 13%.

The study saw 7 types of machine-cut hand injuries among those surveyed. Since some patients had more than one injury, the total number of injuries came to 66.18 patients had amputations, out of which 7(39%) were unable to return to the same work. 24 patients had lacerations, out of which 8(33%) were unable to return to the same work. 6 patients had fractures, out of which 2(33%) were unable to return to the same work. 4 patients had nail bed injuries, out of which 3(75%) were unable to return to the same work. 2 patients had crush injuries, out of which 1(50%) were unable to return to the same work. 11 patients had soft tissue injuries, and everyone was able to return to the same work. 1 patient had a nerve injury and was able to return to the same work. The majority of the victims of machine-cut hand injuries spent less than Rs.10,000 rupees on the treatment. The most important finding was that 48% of the patients paid, on an average, Rs.11,928, out of pocket. Average income lost per month by the patients was Rs.7459 with a standard deviation of Rs.6926.

This study found that the age group of 21-30 years had the highest prevalence of hand injuries. The results were consistent with other similar studies done^{7,17,20}. One study found the mean age of affected patients to be 47 years¹⁸ while a study from the Netherlands found the most affected age group to be 10-14 years. In the present study, males were affected more than females. Other studies have similar findings.^{17,18,19,20,22}

The most common cause of hand injuries in this study was road traffic accidents followed by hand injuries caused by machines. This is in line with the findings of a study in Nigeria¹⁷. Other studies have reported the following as the most common or main cause of hand injuries: altercations and road traffic accidents²⁰; assaults²¹; machine cut injuries followed by road traffic accidents. In the current study, the right hand was injured 48% of the time, the left hand 42% of the time and both the hands 11% of the time. This is consistent with the findings of the Nigerian study.¹⁷ One study found that the left hand was affected more than the right hand¹⁸.

In the present study, 49.5% of patients of machine-cut hand injuries recovered within 3 months. Studies have reported a median time off work of 3 weeks⁴, and average time off work of 8 weeks¹⁴ and 64 days.¹⁸ In the present study, 71% of the machine-cut hand injury patients were able to return to the same work. 29% of patients either had to change their occupations or were not able to work

again. Another study reported that 91% of patients were able to return to the same work, 5% changed their type of work and 4% received disability pensions.¹⁴ A study in the Netherlands classified return to work into early (< 10 days) and late (> 10 days): 48% returned to work early and 52% returned to work late.¹⁶

In the current study, medical expenses have been calculated only for machine-cut hand injuries. The majority of patients have spent less than Rs.10,000 on the treatment. There was a significant fall in the average income of the patient (Rs.12,196) after machine-cut hand injuries (Rs.9066).

Conflict of Interest: Nil

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REFERENCES

1. Gaul JS. Identifiable costs and tangible benefits resulting from the treatment of acute injuries of the hand. *J Hand Surg [Am]* 1987;12A:966-70.
2. Burke FD, Dias JJ, Lunn PG, et al. Providing care for hand disorders: Trauma and elective. *J Hand Surg [Br]* 1991;16B:13-8.
3. Andrea B Lese. Soft tissue hand injury. *emedicine. medscape.com*. Gaul, S. Cost Benefit Committee Report of American Society for Surgery of the Hand, 1983.
4. Johns AM. Time off work after injury. *Injury* 1981;12:417-24.
5. O'Sullivan ME, Colville J. The economic impact of hand injuries. *J Hand Surg [Br]* 1993;18B:395-8.
6. Oleske DM, Hahn JJ. Work-related injuries of the hand: Data from an occupational injury/illness surveillance system. *J Common Health* 1992;17:205-19.
7. Trybus M, Lorkowski J, Brongel L, et al; Causes and consequences of hand injuries; *Am J surg* 2006;192:52-7.
8. Gaul, S. Cost Benefit Committee Report of American Society for Surgery of the Hand, 1983.
9. T. Mirdad, "Pattern of hand injuries in children and adolescents in Saudi Arabia", *Journal of rch Social Health*, vol. 121, no. 1, p. 47-49, 2001.

10. R. E. Unlu, "Crush injuries of hand," *Ulus Travma Acil Cerrahi Derg*, vol. 11, no. 4, p. 324-328, 2005.
11. Article on "HAND 2061" written by M. Felix Freshwater, professor of surgery at University Of Miami, USA.
12. www.meritthawkins.com (A review of Physician to Population ratio).
13. Article on 'Hand & Finger injuries' by John P. Cunha, DO.
14. Wong JY; Time off work in hand injury patients; *Journal of hand surgery* (2008); Vol. 33(5): 718-25.
15. Disability; Guidelines and explanation by Dr. Ratnesh Kumar; National Institute for the orthopaedically handicapped.
16. Lonneke Opsteegh, Heleen A. Reinders, Donna Schollier, Johan W. Groothoff, Klaas Postema; Determinants of return to work in patients with hand disorders and injuries ;*Journal Of Occupation Rehabilitation* (2009) Vol.19: 245-255.
17. Ogemdi Ihekire, Siddiq A.I. Salawu, Temilolu Opadele; Causes of hand injuries in a developing country; *Canadian Journal Of Surgery*; Vol. 53, No. 3, June 2010.
18. Hoxie SC, Capo JA, Dennison DG, Shin AY; The economic impact of electric saw injuries to the hand; *Journal of Hand surgery* (May-Jun 2009); Vol. 34(5):886-9.
19. Dias JJ, Garcia-Elias M; Hand Injury costs; *Injury* (Nov 2006); vol. 37(11):1071-7.
20. Ashish Gupta, Ashok K. Gupta, Sanjeev K. Uppal; Demographic profile of hand injuries in an industrial town of North India: a review of 436 patients; *Indian journal of surgery* (June 2012); vol.75(6): 454-461.
21. W Kaisha KS; Hand injury: association of handedness with cause and site of injury; *Annals of African surgery* (2007); vol. 1.
22. Panagopoulou P et al; Epidemiological patterns and preventability of traumatic hand amputations among adults in Greece; *Injury* (2003); vol. 44(4):475-80.

X Rays Induced Oxidative Stress in Cerebral Tissue of Albino Wistar Rats

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ABSTRACT

Radiotherapy has been increasingly used as an effective tool in the treatment of cancer. Radiations might produce toxic effects to the surrounding normal cells mediated by free radicals. The study of normal tissue response to x rays is of great importance in cancer patients who undergo radiotherapy. Brain is the logical target of free radical injury due to high lipid content and low antioxidants. Hence, this study was undertaken to study the toxic effects of radiation on brain.

Albino rats exposed to whole body radiation of 6 Gy per minute formed test group and rats that were not irradiated formed control group. Each group had eight animals. Malondialdehyde, SOD, catalase, glutathione and acetyl choline esterase were estimated in brain homogenates by spectrophotometric methods.

Brain antioxidant enzymes viz., SOD and catalase decreased significantly in rats exposed to radiations compared to normal rats. Acetyl cholinesterase a marker of low grade inflammation increased significantly in x ray treated rats. The increase in lipid peroxidation was also statistically significant in these rats compared to control group.

On the whole, it can be concluded that free radical toxicity may be one of the major factors contributing to radiation pathology in rats.

Keywords: Antioxidant enzymes, Acetyl cholinesterase, Lipid peroxidation

INTRODUCTION

Radiotherapy is one of the most important modalities in the management of tumors. Although it has been widely used as an effective tool to kill cancer cells, it might produce toxic effects to the surrounding healthy tissues. Radiation pathology is mediated by free radicals that attack diverse cellular macromolecules such as DNA, lipids and proteins, eventually inducing membrane damage and cell death¹. Very high PUFA content and paucity of antioxidants to dissipate oxidative insult makes brain a logical target for free radical toxicity. Inflammation, vascular damage, altered cell

permeability were the key features of high dose gamma radiation injury predominantly affecting the white matter of the brain^{2,3}. The literature survey showed scantiness of data on oxidative damage induced by X rays on brain which tempted us to evaluate antioxidant status and oxidant damage in the brain of rats exposed to high dose X rays and study the normal tissue response and tissue injury after exposure to the X rays.

MATERIALS & METHOD

16 adult albino wistar rats aged 8-10 weeks with body weight ranging between 140-160 grams procured from central animal house of Kasturba Medical College were used for the study. The institutional ethical committee approval was obtained to conduct the study. The animals were housed in polypropylene cages kept in well ventilated and naturally illuminated room and fed with commercial pelleted feed and water ad libitum. The rats were divided into two groups with eight animals

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in each group. Whole body radiation of 6Gy/min was administered to the animals of one group by LINIAC accelerator having a field size of 40x40 and a distance of 100 cm from source to subject, at department of radiotherapy, KMC hospital. The group that was not irradiated served as control (group I). Exactly after a month, rats were sacrificed by administering ether. A midline sagittal incision was made on the head and the brain was dissected out, washed with saline and homogenized in ice cold phosphate buffer pH 7.4 to yield 10% homogenate. Reduced Glutathione was estimated at 412nm based on the development of yellow color with DTNB [4], SOD was determined according to Beauchamp and Fridovich ⁵ based on inhibition of nitroblue tetrazolium reduction. Catalase was assayed by recording the decrease in absorbance due of decomposition of hydrogen peroxide to water ⁶. Malondialdehyde, the end product of lipid

peroxidation was quantified using thiobarbituric acid ⁷. Protein concentration was estimated by Biuret method. Acetylcholine esterase was determined by Elmans method Data was analysed by student t test using software package SPSS version 16 and p <0.05 was considered significant.

RESULTS

Table 1 shows that x rays caused almost four times increase in lipid peroxidation in brain of rats subjected to whole body radiation compared to control rats(p=0.000). Reduced glutathione, SOD and catalase decreased significantly in brain homogenate of irradiated rats compared to control group. However, acetylcholinesterase activity was markedly elevated in group II rats compared to group I rats. Further, the increase was statistically significant.

Table 1: Comparison of lipid peroxidation, antioxidants and acetylcholinesterase in X ray irradiated and normal rat brain

	Group I	Group II
MDA (µmol/l)	0.796 ± 0.069	3.028 ± 0.087*
GSH (µmol/g tissue)	1.109 ± 0.252	0.465 ± 0.0697*
SOD (U/mg protein)	0.019 ± 0.001	0.013 ± 0.0006*
Catalase (U/g protein)	217.96 ± 13.54	170.75 ± 11.6*
AChE (µmol/min/mg protein)	0.4940 ± 0.047	12.860 ± 0.854*

*p = 0.000

DISCUSSION

Central nervous system may be relatively resistant to radiation induced changes specially when brain is treated with radiation dose of 2Gy /d. Acute reactions are seldom seen and toxicity of cranial irradiation is believed to be secondary to radiation effects on replicating oligodendrocytes and microvasculature ⁸ However, results of the present study with high dose of X rays(6Gy) demonstrated a significant elevation in lipid peroxidation in brain homogenates of whole body irradiated rats compared to controls which is in consonance with previous reports indicating increased liability of lipid rich brain cell membrane to peroxidation⁹. Photolysis of water within the cells by ionizing radiation releases most potent hydroxyl radicals which damage biomolecules like DNA, membrane lipids, proteins disrupting membrane fluidity, permeability and finally cell lysis ^{10,11}.

The inherent biochemical, anatomical and physiological characteristics of brain makes it vulnerable to oxidant attack(29Ga) Moreover, Osman et al¹² demonstrated that brain was most susceptible to radiation induced changes specially lipid peroxidation amongst tissues such as liver, spleen, kidney and testis. He opined that paucity of enzymes dissipating reactive oxygen species in brain is the underlying factor for increased lipid peroxidation. This is in agreement with the findings of the present work which demonstrated a significant decrease in antioxidant enzymes SOD and catalase in the brain of irradiated rats. The decline in the antioxidant enzymes may be due to their oxidation by free radicals or due to their utilization to mop up free radicals. Our previous investigation of chronic effects of X rays on cardiac tissue of rats also indicated increased lipid peroxidation with concomitant decrease in GSH, SOD and catalase⁵.

On the contrary, one of the earlier studies reported a significant increase in hepatic catalase of rats exposed to gamma radiation¹³. In the present study, brain GSH decreased significantly in animals subjected to whole body irradiation compared to controls. Sisodia et al¹⁴ also observed a decrease in brain GSH content following gamma irradiation of 5Gy. Ralf et al¹⁵ demonstrated a significant depletion in the antioxidant system with the increase in lipid peroxidation in animals exposed to gamma rays. The reduction in tissue GSH may be due to decreased synthesis of GSH or due to its consumption during oxidant surge¹⁶. Cholinesterases are a large family of enzymes distributed throughout neuronal and non-neuronal tissues. Acetyl cholinesterase is responsible for regulation of neurotransmitter acetylcholine at the cholinergic nerve synapses. Exposure of rats to the X rays significantly elevated this enzyme demonstrating its role in radiation pathology. It has been suggested that primary cellular protective response to brain injury includes increase in transcription and translation of several growth factors leading to the synthesis of several enzymes¹⁷. Inflammation is another response of innate immune system upon exposure to oxygen radicals. Increase in acetyl cholinesterase leads to the fall in tissue acetylcholine which inhibits cholinergic anti-inflammatory pathway¹⁸ contributing to inflammation in radiation induced toxicity. Acetylcholinesterase in brain homogenate increased after microwave irradiation while other enzymes like 5' nucleotidase decreased¹⁹. Zubkova²⁰ observed nearly threefold increase in AChE activity in acetylcholinergic neurons subjected to magneto laser radiation.

CONCLUSION

Results of this study gives valuable data regarding the extent and role of oxidative damage induced by x rays and may help to provide useful information for clinical dose fixation in radiotherapy patients. Acetylcholinesterase may act as a possible marker of low grade inflammation in radiation pathology. The possible brain injury as a consequence to radiotherapy justifies the need of pretreatment with antioxidants to brain tumor patients before undergoing radiotherapy to alleviate the ill effects.

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REFERENCES

1. Heba HM. Protective effect of ginseng against gamma irradiation induced oxidative stress and endothelial dysfunction in rats. *Experimental and clinical journal* 2013; 12: 766-77
2. Kamiryo T, Kassell NF, Thai QA, Lopes MBS, Lee KS. Histological changes in the normal rat brain after gamma irradiation. *Acta Neurochir (Wien)*.1996; 138:451-459
3. Tada E, Matsumoto K, Kinoshita K, Furuta T, Ohmoto T. The protective effect of dexamethasone against radiation damage induced by interstitial irradiation in normal monkey brain. *Neurosurgery*.1997; 41:209- 217
4. Ramesh , Sudha K, Amareshwara M, Sameer, Rakesh M. Study of protein oxidation and antioxidants status in pulmonary tuberculosis patients. *Int J Pharma Biosciences*.2011; 2(3):B104-108
5. Sudha K, Reshma K, Vinitha D, Gaya PR. Evaluation of X-ray induced oxidative stress in cardiac tissue of albino wistar rats. *Indian J Public Health Research and Development* 2016;7(3):41-44
6. Brannan TS, Maker HS, Raes IP .Regional distribution of CT in the adult rat brain. *J Neurochem* 1981; 36(1):307-9
7. Stocks J, Dormandy TL .The autooxidation of human red cell lipids induced by hydrogen peroxide. *Br J Haematol* 1971; 44:276-87
8. Coderre JA, Morris GM, Micca PL et al. Late effects of radiation on CNS: role of vascular endothelial damage and glial stem cell survival. *Radiat Res* 2006;166:495-503
9. Karbownik M, Gitto E, Lewinski A, Reiter RJ Induction of lipid peroxidation in hamster organs by the carcinogen cadmium: melioration by melatonin. *Cell Biol Toxicol*. 2001; 17(1):33-40.
10. Stone HB, Coleman CN, Anscher MS, McBride WH. Effects of radiation on normal tissue: consequences and mechanisms. *Lancet Oncol* 2003; 4(9):529-36

11. Lee HJ, Kim SR, Kim JC, Kang CM, Lee YS, Jo SK, Kim TH, Jang JS, Nah SY, Kim SH. 06. In vivo radioprotective effect of Panax ginseng C.A and identification of active Ginsenosides. *Phytother. Res.*2006; 20: 392-395.
12. Osman NN, Abd El Azime. *Salvia officinalis* ameliorates radiation induced oxidative brain damage in rats. *Arab J Nuclear Science and applications* 2013; 46(1): 297-304
13. Rehab M, Ibrahim M. Evaluation of the effect of spirulina against gamma irradiation induced oxidative stress and tissue injury in rats. *International journal of applied sciences and engineering research* 2012; 1:152-164
14. Sisodia R, Ahaskar M, Sharma KV, Singh S Modulation of radiation-induced biochemical changes in cerebrum of Swiss albino mice by *Grewia Asiatica*. *Acta Neurobiol Exp (Wars)*. 2008; 68(1):32-8.
15. Ralf D, Brigitte P, Bernd H. Synthesis of the antioxidant glutathione in neurons: supply by astrocytes of cystgly as precursor of neuronal glutathione. *J of Neuroscience*1999: 19(2):562-569
16. Heba HM, Mona G, Azeem El, Ismael NE. Protective effect of *Moringa oleifera* on gamma radiation induced hepatotoxicity and nephrotoxicity in rats. *American Journal of phytomedicine and clinical therapeutics* 2014: 4: 495-508
17. Noel F, Ijichi, JA. Chen J, Gumin GJ, Tofilon PJ .X-Ray-Mediated Reduction in Basic Fibroblast Growth Factor Expression in Primary Rat Astrocyte Cultures. *Radiation Research* 1997; 147(4): 484-489
18. Das UN. Acetylcholinesterase and butyrylcholinesterase as possible markers of low grade systemic inflammation. *Med Sci Monit* 2007;13(12); RA 214-21
19. Marani E, Bolhuis P, Boon ME. Brain enzyme histochemistry following stabilization by microwave irradiation. *Histochem J.* 1988; 20(6-7):397-404
20. Zubkova EV, Vasileva IG, Oleksenko NP. Influence of magnitolaser radiation on acetylcholinergic neurons in culture. *Lik Sprava* 2007:5-6:108-10

Study of Some Risk Factors Causing Infertility in Females at Tertiary Care Centre

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ABSTRACT

Introduction: Infertility is worldwide problem affecting people of all communities, though the cause and magnitude may vary with geographical location and socioeconomic status. WHO estimates the prevalence of primary infertility in India to be between 3.9 to 16.8%.

Objective: To study the different correlates like sociodemographic factors and risk factors influencing female infertility in patients attending infertility clinic of tertiary care centre, Aurangabad.

Material and Methodology: It is a cross-sectional study carried out in infertility clinic at Tertiary Care Centre of Govt. Medical College, Aurangabad over period of 3 month (Oct-Dec 2016). About 100 patients visiting for first time were included in the study. Female infertile patients were interviewed with predesigned pretested questionnaire.

Results: Out of 100 female patients 70 (70%) were with primary infertility and 30 (30%) were with secondary infertility. The causes of primary infertility found are uterine anomalies, PCOD, PID, menstrual abnormalities, fibroid, obesity and hypothyroidism. The causes of secondary infertility in this study are PID, menstrual abnormalities, hyperprolactinemia, recurrent abortions, tubal blockage and hypothyroidism. Statistical tests were applied to results wherever necessary.

Conclusion: Infertility has become a global challenge at present time; to overcome the problem mass awareness has to be created with availability of effective treatment facilities. Efforts to raise awareness in the population about the causes of infertility are needed and facilities should be made available for early diagnosis and treatment.

Keywords: Female infertility, PCOD, PID, Menstrual abnormality.

INTRODUCTION

Infertility is a global health issue, affecting approximately 8-10% of couples worldwide.¹ It is estimated that globally 60-80 million couples suffer from infertility every year, of which between 15-20 millions are in India alone.² WHO defines Infertility as “A disease of

the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse.” WHO estimates the prevalence of primary infertility in India to be between 3.9 to 16.8%.³ Infertility classified as primary, when there is no history of pregnancy having occurred, or secondary, when inability to conceive occurs after one or more successful pregnancies.⁴ In 40% of cases the problem is attributable to the male, in 40% to the female. In about 10% of cases, fertility problems are linked to both partners. The remaining 10% unexplained, even after exhaustive testing.⁵ According to NFHS-III 2% of currently married women age 45-49 have never given birth. This suggests that primary infertility is low in India.⁵

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Some of the medical conditions associated with infertility Anovulation, Tubal problem, Polycystic ovary, Endometriosis, Lifestyle problem, Endometrial polyp,

Recurrent Abortion.⁶ So there is need of such study to identify and quantify some risk factors for infertility.

MATERIAL AND METHOD

Study Objectives

1. To know the correlates of infertility like Socio demographic factors and risk factors in females.
2. Recommendations regarding infertility based on study results.

Study design: Cross Sectional Study.

Site of study: Infertility clinic of tertiary centre, GMC Aurangabad, Maharashtra, India.

Study population and selection criteria: Married infertile females of reproductive age group attending infertility clinic of GMC and willing to participate in the study.

Study procedure: This cross sectional study was conducted in Infertility clinic of Tertiary Care Centre, GMC, Aurangabad. All infertile female of reproductive age group coming to clinic and those women who fail to conceive within a year of fully unprotected regular intercourse were included.

Approval for the study was obtained from Institutional Ethical Committee, GMC, Aurangabad. Duration of study was from 1st Oct to 31st Dec 2016 i.e. 3 months. All infertile female coming for 1st time in OPD were interviewed within study duration. If same patient comes for follow up was not considered as sample.

Infertile women were interviewed face to face with pretested, prestructured questionnaire suitable to their local language. Privacy was maintained throughout the interview schedule.

RESULTS AND DISCUSSION

Table 1: Distribution of study subjects according to age, Education, Socioeconomic status (n = 100)

Age in years	No. of Infertile females (n = 100)	Percentage
15-25 yrs	56	56%
26-35 yrs	40	40%
36-45 yrs	4	4%

Conted...

Education		
Postgraduate	2	2%
Graduate	14	14%
Intermediate	8	8%
High School	24	24%
Middle School	50	50%
Primary School	-	-
Illiterate	2	2%
Socioeconomic status Class		
I	2	2%
II	4	4%
III	24	24%
IV	68	68%
V	2	2%

Above table shows distribution of study subjects according to age group. Out of 100 infertile female

maximum i.e. 56 (56%) found in age group 15-25 years. There were 40 females in the age group of 26-35 years. In similar study by Chetna R et al it was found that most of the infertile female were in age group 20-24 yrs.³ Most of the infertile females 50(50%) were educated up to middle school, 24 (24%) up to high school. In study

by Anshu Mittal et al. shows infertile women educated up to middle school and high school.⁹ Maximum infertile female 68(68%) were in upper lower socioeconomic class, 24(24%) were in lower middle socioeconomic class.

Table 2: Distribution of Study Subjects According To Duration of Infertility (n = 100)

Duration of infertility in years	Primary infertility [n = 70] (%)	Secondary infertility [n = 30] (%)
<5	42 (60%)	10 (33%)
5-10	16 (22.85%)	20 (66%)
>10	6 (8.5%)	-

Above table shows higher percentages of female i.e. 60% of primary infertile having duration of infertility of < 5 years and 66% of secondary infertile female had duration of infertility 5-10 years. Similar study of G. Sudha et al. shows higher percentage of females (52.445%) with BMI 26.45 ± 2.6 is present in 1-2 years of infertility period.²

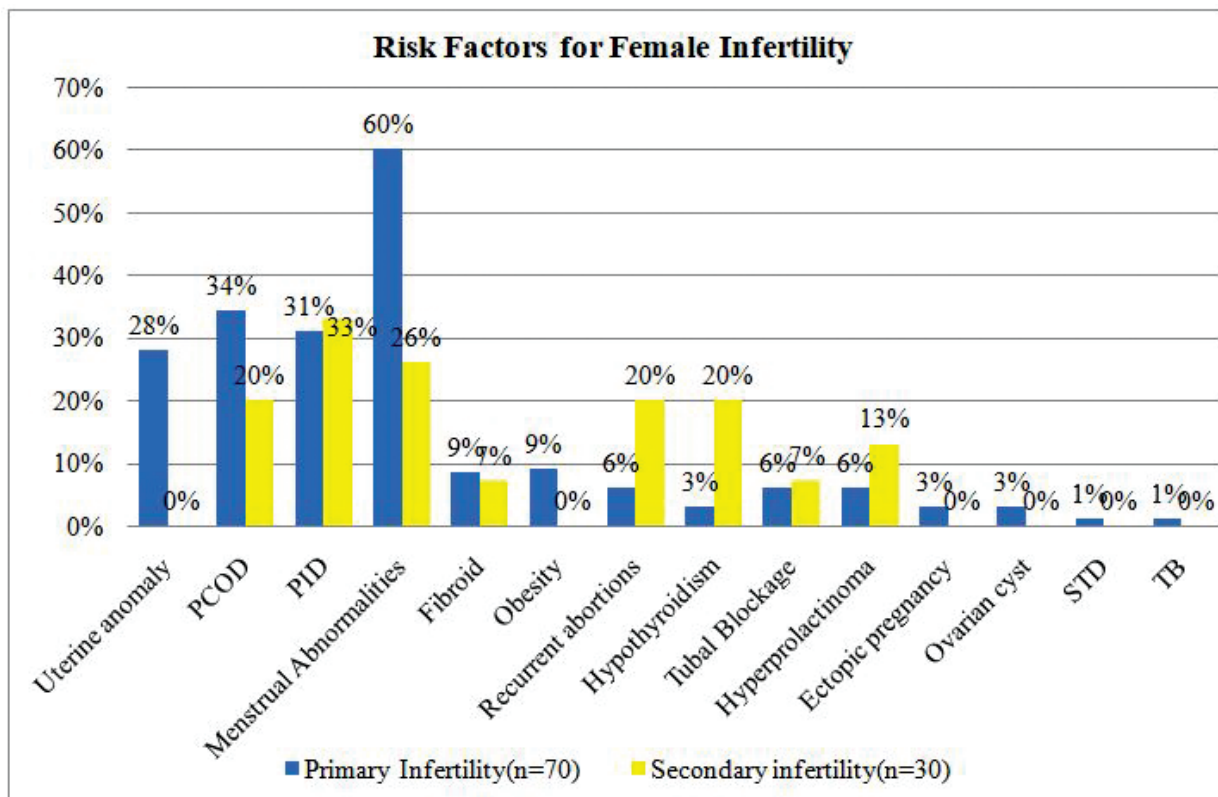
Table 3: Association of some risk factors with Socioeconomic status (SES) of study subjects (n = 100)

Socioeconomic status (SES)	Risk Factors	No. of infertile females (n = 100)	Chi sq . value	P value*	Interpretation (S/NS)
Upper class(I,II,III)	Fibroid	8	0.782	0.185#	NS
	Hypothyroidism	8	2.853	0.050#	S
	Recurrent abortion	10	0.132	0.373#	NS
	Hyperprolactinoma	8	6.218	0.008#	S
Lower class(IV,V)	Uterine anomalies	20	3.64	0.028	S
	PCOD	30	4.59	0.016	S
	PID	32	0.002	0.480	NS
	Menstrual abnormalities	50	8.04	0.002	S
	Obesity	6	1.427	0.110#	NS

*p with Yates correction <0.05 considered as significant

#p with fisher exact test

Above table shows association of some risk factors with socioeconomic status (SES) of study subjects. Out of all this Fibroid, Hypothyroidism ,Recurrent abortion and Hyperprolactinoma found more with upper socioeconomic class of study subjects. In upper SES Hypothyroidism and Hyperprolactinoma found significantly associated. Uterine anomalies, PCOD, PID, Menstrual abnormalities ,Obesity are risk factors among lower socioeconomic class of study subjects among them uterine anomalies, PCOD, Menstrual abnormalities found significantly associated. Some risk factors are found in both SES class. In similar study by Nirmalya Manna et al. have shown anemia, PID, PCOD, obesity as associated causes with infertility.⁸



Graph I: Distribution of risk factors of female infertility (n = 100)

CONCLUSION

Infertility has become a global challenge at present time; to overcome the problem mass awareness has to be created with availability of effective treatment facilities. This study has yielded important information regarding the risk factors influencing infertility. Efforts to raise awareness in the population about the causes of infertility are needed and facilities should be made available for early diagnosis and treatment.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Received from ethical committee of Govt. Medical College.

REFERENCES

1. Kumar D. Prevalence of female infertility and its socio economic factors in tribal communities of central India. Rural and remote health [online] 2007. Avail from: URL: <http://www.rrh.org.au>
2. G. Sudha and K.S.N. Reddy. Causes of female infertility: A cross sectional study, International Journal of Latest Research in Science and Technology Volume 2, Issue 6: Page No.119-123, November-December 2013.
3. Chethana R, Shilpa. "Prevalence and Risk Factors influencing Primary Infertility". Journal of Evolution of Medical and Dental Sciences 2014; Vol. 3, Issue 13, March 31; Page: 3384-3393
4. Amrita Baranwall et.al. Causes of Increasing Rate of Female Infertility in India International Journal of Science and Research (IJSR) ISSN (Online) Volume 4 Issue 7, July 2015 2319-7064, www.ijsr.net
5. Dr Nirmalya Mannal, Dr Dipanwita Pandit et. al. "A community based study on Infertility and associated socio-demographic factors in West Bengal, India" IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) e-ISSN: 2279-0853, p-ISSN: 2279-0861. Volume 13, Issue 2 Ver. II. (Feb. 2014), PP 13-17 www.iosrjournals.org
6. Hossain SM, Khaliduzzaman SM, Huq S, et al. Evaluation of Pattern of Infertility Among The Patients of A Selected Infertility Center in Dhaka, Bangladesh. IOSR Journal of Nursing and Health Science (IOSR-JNHS) e-ISSN: 2320-1959.p-ISSN: 2320-1940 Volume 5, Issue 4 Ver. III (Jul. - Aug. 2016), Page 28-32.
7. Mallikarjuna M.1*, Rajeshwari B. V. Selected risk factors of infertility in women: case control study International Journal of Reproduction, Contraception, Obstetrics and Gynecology 2015 Dec;4(6):1714-1719 www.ijrcog.org
8. Nirmalya Manna, Dipanwita Pandit, Soumi Biswas: Infertility and related factors: An experience from a rural community of West Bengal, India. Indian J. Prev. Soc. Med. Vol. 45 No. 1-2, 2014.
9. Anshu Mittal, Shweta Yadav, Sachin Singh Yadav, et al. An epidemiological study of infertility among urban population of Ambala, Haryana. International Journal of Interdisciplinary and Multidisciplinary Studies (IJIMS), 2015, Vol 2, No.4, 124-130.
10. Patel Mital, Jain Shefali, Jain Dinesh et al. Prevalence of Different Factors Responsible for Infertility. Research Journal of Recent Sciences ISSN 2277-2502. Vol. 1(ISC-2011), 207-211 (2012)
11. Kerala S Shamila and SL Sasikala. Primary Report on the Risk Factors Affecting Female Infertility in South Indian Districts of Tamil Nadu and Kerala. Indian Journal of Community Medicine 2011; 36 (1): 59-61
12. Dabral S, Malik SL. Demographic study of gujars of Delhi: Factors affecting fertility, Infant mortality and use of BCM. Journal of Hum. Ecol. 2005; 17: 85-92. 2.
13. Dutta S, Guha A. A clinico-anatomical study on the etiological factors pertaining to primary infertility in females using some common investigative procedures. J Anat Soc India. 2007; 56: 14-7
14. World Health Organization. Infecundity, infertility, and childlessness in developing countries. DHS Comparative Reports No 9. Calverton, Maryland, USA: ORC Macro and the World Health Organization; 2004.
15. Paul CA, Krupp K, Alexandra HF, Jeffery DK, Arthur LR, Purnima M. Prevalence and correlates of primary infertility among young women in Mysore, India. Indian J Med Res 2011 Oct; 134: 440-446.
16. Mokhtar S et.al. Risk factors for primary and secondary infertility in Alexandria: A hospital based case control study. J Med Res Inst. 2006; 27: 251-61
17. Gupta N. Infertility: planning a prototype action plan in the existing health care system. J Indian Med Assoc 2002; 100:391-94.

Learning Styles and Academic Outcome among Nursing Students-Systematic Review

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ABSTRACT

Background: Learning is a dynamic process and changes from person to person. Present day learners, in healthcare sector need to be competent to gain the quick access to the knowledge and skills in the technologically advancing world.

Method: The purpose of this systematic review was to find the learning styles adapted by nursing students and its relationship with academic outcome. A comprehensive literature search was done between November and December 2016, using the MeSH words and key words such as learning, learning styles, learning approaches, academic success, academic results, academic achievements, students, learner, nursing students and Boolean operators from four online data bases such as PubMed, Ovid Medline, Proquest and CINAHL for the articles published between 2005 and 2016. A narrative synthesis approach of analysis was adopted for summarizing the findings.

Results: Total of 1,840 articles were identified. After quality appraisal and based on the inclusion criteria, six research articles were found relevant for data extraction for the review. Out of these, three studies were exclusively conducted among nursing students, and five different types of learning style assessment tools were used among these six studies. Academic achievement was mainly assessed through academic marks and academic grade points.

Conclusion: Learning style is unique for each learner. Teachers should understand learning style of student to encourage the new ways of learning to improve the learning outcome.

Keywords: Learning style, learning approach, academic outcome, academic achievements, nursing student

INTRODUCTION

Amazing advancements of today's world are the consequences of human learning. Change is constant and human beings are attempting to learn to add to their knowledge in order to deal with the change and adapt to the situations⁽¹⁾. Learning is a dynamic process⁽²⁾, influenced by how learner approach studying⁽³⁾ and vary from person to person⁽⁴⁾. "Learning styles" is "characteristic cognitive, effective, and psychosocial behaviors that serve

as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment"⁽⁵⁾. Learner's learning process is considerably affected by learner's preferred style of learning⁽¹⁾.

Learning styles have been shown to vary widely among students⁽⁶⁾. Every learner has his/her own preferred way of perceiving, organizing and retaining information. Accordingly, learners choose a particular method of interacting with and processing information and stimuli when they learn⁽²⁾. Learners attending colleges are with different categories of ethnic/ racial diversity⁽⁷⁾ and different attitudes about learning and teaching, different levels of motivation and different responses to instructional practices and classroom environments⁽⁸⁾.

Health care is changing at rapid speed in this fast moving world which is mostly influenced by advances in technology and change in demographics⁽⁹⁾. Increased

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production of information and knowledge due to technological advancement has lessened the life cycle of information and knowledge⁽¹⁾. Present-day world needs people with much capabilities such as using different ways of thinking, critical thinking, creativity and problem solving. One of the aspects of thinking is critical thinking which is essential to overcome the difficulties in life and facilitate the access to information⁽¹⁰⁾. Teaching the individual to learn and to gain quick access to information is very much essential to overcome the situation⁽¹⁾. Mastering, deep understanding of course material and developing self-directed independent skills are promoted by ideal learning environment and learner's learning styles. The approaches in learning are also essential for acquiring critical thinking and problem solving skills leading to intensified academic performance and fostering desire for lifelong learning⁽¹¹⁾.

MATERIAL AND METHOD

Purpose of research question: The purpose study was to examine the research focused on learning styles adapted by the learners of different disciplines of health care and its relationship with academic performance. The review question was, "What is the correlation between different styles of learning and academic outcome among nursing students?"

Study design: The guidelines described in the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) were used to conduct this review. Checklist to ensure transparent reporting of systematic reviews and a four-phase diagram is included in PRISMA⁽¹²⁾.

METHOD

A comprehensive search for original relevant research studies which are published between 2005 and 2016 was conducted among three scientific data bases of Ovid Medline, PubMed, Proquest and CINAHL. Following combination of keywords, "learning", "learning styles" "learning approaches", "academic success", "academic results", "academic achievements", "students", "learner", "nursing students" and MeSH terms used were "learning", "academic achievements", "students", "students, nursing". The search was performed between November and December 2016 by using terms in combination with Boolean operators 'AND', 'OR', 'NOT'. The detailed method of study retrieval is shown in figure 1. Inclusion criteria for the studies to include in the systematic review were original research studies published in English after 2005 and conducted among nursing students. Initial screening of the titles and abstracts for the inclusion criteria was done by investigator. Full text of the required articles was then retrieved for further assessment.

Data extraction: Quality appraisal of the studies was done by using appraisal checklist given by Guyatt GH et al. The checklist is designed to appraise the cross-sectional studies in the medical literature⁽¹³⁾. Data was extracted independently from the included studies by reviewers into the pre-designed structured data extraction forms.

Data Synthesis: Narrative synthesis is adopted to summarize the findings as the outcome measure was assessed by different statistical measures among the studies. Narrative synthesis is an approach for the systematic review and synthesis of review findings from numerous research studies. Narrative synthesis uses texts and words to sum up and explain the findings⁽¹⁴⁾.

RESULTS

The initial search produced 1,840 studies. After removing non-relevant and non-English 37 research studies were included for title screen. After removing the duplicate studies 19 research studies articles were included for the full text review. Based on the inclusion criteria six relevant articles were included in the final review.

Sample characteristics: Six research articles were included in the final review based on the inclusion criteria. And among four, two studies were represented more than one database. The demographic and methodological characteristics of chosen studies shown in the table 1. Out of six, three studies were conducted exclusively among nursing students^(2, 5, 16). Other three were conducted among other disciplines such physician's assistant, physical therapy, athletic training, natural science, engineering, medicine, health Sciences, medicinal chemistry, health and medical emergency along with nursing students^(3, 10, 17). Total sample size from these six studies was 1,774 out of which 993 were nursing students from five research articles. The number of nursing students was not available in the study conducted by Ghazivakili, et al., 2014.

The learning styles were assessed by various tools in these research studies. The different tools used are Revised Study Process Questionnaire (R-SPQ-2F),³ Kolb learning style inventory^(10, 15), Chinese version of the Myers-Briggs type indicator Form M⁽²⁾, visual-audal read/write-kinesthetic (VARK) inventory⁽¹⁷⁾ and Honey and Mumford's learning styles inventory⁽¹⁶⁾. The academic outcome was measured with academic marks⁽³⁾, Grade point average (GPA)^(2,15), summative assessment performance⁽¹⁷⁾, knowledge questionnaire, attitude questionnaire and intervention confidence skills scale⁽¹⁶⁾ and academic grade points⁽¹⁰⁾.

Table 1: Demographic and methodological characteristics of the studies

Authors/year	Country/ Journal	Sample & Sample size	Tools	Statistics & major findings
Salamonson et.al./2013	Australia/Journal of Allied Health,	Nursing=476, Engineering =75, Medicine=77, Health Sciences=204, Medicinal chemistry= 87	Revised Study Process Questionnaire (R-SPQ-2F) and academic marks	Stepwise regression analysis Surface learning approach (β :0.13, $p<0.001$) deep approach (β :0.11, $p=0.009$)
Suliman WA/2010	Saudi Arabia/ Journal of Nursing Research	Nursing =98	Kolb learning style inventory & Grade point average	Pearson correlation co-efficient No significant correlation between concrete experience ($r=-.009$), reflective observation ($r=-.021$), abstract conceptualization ($r=-.084$) and active experimentation ($r=-.074$) with GPA ($p>.05$)
Li Y et.al/ 2014	Taiwan/ Contemporary Nurse	Nursing =285	Chinese version of the Myers-Briggs type indicator Form M & grade point average	ANOVA Significant relationship between academic performance and learning style ($p=0.001$, $d/f=15$)
Good PJ et.al/ 2013	United States/ Journal of Allied Health	Nursing students = 24 Physician's assistant= 34, Physical therapy = 51, Athletic training = 5, and Natural science = 32	Visual-aural-read/write-kinesthetic (VARK) inventory & summative assessment performance	Linear regression Significant negative correlation between assessment performance and aural modality ($P<0.01$, $R^2=0.3048$); significant positive correlation with visual modality ($p<0.05$, $R^2= 0.2198$)
Rassool GH et.al/2008	Not mentioned First author is from Brazil/ Nurse Education in Practice	Nursing =110	Honey and Mumford's learning styles inventory knowledge questionnaire, attitude questionnaire and intervention confidence skills scale	Analysis of covariance (ANCOVA and Bonferroni test) Learning styles preference had no influence on knowledge acquisition ($F_{(2,106)} = 2.645$, $p=.076$) attitude change ($F_{(2,106)} = 0.341$, $p=.712$)
Ghazivakili Z et.al/2014	Iran/Journal of Advances in Medical Education And Professionalism	Medical, nursing and midwifery, and health and medical emergency=216	Kolb standardized questionnaire of learning style & academic grade points	One way ANNOVA -Significant relation between academic performance and learning style ($p=0.049$)

Relationship between learning styles and academic outcome: Findings revealed two learning styles i.e. deep learning approach and superficial learning approach. There was wide variations in the approach of deep learning among different group of participants and no statistically significant difference in the surface learning approach. Both deep and surface learning approaches were termed as significant and independent predictors of academic performance⁽³⁾. Good et.al 2013, categorized the students into unimodal [visual-aural-read/write-kinesthetic (V A R and K)], bimodal, trimodal or quadmodal based on VARK inventory. There was a negative correlation between assessment performance and aural mode; positive correlation with visual mode⁽¹⁷⁾. Four categories of learning abilities according Kolb's inventory were concrete experience, reflective observation, abstract conceptualization and active experimentation; which had no significant correlation with Grade Point Average (GPA)⁽¹⁵⁾. Kolb's pattern also had a convergent learning style (the maximum percentage), assimilating style and accommodating style (the minimum percentage). Convergent learning style had better academic performance than other learning styles and significant relation between academic performance with learning style⁽¹⁰⁾. The two categories of learning styles found in the study conducted by Li et.al 2014 were introversion, sensing, thinking and judging (ISTJ); and introversion, sensing, feeling and judging (ISFJ). There was a significant relationship between the academic performance and learning style preference of ISTJ⁽²⁾. Activist, reflector, theorist, pragmatic and dual learning are the styles of learning according to Honey and Mumford's learning style inventory. Dual learning style preference group had better performance in the knowledge domain and confidence skills. However, preference of learning style did not have influence on acquisition of knowledge and attitude change⁽¹⁶⁾.

DISCUSSION

The findings of the review showed that both deep and superficial learning approaches are not having significant correlation with academic outcome. In a study conducted by Jayawardena CK et.al. 2013 at Sri Lanka to find the association of learning approaches with academic performance of Sri Lankan first-year dental students revealed a greater number of deep approach learners than superficial or surface learners. There was also a statistically significant positive correlation between deep approach of learning ($r=.3$, $p < .05$) with academic outcome⁽¹⁸⁾.

There was positive correlation between academic outcome and visual mode of learning whereas negative correlation with aural mode of learning. A study conducted by O'Mahony et.al. 2016 to find the association between learning style preferences and anatomy assessment outcomes in graduate entry and undergraduate medical students by using VARK inventory showed a positive correlation with aural modality of learning⁽¹⁹⁾. Similar findings also revealed in a study conducted by Kim RH et.al to assess learning style preferences of surgical residency applicants. Subjects with aural preferences had higher scores than that of any other learning style⁽²⁰⁾.

According to Kolb's style of learning convergent style of learning and introversion, sensing, thinking and judging (ISTJ) had significant positive correlation with the academic outcome. Ghaffari et.al conducted an analysis of learning styles and their relationship to academic achievement in medical students of basic sciences program at Iran showed that diverger, assimilator, converger and accommodator learning styles had no significant relationship between students' learning academic achievement⁽¹⁾. Similar findings of not having significant correlation between learning styles and academic scores was found in study conducted by using Kolb's inventory to assess the learning style of medical students and its correlation with preferred teaching methodologies and academic achievement at Pakistan⁽²¹⁾, in a cross-sectional study conducted in Iran among dental students' to find the educational achievement in relation to their learning styles⁽²²⁾ and in a research conducted to find the relationship between the learning style preferences of medical students and academic achievement at Kingdom of Saudi Arabia⁽⁴⁾.

CONCLUSION

Learning and style of learning is unique for individual learner. The review was also unable to prove that a particular style of learning has a material advantage on academic outcome. Since the clinical experience is a much important component in nursing, the teachers should understand the learning style preference of the student and encourage to practice the new ways of learning to increase the learning outcomes.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Obtained from Institutional Research Committee (IRC) of Maniapal College of Nursing Manipal

REFERENCES

1. Ghaffari R, Ranjbarzadeh FS, Azar EF, Hassanzadeh S, Safaei N, Golanbar P, Abbasi E. The analysis of learning styles and their relationship to academic achievement in medical students of basic sciences programme. *Res Dev Med Edu*, 2013; 2(2); 73-76.
2. Li Y.-S, Yu W-P, Liu C-F, Shie S.-H, & Yang B.-H. An exploratory study of the relationship between learning styles and academic performance among students in different nursing programs. *Contemporary Nurse*, 2010; 48 (2); 229-239.
3. Salamonson Y, Weaver R, Chang S, Koch J, Bhathal R, Khoo C, Wilson I. Learning approaches as predictors of academic performance in the first year health and science students. *Nurse Education Today*, 2013; 729-733.
4. Almigbal TH. Relationship between the learning style preferences of medical students and academic achievement. *Saudi Medical Journal*, 2015; 36 (3); 349-355.
5. Romanelli F, Bird E, Ryan M. Learning styles: A review of theory, application and best practices. *American Journal of Pharmaceutical Education*, 2009; 73(1); 1-5.
6. Samarakoon L, Fernando T, Rodrigo C, Rajapakse S. Learning Styles and approaches to learning among medical undergraduates and postgraduates. *BMC Medical Education*, 2013; 13 (42); 2-6.
7. Gurin P, Dey EL, Hurtado S, Gurin G. Diversity and Higher Education: Theory and Impact on Educational Outcomes. *Harvard Educational Review*, 2002; 330-366.
8. Felder RM, Brent R. Understanding Student Differences. *Journal of Engineering Education*, 2005; 57-72.
9. Spekowius G, Wendler T. *Advances in Healthcare Technology: Shaping the Future of Medical Care*. Netherlands: Springer. 2006.
10. Ghazivakili Z, Nia RN, Panahi F, Karimi M, Gholsorkhi H, Ahmadi Z. The role of critical thinking skills and learning styles of university students in their academic performance. *Journal of Advances in Medical Education and Professionalism*, 2014; 2(3); 95-102.
11. Smith L, Krass I, Sainsbury E, Rose G. Pharmacy Students' Approaches to Learning in Undergraduate and Graduate Entry Programmes. *American Journal of Pharmaceutical Education*, 2010; 74 (6); 1-6.
12. Moher D. Preferred reporting Items for systematic review and meta analysis: the PRISMA statement. *Journal of Clinical Epidemiology*, 2009; 1006-12.
13. Guyatt GH, Sackett DL, Cook DJ, Guyatt G, Bass E, Brill-Edwards P, Browman G. *Users' guides to the medical literature. 1994*: Retrieved from <https://reache.files.wordpress.com/2010/03/cross-sectional-appraisal-tool.pdf>.
14. Popay J, Roberts H, Sowden A, Petticrew M, Lisa A, Rodgers M, Duffy S. *Guidance on the Conduct of Narrative synthesis in Systematic Reviews: A product from the ESRC Methods Programme*. 2006: Retrieved from http://www.lancaster.ac.uk/shm/research/nssr/research/dissemination/publications/NS_Synthesis_Guidance_v1.pdf.
15. Suliman WA. The relationship Between Learning Styles, Emotional Social Intelligence, and academic success of Undergraduate Nursing students. *Journal of Nursing Research*, 2010; 18 (2): 136-143.
16. Rassool GH, Rawaf S. The influence of learning styles preference of undergraduate nursing students on educational outcomes in substance use education. *Nurse Education in Practice*, 2008; 8; 306-314.
17. Good JP, Ramos D, D'Amore DC. Learning Style Preferences and Academic Success of Preclinical Allied Health Students. *Journal of Allied Health*, 2013; 42 (4); 81-90.
18. Jayavardena CK, Hewapathirana TN, Banneheka S, Ariyasinghe S, Ihalagedara D. Association of Learning Approaches With Academic Performance of Sri Lankan First-Year Dental Students. *Teaching and Learning in Medicine*, 2013; 25 (4): 334-341.
19. O'Mahony SM, Sbayah A, Horgan M, O'Flynn S, O'Tuathaigh CM. Association between learning style preferences and anatomy assessment outcomes in graduate entry and undergraduate medical students. *Anatomical Sciences Education*, 2016; 9; 391-399.

20. Kim RH, & Gilbert T. Learning style preferences of surgical residency applicants. *Journal of Surgical Research*, 2015: 61-65.
21. Bhalli MA, Khan IA, Sattar A. Learning style of medical students and its correlation with preferred teaching methodologies and academic achievement. *Journal of Ayub Medical College*, 2015: 27 (4); 837-842.
22. Hosseini SM, Amery H, Emadzadeh A, Babazadeh S. Dental Students' Educational Achievement in Relation to Their Learning Styles: A Cross-sectional Study in Iran. *Global Journal of Health Science*, 2015: 7 (5); 152-158

Goiter and Hypothyroidism among Elementary School Children in Lowland Agricultural Area, Brebes District Indonesia

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ABSTRACT

The most common cause of goiter is the lack of iodine intake and usually occurs in many communities in upland areas. Pesticides are widely used in the agricultural area, and it was probably the cause of goiter. This research is aimed to identify goiter and hypothyroidism among elementary school children in lowland agricultural areas. Cross-sectional study recruited sample of 100 children aged 9-12 years old from three elementary schools in Brebes District, Indonesia. Goiter existence determined by palpation of a trained nutritionist; level of thyroid stimulating hormone (TSH) measured with mini vidas test kits; and Urinary Iodine Concentration (UIC) measured with acid digestion method. Univariate and bivariate data analysis (Chi-square test, risk estimate) were applied. Proportion of goiter and hypothyroidism was 53.0% and 17.4% respectively. Median UIC was 346 µg/dL. Proportion of goiter in the children whose fathers were farmer and non-farmer was 80,8% and 43,2% respectively ($p=0.002$; Prevalence Ratio=1.9; 95% CI=1.3-2.6). The proportion of hypothyroidism in the children whose fathers were farmers (29.4%) tends to be higher than non-farmers (13.5%). However, there was no significance difference proportion of hypothyroidism in both group ($p=0.255$; Prevalence Ratio=2,2; 95% CI=0.8-6.0).

Keywords: Goiter, Hypothyroidism, Children, Agricultural Area, Indonesia

INTRODUCTION

Goiter is an enlargement of thyroid gland located in the neck caused by malfunctioning or changing gland structures or its morphology. The enlargement of the thyroid gland can influence the positions of organs. The negative effects of goiter can be a cosmetic problem and difficulties in swallowing and breathing¹. Thyroid gland has a function to produce thyroid hormones, thyroxine (T4) and triiodothyronine (T3). Thyroid hormone plays an important role in a process of body growth, brain development, nervous system, and teeth and skeletal

development². The lack of thyroid hormone will increase a level of Thyroid Stimulating Hormone (TSH), a type of hormone that increases a synthesis of thyroid hormone and stimulates an enlargement of thyroid gland³. Goiter occurred on children is responsible for growth and development disruption such as stunting, low Intelligence Quotient, and mental disorders⁴.

Goiter in an endemic area is mainly caused by the lack of iodine intakes as the critical raw material in the process of thyroid hormone synthesis. Endemic goiter, well-known as Iodine Deficiency Disorder (IDD)⁵, is generally found in highland areas due to low iodine levels in soil, water, and agricultural products. Goiter rate in lowland areas is also quite high even though the content of iodine levels in soil, water, and agricultural commodities is sufficient⁶. Related to this phenomenon, some theories stated that thyroid dysfunctions occurred due to exposures of heavy metals in the environment such as lead, mercury, cadmium, polychlorinated biphenyl (PCB), and pesticide^{7,8}.

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Bulakamba, one of the Subdistricts in Brebes District, is the area with high-intensity pesticide use and depends on agricultural products (paddy, shallots, corn, green bean, and chili). Meanwhile, Kluwut Public Health Center located in the Bulakamba Subdistrict was the highest total goiter rate (TGR) among elementary school students in Brebes District (38.5%). The result of the measurement of UIC demonstrated that median UIC ranged from 286-293µg/L (Brebes District Health Offices, unpublished data 2010). These values were not categorized as iodine deficiency⁹.

MATERIAL AND METHOD

A cross-sectional study design was conducted in Brebes district, Central Java Indonesia in 2012. Minimum sample size were 97 students calculated using the formula for estimating the population proportion¹⁰. Notwithstanding, as many as 100 students aged 9-12 years old randomly selected from three elementary schools.

Variables of characteristics were collected using a structured questionnaire by a trained interviewer. Thyroid gland palpation undertaken by trained nutritionists worked at Brebes District Health Office determined the occurrence of goiter. The thyroid size was graded according to the joint criteria of WHO, UNICEF and ICCIDD (non-palpable goiter = grade 0, palpable but not visible goiter = grade 1 and palpable and visible goiter = grade 2)⁹.

Thyroid stimulating hormone (TSH) levels collected from sub-samples of 69 subjects were measured with a mini VIDAS® (bioMérieux S.A.), a compact automated immunoassay system based on the Enzyme Linked Fluorescent Assay (ELFA) principles at an accredited clinic laboratory. Non-fasting peripheral venous blood samples were obtained in the morning from 09.00 to 11.00. Subjects were categorized suffering from hypothyroidism when the TSH levels were ≥ 4.5 µIU/L². Meanwhile, UIC levels were measured using a method of acid digestion with persulfate ammonium. Spot urine samples were obtained from sub-samples of 66 subjects.

Univariate analysis was used to describe frequencies for categorical data, mean±standard deviation, and range for continuous data. Chi-square test was performed to analyze the association between two variables.

Ethics approval was obtained from the health ethics committee of Faculty of Public Health, Diponegoro

University, Semarang, Indonesia. Written permission to conduct this study was obtained from the head of Education Office Brebes District and the head teachers and chiefs of the schools involved. Parents also signed an informed consent form.

FINDINGS

A proportion of female was higher than a proportion of male in three elementary schools. Fathers and mothers educational status were mostly middle or less, respectively 95% and 97%. Meanwhile, as many as 26% of fathers worked as a farmworker and mothers as a farmworker as many as 21%. (Table 1).

Table 1: Characteristics of Subjects

Characteristics	Frequency (%)
Age (years):	
9	6 (6.0)
10	17 (17.0)
11	52 (52.0)
12	25 (25.0)
Sex:	
Male	43 (43.0)
Female	57 (57.0)
Fathers educational status:	
Middle or less	95 (95.0)
High school	5 (5.0)
Fathers occupation:	
Farmworker	26 (26.0)
Non-farmworker	74 (74.0)
Mothers educational status:	
Middle or less	97 (97.0)
High school	3 (3.0)
Mother's occupation:	
Unemployment	33 (33.0)
Farmworker	21 (21.0)
Non-farmworker	46 (46.0)

The overall prevalence of goiter was found to be 53.0%. Prevalence of Grade 1 goiter was 27.0% and that of grade 2 was 26.0%. The results of TSH level measurement on 69 samples demonstrated that as many as 17% of them were categorized suffering from hypothyroidism (TSH > 4.5 µIU/L). Meanwhile, the results of UIC level measurement showed that there was no subject suffering from iodine deficiency (> 100 (mg/L) (Table 2).

Table 2: The occurrence of goiter, hypothyroidism, and median UIC

Characteristics	Frequency (%)
The occurrence of goiter (n = 100):	
Yes	53 (53.0)
No	47 (47.0)
Grade:	
Grade 0	47 (47.0)
Grade 1	27 (27.0)
Grade 2	26 (26.0)

Conted...

Hypothyroidism (n = 69):	
Yes	12 (17.4)
No	57 (82.6)
TSH (mean±SD, range)	3,1±1,87 (0,4-11,4)
UIC (median, range) (mg/L) (n=66)	346 (192-349)

A proportion of goiter among subjects who had fathers working as a farmworker was equal to 80.8%, two times higher than that of subjects who had fathers working as non-farmworker (43.2%) (Table 3).

Table 3: The occurrence of goiter based on fathers' occupation

Fathers' occupation	The occurrence of goiter		P	Prevalence Ratio (95% CI)
	Yes	No		
Farmworker	21 (80.8)	5 (19.2)	0.002*	1.9 (1.3-2.6)
Non-farmworker	32 (43.2)	42 (56.8)		

Significant <0.05

A proportion of hypothyroidism among subjects who had fathers working as a farmworker was equal to 29.4%, two times higher than that of subjects who had fathers working as non-farmworker (13.5%) (Table 4).

Table 4: The occurrence of hypothyroidism based on fathers' occupation

Fathers' occupation	The occurrence of hypothyroidism		P	Prevalence Ratio (95% CI)
	Yes	No		
Farmworker	5 (29.4)	12 (70.6)	0.255	2.2 (0.8-6.0)
Non-farmworker	7 (13.5)	45 (86.5)		

DISCUSSION

This study found as many as 53% of elementary school students located in lowland areas suffered from goiter. Brebes is an agricultural area producer of shallot in Central Java province, Indonesia. The farmers usually spray pesticides 2-3 times per week, even every day in the rainy season. The yield rate of shallot in Brebes in 2014 as much as 121.46 quintals/hectare¹¹.

Goiter, a manifestation of thyroid hyperplasia and increased thyroid vascularity, results from a compensatory increase in the release of thyroid-stimulating hormone (TSH) as a result of lower triiodothyronine (T_4) levels and is traditionally detected and evaluated using inspection and palpation¹². We used palpation in our study because ultrasonography is cumbersome and costly to carry out¹³, and palpation is regarded as an acceptable and

simple alternative. Palpation of the thyroid is important in assessing goiter prevalence, which is relatively easy to conduct, and training of personnel to do it¹⁴.

UIC levels greater than 100 $\mu\text{g/L}$ (Table 2) mean that there was no case of iodine deficiency on all research participants. Iodine deficiency early in life impairs cognition and growth, but iodine status is also a key determinant of thyroid disorders in adults. Dietary iodine intake is required for the production of thyroid hormone. Consequences of iodine deficiency include goiter, intellectual impairments, growth retardation, neonatal hypothyroidism, and increased pregnancy loss and infant mortality^{15,16}. A main cause of goiter commonly is due to lack of iodine intakes. Iodine is the critical raw material for a process of thyroid hormone biosynthesis. Iodine plays an important role in growth and development, and brain function¹⁷.

There are several accepted methods for the monitoring of population iodine status¹⁸. Because 90% of ingested iodine is renal excreted, median spot urinary iodine concentrations (UIC) serve as a biomarker for recent dietary iodine intake. Population iodine sufficiency is defined by median UIC of 100–299 $\mu\text{g/L}$ in school-aged children⁹. A source of iodine in the environment depends on a location/geographical factor. Generally, sufferers of goiter are commonly found in highland areas (mountainous regions) because there is a lack of iodine levels in water and soil, where iodine has been washed away by glaciation and flooding¹⁵. On the other hand, oceans are the world's main repositories of iodine and very little of earth iodine is actually found in the soil. The deposition of iodine in the soil occurs due to volatilization from ocean water, a process aided by ultraviolet radiation. The coastal regions of the world are much richer in iodine content than the soils further inland¹⁹.

IDD has a strong relationship with a geographical factor because it is generally found in highland areas among school age children. This age group is very susceptible to iodine intakes obtained from the environment. School-age children are considered as an appropriate target group for determining iodine deficiency due to their susceptibility to iodine deficiency, easily accessibility as a study group and representativeness of their community society as a whole²⁰. Some studies demonstrated that the occurrence of goiter was due to a lack of iodine intake and generally found in highland areas. A study conducted at Kayseri, Turkey, where the goiter is endemic, goiter prevalence was 54.8% and median urinary iodine level was 9.54 $\mu\text{g/dl}$ indicating mild iodine deficiency²¹. The prevalence of goiter among children 6-12 years old in Lay Armachiho Northwest Ethiopia was found to be 37.6%, whereas 70.3% of the subjects had inadequate iodine content ($<15 \text{ ppm}$)²⁰. A study in high altitude areas of Saudi Arabia revealed the goiter prevalence was 7.4% and about 71% of the participants had UIC less than $100 \mu\text{g/L}$ ²². Other studies demonstrated that goiter cases were found in areas with sufficient iodine intakes (non-endemic areas) such as coastal or lowland areas. Study at adult more than 18 years old in an iodine-sufficient area in Chengdu China revealed prevalences of goiter was 8.8%²³. A study by Suhartono in District of Brebes found pesticide exposure as a risk factor for hypothyroidism among women at childbearing age living in an agricultural area, Brebes District, Indonesia²⁴.

The proportion of goiter and hypothyroidism was higher among farmworkers' children than among non-farmworker's children (Table 4). However, Iodine intakes in all research participants were sufficient. Pesticides might be a risk factor for goiter. A pesticide is a chemical widely used to increase agricultural products and to decrease food-borne or vector-borne diseases²⁵. The use of a synthetic pesticide can contaminate soil, water, grass, and other vegetation. In addition to killing the insects or weeds, pesticides can be toxic to a number of other organisms, including birds, fish, beneficial insects, and non-target plants. Insecticides are generally the most acute toxic class of pesticides, herbicides but can also pose a risk to non-target organisms²⁶. Pesticide residues leftover from agriculture not only contaminated crops but also the environment, such as ambient air, surface water, and soil. These findings reinforce the concern about pollution by organophosphates in areas surrounding agriculture areas of pesticide use²⁷. Ideally, toxic effects of pesticide are on target organisms (pests) but in fact, the toxicity of most of the active ingredients of pesticide is not specific. Therefore, it is very harmful to human health²⁸.

Pesticides are categorized as endocrine disrupting chemicals (EDCs)²⁹. Exposure by EDCs can disrupt thyroid function that is well-known as thyroid disrupting chemicals (TDCs)³⁰. Thyroid dysfunction has an impact on growth and development of children². EDCs can bind and activate a variety of hormone receptors and then mimics the action of natural hormones (agonist action). EDCs also can bind to the receptors without activating them. Antagonist action would block and inhibit the action of the receptors. In addition, EDCs also can interfere with the synthesis, transport, metabolism and elimination of hormones, thus reducing the concentrations of natural hormones³¹.

CONCLUSIONS

The proportion of goiter and hypothyroidism among children was two times higher in subjects whose fathers as farmworkers than non-farmworkers although the iodine intake was adequate.

Conflict of Interest: The authors declare that they have no conflict of interest.

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REFERENCES

1. Guyton AC and Hall JE. *Textbook of Medical Physiology*. 12th ed. Philadelphia: Saunders, Elsevier; 2011.
2. Stone MB and Wallace RB. *Medicare Coverage of Routine Screening for Thyroid Dysfunction*. Washington DC: The National Academic Press; 2003. <http://www.nap.edu/catalog/10682.html>.
3. American Thyroid Association. www.thyroid.org. http://www.thyroid.org/wp-content/uploads/patients/brochures/Goiter_brochure.pdf. Published 2016. Accessed March 14, 2017.
4. Dunn JT. Iodine should be routinely added to complementary foods. *J Nutr*. 2003;133:3008S-3010S.
5. Eastman C. Iodine Deficiency Disorders Continue to be a Problem in the Asia Pacific Region. *J ASEAN Fed Endocr Soc*. 2012;27(2):170-175. doi:10.15605/jafes.027.02.06.
6. Sulchan M. Goiter in the coastal areas (case study in Pati Regency): an ecological nutrition problem? *Indones J IDD*. 2007;6(1):17-22.
7. Wade M, Parent S, Finnson K, et al. Thyroid toxicity due to subchronic exposure to a complex mixture of 16 organochlorines, lead, and cadmium. *Toxicol Sci*. 2002;67(2):207-218. doi:10.1093/toxsci/67.2.207.
8. Henson M, Chedrese P. Endocrine disruption by cadmium, a common environmental toxicant with paradoxical effects on reproduction. *Exp Biol Med*. 2004;229(5):383-392.
9. World Health Organisation. Assessment of the iodine deficiency disorders and monitoring their elimination. *WHO, Geneva*. 2007:1-107. doi:ISBN 978 92 4 159582 7.
10. Lemeshow S, Hosmer Jr D, Klar J, Lwanga S. *Adequacy of Sample Size in Health Studies*. New York: John Wiley & Sons Ltd.; 1990.
11. Central Statistics Office. *Brebes Regency in Figures*. Brebes; 2016.
12. WHO/NMH/NHD/EPG/14.5. Goitre as a determinant of the prevalence and severity of iodine deficiency disorders in populations. 2014:14-19.
13. Peterson S, Sanga a, Eklöf H, et al. Classification of thyroid size by palpation and ultrasonography in field surveys. *Lancet*. 2000;355(9198):106-110. doi:10.1016/S0140-6736(99)07221-9.
14. World Health Organization. Indicators for assessing iodine deficiency disorders and their control through salt iodization. 1994:1-55.
15. Pearce EN, Andersson M, Zimmermann MB. Global Iodine Nutrition: Where Do We Stand in 2013? *Thyroid*. 2013;23(5):523-528. doi:10.1089/thy.2013.0128.
16. Zimmermann M, Boelaert K. Iodine deficiency and thyroid disorders. *Lancet Diabetes Endocrinol*. 2015;3(4):286-295. doi:10.1016/S2213-8587(14)70225-6.
17. Zimmermann M. The role of iodine in human growth and development. *Semin Cell Dev Biol*. 2011;22(6):645-652. doi:10.1016/j.semcdb.2011.07.009.
18. Zimmermann M, Andersson M. Assessment of iodine nutrition in populations: Past, present, and future. *Nutr Rev*. 2012;70(10):553-570. doi:10.1111/j.1753-4887.2012.00528.x.
19. Patrick L. Iodine: deficiency and therapeutic considerations. *Altern Med Rev*. 2008;13(2):116-127 12p. <http://search.ebscohost.com/login.aspx?direct=true&db=c8h&AN=105798795&%5Cnlang=ja&site=ehost-live>.
20. Mesele M, Degu G, Gebrehiwot H. Prevalence and associated factors of goiter among rural children aged 6-12 years old in Northwest Ethiopia, cross-sectional study. *BMC Public Health*. 2014;14(1):130. doi:10.1186/1471-2458-14-130.
21. Bayram F, Borazan B, Torun E, et al. The Prevalence of Endemic Goiter and Iodine Deficiency and Evaluation of Thyroid Functions in an Area of Central Anatolia. *Turkish J Endocrinol Metab*. 2003;1:37-43.
22. Omar MS, Desouky DES. Environmental, urinary iodine status and prevalence of goitre among schoolchildren in a high altitude area of Saudi

- Arabia. *Pakistan J Med Sci.* 2015;31(2):414-419. doi:10.12669/pjms.312.6637.
23. Liu Y, Huang H, Zeng J, Sun C. Thyroid volume, goiter prevalence, and selenium levels in an iodine-sufficient area: a cross-sectional study. *BMC Public Health.* 2013;13(37):1153. doi:10.1186/1471-2458-13-1153.
 24. Suhartono, Djokomoeljanto R, Hadisaputro S, Subagio H, Kartini A, Suratman. Paparan pestisida sebagai faktor risiko hipotiroidisme pada wanita usia subur di daerah pertanian. *Media Med Indones.* 2012;46(2):91-99.
 25. Weiss B, Amler S, Amler R. Pesticides. *Pediatrics.* 2004;113(4):1030-1036.
 26. Aktar MW, Sengupta D, Chowdhury A. Impact of pesticides use in agriculture: their benefits and hazards. *Interdiscip Toxicol.* 2009;2(1):1-12. doi:10.2478/v10102-009-0001-7.
 27. Harnpicharnchai K, Chaiear N, Charerntanyarak L. Residues of organophosphate pesticides used in vegetable cultivation in ambient air, surface water and soil in Bueng Niam subdistrict, Khon Kaen, Thailand. *Southeast Asian J Trop Med Public Health.* 2013;44(6):1088-1097.
 28. Costa L. Toxic effects of pesticides. In: *Toxicology: The Basic Science of Poisons.* ; 2008:883-930.
 29. Diamanti-Kandarakis E, Bourguignon J, Giudice L, et al. Endocrine-Disrupting Chemicals: An Endocrine Society Scientific Statement. *Endocr Rev.* 2009;30(4):293-342. doi:10.1210/er.2009-0002.
 30. Crofton KM. Thyroid disrupting chemicals: Mechanisms and mixtures. *Int J Androl.* 2008;31(2):209-222. doi:10.1111/j.1365-2605.2007.00857.x.
 31. Mnif W, Hassine A, Bouaziz A, Bartegi A, Thomas O, Roig B. Effect of endocrine disruptor pesticides: A review. *Int J Environ Res Public Health.* 2011;8(6):2265-2303. doi:10.3390/ijerph8062265.

Comparison between Stretching and Stabilization Exercises on Upper Trapezius Muscle Fatigue in Mobile Phone Users

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ABSTRACT

Background: Mobile phone users are increasing drastically nowadays. Teenagers are addicted to the mobile phone usage and they became neediest items in modern human life. Activation of uppertrapezius muscle is more during mobile phone use due to flexed posture of the neck. Overuse of mobile phones leads to muscle fatigue, a motor deficit resulting in pain and other musculoskeletal problems.

Objective: The aim of the study was to evaluate the efficacy of stretching and strengthening exercises on upper trapezius muscle fatigue in mobile phone users and comparing both.

Methodology: Study design is quasi experimental and study type is comparative study. 30 samples were selected according to inclusion and exclusion criteria and divided into two groups Group-A and Group-B. Group-A was given stretching exercises and Group-B was given stabilization exercises. Electromyography is used as an outcome measure to quantify the upper trapezius muscle fatigue.

Results: Stretching and stabilization exercises are effective in reducing upper trapezius muscle fatigue but on comparing both stabilization exercises are more effective on upper trapezius muscle fatigue in mobile phone users.

Conclusion: From this study, it is concluded that stabilization exercises were found to be effective in declining upper trapezius muscle fatigue in mobile phone users than the stretchingexercises.

Keywords: Mobile phone users, Muscle fatigue, Stretching and Stabilization exercises, Electromyography.

INTRODUCTION

A Mobile phone is a wireless handy device that allows users to make calls, texting, gaming and also used for variety of purposes. In current generation, there are almost 6.8 billion mobile phone subscriptions out of 7 billion people on this earth. Due to its advanced features and updates, young people are more addicted to their mobile phones and thus mobile phones became one of the neediest items in modern human life. The usage of mobile phones is greater in teens and twenties than elders. Hence younger age group experience severe

health risks. The neck and shoulders are particularly vulnerable to pain due to increased muscle load while using mobile phones, with the muscles showing a high level of muscle fatigue, which lead to musculoskeletal injuries, resulting exhausting andpain¹.

Neck bends more when an individual is using a mobile phone with a relatively small screen than using a general desktop computer and the amount of muscle activity during phone use increases greatly on neck muscles^{2,5}. The rapid increase in the usage of mobile phones among adults can adversely affect various aspects of human health. Smartphone users often complain of a variety of symptoms, such as headache, hand tremor, and finger discomfort.

The trapezius is extending from the cervical region to thoracic region on the posterior aspect of the neck and trunk. It is a postural and active movement muscle, used to tilt and turn the head, elevation, depression, rotation and retraction of the scapula. The trapezius muscle also

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counterbalance the pull of gravity on the head, as the head tends to be pulled into flexion due to its anterior centre of gravity.

Holding neck in static posture while using mobile phones can add up to 30 pounds of extra weight on upper trapezius muscle fibres which can pull the spine out of alignment. When using mobile phone continuously, the shoulder muscles enter the state of low level continuous contraction which is an abnormal state of muscle causing damage to the muscle fibres and studies also reported that muscle fatigue is caused by work that requires repeated movements in static postures^{12,14}.

Muscle fatigue is defined as a motor deficit in which there is a gradual decrease in the force capacity of muscle or the end point of sustained activity and it can be measured as a reduction in muscle force, or an exhaustion of contractile function. Electromyography (EMG) is one of the methods which is used to measure muscle activity^{16,17}. In this study surface electromyography, which is a non-invasive method was used to measure the amount of muscle fatigue.

Stretching is a term used to describe any therapeutic manoeuvre designed to increase the extensibility of soft tissues, thereby improving flexibility by elongating structures that have adaptively shortened and have become hypo-mobile over time^{4,18}. Stabilization exercises are isometrics which is a static form of exercise that occurs when a muscle contracts without any change in the muscle length. The muscle develops tension during isometric contraction as some sarcomeres shorten and stretch the series elastic component but the entire muscle does not show any change in the length¹⁹. This are considered as most effective when the individuals are in low state of training.

Many studies investigated the effects of stretching and stabilization exercises in reducing neck pain and muscle fatigue in longer duration. Thus the present highlighted the immediate effects of stretching and stabilization exercises on degree of muscle fatigue resulting from continuous use of mobile phones.

PROCEDURE

Thirty four young adults of aged 19 years to 23 years (14 male and 16 female) who were studying at SRM College of physiotherapy were recruited for this

study. Thirty subjects are selected as inclusion criteria are Age group: 19-23 years, Both males and females were included, Subjects who used mobile phones more than 20-30 minutes per day and exclusion criteria Neck pain, Any recent surgery in upper limb and upper back. Any neurological problems, Dermatological conditions on upper back and neck, Whiplash injury, Cervicogenic headache.

Four subjects were excluded due to the presence of surgery, allergy as mentioned in the exclusion criteria. The procedure and importance of the study were fully explained to all the subjects and written consent form was obtained from each subject.

the selected subjects were randomly assigned into two groups, GROUP-A and GROUP-B. Electromyography was used as a tool on all subjects in order to measure the quantity of muscle fatigue on upper trapezius in mobile phone users. To equalize all participants starting positions before the EMG measurement, all the subjects were made to sit on a chair comfortably with the foot flat on the floor, hip and knee placed at right angle to each other and trunk upright. Upper arms were raised to clavicle level to prevent lumbar over flexion. To collect the surface EMG signal from upper trapezius, initially skin is exfoliated using water and cotton in order to reduce muscle resistance to the EMG signals. Surface electromyography electrodes were placed in three points. Reference electrode is placed distal to the tedious insertion of the muscle i.e., 2cm behind the superior surface of the lateral end of the clavicle for upper trapezius muscle. Stimulating electrode is placed directly on skin surface at midpoint of the upper trapezius muscle i.e. end plate region between origin and insertion or the exact point is between C7 vertebra and protruding peaks of the scapula. The ground electrode is placed at the nape of the neck to complete the circuit.

On day 1, 30 subjects were made to use mobile phones for duration of 20 minutes on day 1 for both the groups. Electromyography (EMG) is taken by placing surface electrodes on upper trapezius muscle.

On day 2, GROUP-A (15 subjects) was performed Stretching exercises and GROUP-B was performed stabilization exercises before using the mobile phone for 20 minutes and EMG signals were collected immediately after the mobile usage. Exercise protocol was done for 2 sets in total with hold time of 10 seconds for each exercise and rest time of 10 seconds between each set.

Group-A: Stretching exercises

Stretching exercises are flexibility exercises done for neck.

They are Push chin downward, trying to touch the chest without causing too much strain. Pause and slowly lift head backwards as far as possible without straining. Bending neck to left and right towards the shoulder trying to touch the ear to shoulder of respective side in standing upright position.

Group-B: Stabilization exercises

Stabilization exercises are isometric contraction exercises for neck. They are – neck bending exercise in supine position

Neck flexion: Standing upright, bend head forward. Try to touch your chin on your chest.

Isometric exercises are Static flexion, Static extension, Isometric lateral flexion to left and right.

Static Flexion: Put both hands on forehead and gently push against their resistance. Tighten the neck muscles and try best not to let head move forward.

Static Extension: Place both hands against the lower back of the head. Apply slight forward pressure, but make sure to resist the movement as you push head back into hands. Be conscious that your head does not fall backward.

Isometric lateral flexion to right and left side: Place right hand for right side and left hand for left side just above the ear. Tighten the neck muscles and resist the pressure to move the head sideways.

Table-1: Comparison of Pre-Test and Post-Test Amplitudes on Right and Left Side among Group-A Subjects Treated with Stretching exercises

Group-A	Mean	N	Std. Deviation	T Test	P Value
Pre-test amplitude right side	152.45	15	41.22	5.29	.00*
Post-test amplitude right side	101.30	15	38.08	5.29	.00*
Pre-test amplitude left side	154.68	15	55.07	4.78	.00*
Post-test amplitude left side	97.60	15	51.25	4.78	.00*

P < 0.05*

According to table–1: Pre-test mean value of amplitude for right is 152.45 and left side is 154.68 and Post-test mean values of right side is 101.30 and for left side is 97.60 for Group-A, where P = .00 which is statistically significant

Table-2: Comparison of Pre-Test and Post-Test Amplitudes on Right and Left Side among Group-B Subjects Treated with Stabilization Exercises

Group-B	Mean	N	Std. Deviation	T Test	P Value
Pre-test amplitude right side	183.56	15	66.66	5.44	.00*
Post-test amplitude right side	101.99	15	24.69		
Pre-test amplitude left side	159.47	15	47.82	5.86	.00*
Post-test amplitude left side	89.42	15	28.86		

P < 0.05*

According to table–2: Pre-test mean value of amplitude for right is 183.56 and left side is 159.47 and Post-test mean values of right side is 101.99 and for left side is 89.42 for Group-A, where P = .00 which is statistically significant.

Table 3: Comparison of Post-Test Amplitudes of Group-A Subjects Treated with Stretching Exercises with Group-B Subjects Treated with Stabilization Exercises

Group Statistics						
	Group Variable S	N	Mea N	Std Deviat On	T Valu E	P Valu E
Post-test amplitude right side group-A versus group-B	1	15	101.30	38.08	.059	.239
	2	15	101.99	24.69	.059	
Post-tset amplitude left side group-A versus group-B	1	15	97.60	51.25	.539	.044
	2	15	89.42	28.86	.539	

According to table-3: The p value of post-test amplitude right side of group-A versus group-B is 0.239 where it is not <0.05 which is not statistically significant.

The p value of post-test amplitude left side of group-A and group-B is 0.044 where it is <0.05 which is statistically significant.

RESULTS

When comparing the post-test mean values of right amplitude and left amplitude of group A and group B, both groups showed significant differences before and after the exercise intervention on upper trapezius muscle fatigue in mobile phone users but stabilization exercises are more effective on upper trapezius muscle fatigue in mobile phone users.

Table 1: Pre-test mean value of amplitude for right is 152.45 and left side is 154.68 and Post-test mean values of right side is 101.30 and for left side is 97.60 for Group-A, where P is 0.00 which is statistically significant.

Table 2: Pre-test mean value of amplitude for right is 183.56 and left side is 159.47 and Post-test mean values of right side is 101.99 and for left side is 89.42 for Group-A, where P is 0.00 which is statistically significant.

Table 3: The p value of post-test amplitude right side of group-A versus group- B is 0.239 where it is not <0.05 which is not statistically significant.

The p value of post-test amplitude left side of group-A and group-B is 0.044 where it is <0.05 which is statistically significant.

DISCUSSION

The present study aimed to find out the efficacy of stretching and stabilization exercises in reducing upper trapezius muscle fatigue and comparing the immediate effects of both the exercises.

In this study, muscle fatigue due to over use of mobile phones showed muscle inefficiency and it may be consequent to impairments in both ATP turnover and ATP production. Fatigue occurs only at metabolic rates that exceed the lactate threshold in which cellular ATP provision becomes increasingly dependent on contributions from substrate level phosphorylation. This in turn challenges cellular homeostasis or metabolic stability and may impair various sites of ATP utilization in muscle fibres.

ZOLADZ stated that More specifically, an impairment of myosin ATPase function decreases force and power output and therefore directly leads to muscle fatigue, possibly leading to an increased internal work, to agonist/ antagonist co-contraction and to a decreased power output for a given muscle stimulation. The results of the study goes in hand with Hye-Young Kim, 2016 stating that stretching and stabilization exercises have long term effect on muscle fatigue in mobile phone users¹.

Stretching may also change the functional material of the series elastic component transmitting less energy to the muscle which may affect the capacity of the muscle to produce force.

The stabilization exercises or the mild pressure of the muscles accelerates intravenous blood flow and increases blood circulation, which can improve blood flow and remove fatigue causing substances.

The results of this study showed that amount of muscle fatigue on upper trapezius muscle decreased following application of stretching and stabilization exercises in mobile phone users. Statistically no significant differences were found between stretching and stabilization exercises with p value (p<0.05). The correlated values in table-3 indicated that the immediate effects of stabilization exercises on upper trapezius muscle fatigue were greater than stretching exercises in mobile phoneusers.

In this study, Neck stabilization exercises had positive and immediate effects on upper trapezius muscle fatigue in mobile phone users and confirmed a decline in muscle fatigue of the upper trapezius after the implementation of neck stabilization exercises.

Of above, Prevention is better than cure. Exercise intervention will be beneficial in reducing muscle fatigue and related musculoskeletal injuries due to static postures in mobile phone users. Strengthening or Stabilization exercises are quite essential for the

welfare of individuals who had upper trapezius muscle fatigue due over use of mobile phones.

CONCLUSION

Although both stretching and stabilization exercises have been proven to be effective methods in reducing pain, fatigue and the present study showed that stabilization exercises have more effective when compared to stretching exercises in reducing upper trapezius muscle fatigue in mobile phoneusers.

Ethical Clearance: Taken ethical clearance from the ethical clearance committee from SRM college of Physiotherapy, SRM university.

Source of Funding: Self Funding

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REFERENCES

1. Kim H-Y, Yeun Y-R, Kim S-J. Preventive effects of stretching and stabilization exercises on muscle fatigue in mobile phone users. *Journal of Physical Therapy Science*. 2016;28(9):2529-2532. doi:10.1589/jpts.28.2529.
2. Kim S-Y, Koo S-J. Effect of duration of smartphone use on muscle fatigue and pain caused by forward head posture in adults. *Journal of Physical Therapy Science*. 2016;28(6):1669-1672. doi:10.1589/jpts.28.1669.
3. Bogdanis GC. Effects of Physical Activity and Inactivity on Muscle Fatigue. *Frontiers in Physiology*. 2012;3:142.doi:10.3389/fphys.2012.00142.
4. Stretching and injury prevention: an obscure relationship. Erik Witvrouw, NeleMahieu, LievenDanneels, Peter McNair *Sports Med*. 2004; 34(7):443–449.
5. Choi J-H, Jung M-H, Yoo K-T. An analysis of the activity and muscle fatigue of the muscles around the neck under the three most frequent postures while using a smartphone. *Journal of Physical Therapy Science*. 2016;28(5):1660-1664. doi:10.1589/jpts.28.1660.
6. Shin H, Kim K. Effects of Cervical Flexion on the Flexion-relaxation Ratio during Smartphone Use. *Journal of Physical Therapy Science*. 2014;26(12):1899-1901. doi:10.1589/jpts.26.1899.
7. Kanchanomai S, Janwantanakul P, Pensri P, Jiamjarasrangsri W. Risk factors for the onset and persistence of neck pain in undergraduate students: 1-year prospective cohort study. *BMC Public Health*. 2011;11:566.doi:10.1186/1471-2458-11-566.
8. Sharon M.B. Joines, Carolyn M. Sommerich, Gary A. Mirka, et al. Low-level exertions of the neck musculature: A study of research methods. *Journal of Electromyography and Kinesiology*. 2006, Vol.16, No.5,p.485.
9. Alison M. Greig, Leon M. Straker, Andrew M. Briggs. Cervical erector spinae and upper trapezius muscle activity in children using different information technologies. *Physiotherapy*. 2005, Vol.91, No.2,p.119.
10. The impact of computer display height and desk design on muscle activity during information technology work by young adults. Straker L., Pollock C., Burgess-Limerick R., Skoss R., Coleman J.(2008) *Journal of Electromyography and Kinesiology*, 18 (4) , pp. 606-617
11. Kenichi I: Examining the adverse effects of mobile phone use among Japanese adolescents. *Keio Commun Rev*, 2011, 33:69–83.
12. Lee S, Lee D, Park J: Effect of the cervical flexion angle during smart phone use on muscle fatigue of the cervical erector spinae and upper trapezius. *J Phys Ther Sci*, 2015, 27: 1847–1849. [Medline] [CrossRef]
13. Greig AM, Straker LM, Briggs AM: Cervical erector spinae and upper trapezius muscle

- activity in children using different information technologies. *Physiotherapy*, 2005, 91: 119–126. [CrossRef]
14. Straker LM, Coleman J, Skoss R, et al.: A comparison of posture and muscle activity during tablet computer, desktop computer and paper use by young children. *Ergonomics*, 2008, 51: 540–555. [Medline] [CrossRef]
 15. Rubini EC, Costa AL, Gomes PS: The effects of stretching on strength performance. *Sports Med*, 2007, 37: 213–224. [Medline][CrossRef]
 16. Netto KJ, Burnett AF: Reliability of normalisation methods for EMG analysis of neck muscles. *Work*, 2006, 26: 123–130.[Medline]
 17. Hermens HJ, Freriks B, Disselhorst-Klug C, et al.: Development of recommendations for SEMG sensors and sensor placement procedures. *J Electromyogram Kinesiol*, 2000, 10: 361–374. [Medline][CrossRef]
 18. Lee HS, Yoo JH: The effects of stretching and isometric exercise for chronic neck pain patient in strength and pain. *Korean Soc Phys Med*, 2012, 7: 329–337.[CrossRe

Correlation of Hip Muscle Strength and Patellofemoral Pain Syndrome in Men

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ABSTRACT

Background: Patellofemoral pain syndrome (PFPS), sometimes referred to as “anterior knee pain” is one of the most common knee disorders, affecting both the general population and physically active individuals. Pain usually occurs during activities that increase the compressive forces on the patellofemoral joint.

Objective: To evaluate the correlation of hip muscle strength and patellofemoral pain syndrome in men.

Methodology: The study design was non experimental study type was observational , sampling method was convenient sampling with 30 subject and study setting was on SRM college hospital and research institute. Inclusion criteria were only males with patellofemoral pain syndrome were included, age between 16 to 25 years, then subjects should be positive with the Clarke’s test. Exclusion criteria were bilateral knee pain, prior surgery to one or both the hips knees, history of patellar dislocation in either knee, hip pathological conditions.

Procedure: Applying inclusion and exclusion criteria, 30 subjects with patellofemoral pain syndrome were approached, then the procedure was explained and consent was taken. Then the strength of the hip muscle is tested in both the lower limbs along with which range of motion is measured and the questionnaire was given.

Results: The result shows that the patient with patellofemoral pain syndrome has a weakness in hip abductors and lateral rotators.

Conclusion: This study concluded that hip adduction and external rotator weakness are evaluated by hand held dynamometer are associated with iliotibial band syndrome in males, shows development of anterior knee pain which is patellofemoral pain syndrome

Keywords: *Patellofemoral pain syndrome, anterior knee pain, hip muscles, handheld dynamometer.*

INTRODUCTION

Patellofemoral pain syndrome is an orthopedic problem frequently seen in physiotherapy. The knee joint is capable for weight bearing and to produce the wide range of motion, therefore it plays an important role in weight support and weight bearing activities. The patella is located at the front of the knee and lies with the tendon of the quadriceps muscles.

The quadriceps tendon crosses the patella and attaches to the top end of the tibia. Due to this relationship in the knee joint, the knee capsules of the femur forming a joint in which the bones are made in contact with each other. This joint is called the ‘patellofemoral joint’¹.

Patellofemoral pain syndrome (PFPS), sometimes referred to as “anterior knee pain” is one of the most common knee disorders, affecting both the general population and physically active individuals. Several authors report that symptoms are more common in females, certain research report no predominant gender differences while few researchers have found anterior knee pain to be more common in males.

Typically, patients describe diffuse pain around the patellofemoral joint, most often along medial aspect of the patella, but also retro-patellar and lateral.

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Pain usually occurs during activities that increase the compressive forces on the patellofemoral joint, such as running, inclined walking, stair ascent and descent, squatting and prolonged sitting with bent knees^{2,3}.

The quadriceps muscle comprises of rectus femoris and vastus intermedius, vastus medialis lies medially and vastus lateralis lies laterally. Majority of patellofemoral pain syndrome cases have stronger vastus lateralis than the vastus medialis, which results the knee cap pull towards the outside of the leg due to abnormal movement of the knee cap when bending and straightening the knee^{4,5}.

In the absence of trauma, Patellofemoral pain syndrome (PFPS) is believed to be caused by repetitive micro-trauma, overload and abnormal patellar tracking, which can lead to increased stress on pre-patellar soft tissue and/or on the patellofemoral joint^{6,7,8}. The mechanism of injury can, in many cases, be multi-factorial.

Mal-alignment of the lower extremity is believed to be one of the reasons for abnormal patellar tracking during flexion and extension. Some of the factors which are thought to contribute to mal-alignment are genu valgum, genu varum, genu recurvatum, femoral anteversion, tibial varum, pronation of the subtalar joint and increased Q-angle.

The Q-angle is formed by drawing the intersection line from the anterior superior iliac spine to the midpoint of the patella and an extension of the line drawn from the tibial tubercle to the midpoint of patella¹⁰. The factors causing patellofemoral pain syndrome such as patellar mal-alignment, an increased Q-angle, weakness of quadriceps, decreased flexibility and muscle imbalance. Strength between two parts of the quadriceps muscle is the main causes an imbalance.

Some of these include mal-alignment of the lower extremity, muscle or soft tissue tightness and muscle imbalance or weakness^{11,12}. Muscle or soft tissue tightness, for example, in the lateral retinaculum, quadriceps, medial gastrocnemius, hamstrings and hip flexors, is associated in various ways with increased stress on the patellofemoral joint.

The theoretical connection between hip muscle dysfunction and Patellofemoral pain syndrome is that reduced hip muscle strength and neuromuscular control may lead to increased medial rotation and adduction of

the femur during weight-bearing, which contributes to displacement of the patella laterally^{13,14,15}.

The stronger pre-injury hip abductors and weaker pre-injury hip lateral rotators are associated with patellofemoral pain development. A recent systematic review suggests that gluteus medius activity is delayed during activities such as ascent/descent of stairs and running in subjects with Patellofemoral pain syndrome.

PROCEDURE

According to inclusion criteria and exclusion criteria the samples was selected the inclusion criteria is Males between 16 to 25 years, Clarke's test is positive and the exclusion criteria is Bilateral knee pain, Prior surgery to one or both hips or knees, History of patellar dislocation in either knee, Hip pathological condition procedure was explained to the patient and informed consent was taken from them before the treatment.

The male participants with patellofemoral pain syndrome will be taken and evaluated for the knee range of motion along with hip flexors, hip extensors, hip abductors, hip adductors, hip medial rotators and hip lateral rotators strength was taken for both normal and affected leg.

The knee evaluation and muscle strength testing was taken place as a single session.

Clarke's test is a component of knee examination which was used to test for patellofemoral pain syndrome.

During the test procedure, the examiner was kept the hand held dynamometer in a stable position, allowing for the maximum ability to resist the force applied by the subject and force applied by the therapists.

Then the examiner instructs the subject to apply maximal force against the device.

The examiner should start the test with the command, "press" and ends the test after 5 seconds by saying "rest."

By which the strength of the muscles is denoted in handheld dynamometer and they are noted in both the normal leg affected leg.

Then the subjects are given questionnaire and they are asked to fill the questionnaire.

OUTCOME MEASURES

Goniometry is used to find the range of motion (knee flexion and extension).

Handheld dynamometer is used to measure the muscle strength.

Anterior knee pain scale.

DATA ANALYSIS

Table-1: Hip Muscles Strength in Affected and Normal Leg

Variables	Age	Gender	Mean		Std .Deviation	
			Normal	Affected	Normal	Affected
Flexors	18 - 25	MALE 30	15.77	9.97	4.55	4.15
Extensors	18 - 25	MALE 30	12.80	8.73	3.90	4.60
Abductors	18 - 25	MALE 30	9.70	5.57	2.93	3.12
Adductors	18 - 25	MALE 30	9.40	5.70	3.40	3.20
External Rotators	18 - 25	MALE 30	9.03	5.83	2.95	3.13
Internal Rotators	18 - 25	MALE 30	10.23	5.93	3.52	3.78

Table 2: Comparing the Hip Muscle Strength of the Normal–Affected Leg

Variables	N	Correlation
Flexors & Flexors	30	.796
Extensors & Extensors	30	.861
Abductors & Abductors	30	.688
Adductors & Adductors	30	.543
External Rotators & External Rotators	30	.474
Internal Rotators & Internal Rotators	30	.594

p value = 0.05

Table-3: Paired T Test Values

Variables	Age	Gender	Mean	Df	T	Sig. (P Value)
Flexors-Flexors	18-25	Male 30	5.800	29	11.310	.000
Extensors-Extensors	18-25	Male 30	4.067	29	9.487	.000
Abductors-Abductors	18-25	Male 30	4.133	29	9.421	.000
Adductors-Adductors	18-25	Male 30	3.700	29	6.405	.000
External Rotators-External Rotators	18-25	Male 30	3.200	29	5.613	.000
Internal Rotators-Internal Rotators	18-25	Male 30	4.300	29	7.131	.000

RESULTS

There is the mounting evidence suggesting that the hip, pelvis and trunk likely plays a role with respect to injury mechanisms. There is biomechanical relationship between the iliotibial band and the compartments of the hip muscle.

The study states that the muscles of hip have a correlation with the iliotibial band. In this study there is a weakness in adductors and internal rotators compartment muscles, which is due to the compression on the iliotibial band.

Table1 shows the mean value of the hip muscles strength in both the affected and the normal leg.

Table 2 shows the correlation of the hip muscles strength in both the normal and affected leg.

Table 3 shows the mean value and significance of the paired T-test values of the hip muscles strength normal and affected leg.

DISCUSSION

This study was specifically done for measuring the differences in hip abduction and strength of external rotation, between the normal and affected legs of male subject with unilateral patellofemoral pain syndrome. Furthermore, the patellofemoral pain syndrome did not generally have weaker hip strength compared with affected side. Patellofemoral pain syndrome decreased hip adduction and internal rotation strength.

Nakagawa et al looked at gender differences in trunk, pelvis, hip and kinematics, hip strength and gluteal muscle activation during a single -leg squat in subject with patellofemoral pain syndrome controls. Since Hip abductors and lateral rotator dysfunction is the theoretically believed to increase adduction and medial rotation of the femur during weight bearing activities and if males should be looked at these males with patellofemoral pain and squatted with greater dynamic knee varus than healthy males and with less hip adduction compared to females with patellofemoral pain.

Excessive dynamic knee varus may be a clue as to why certain males present with patellofemoral pain, as genu varum has been identified as a risk factor for patellofemoral pain. The result showed significant differences between hip adduction or internal rotation strength in the normal and affected legs of males with patellofemoral pain syndrome.

Chichenowski et al and Robinson and Nee also found a significant difference in hip abductor and lateral rotator strength between the affected and un-affected side in subjects with Patellofemoral pain syndrome (PFPS). Nakagawa et al showed that there is a correlation between reduced strength in the knee extensors and hip lateral rotators, and increased pain and disability in females with Patellofemoral pain syndrome (PFPS).

In this study the hip abductors and external rotators are more affected compare with unaffected side according to Ramskov et al.'s states that individual with

weak hip abductors and external rotators are more to develop patellofemoral pain syndrome. It is difficult to determine the predictive and associative nature of the hip abductor and external rotator weakness to patellofemoral pain syndrome in the population. Piva et al found no difference in hip lateral rotator and abductor strength between subjects with and without PFPS.

The other cause for patellofemoral pain is due to compression caused by the quadriceps mechanism, which is with increased joint flexion that occurs whether in active or passive movements. The compression creates a joint reaction force across the patellar joint that causes patellofemoral pain.

Weakness in the hip adductors muscles may allow for excessive femoral abduction and this, in turn lead to adduction, or valgus of knee. Weakness in internal rotators allows for excessive femoral external rotation and this leads to increase the pressure between and the lateral facet of the patella and lateral femoral condyle.

Hip adductors and internal rotators are also contributing pelvic stability and leg alignment by eccentrically controlling the femoral internal rotation and influencing the hip adduction during the weight bearing activities.

Weakness of these muscles increases medial rotation of femur or cause a gluteus medius gait. These deviations may alters adduction or abduction moments of hip or lead to an increase in Q-angle, which subsequently alter tracking of patella, increases compression force on the patellofemoral joint which ultimately leads to knee pain.

CONCLUSION

This study concluded that hip adduction and external rotator weakness are evaluated by hand held dynamometer are associated with Iliotibial band syndrome in males, shows development of anterior knee pain which is patellofemoral pain syndrome

Ethical Clearance: Taken ethical clearance from the ethical clearance committee from SRM college of Physiotherapy, SRM university.

Source of Funding: Self Funding

Conflict of Interest: Nil

REFERENCE

1. The Newcastle-Ottawa Scale (NOS) for assessing the quality of non-randomised studies in meta-analyses.
2. Alaca R, Yilmaz B, Goktepe AS, Mohur H, Kalyon TA (2002) Efficacy of isokinetic exercise on functional capacity and pain in patellofemoral pain syndrome. *American Journal of Physical*
3. Arendt EA (2007) Musculoskeletal injuries of the knee. Are females at greater risk?
4. Bolgla LA, Malone TR, Umberger BR, Uhl TL (2008) Hip strength and hip and knee kinematics during stair descent in females with and without patellofemoral pain syndrome.
5. Callaghan MJ, McCarthy CJ, Al-Omar A, Oldham JA (2000) The reproducibility of multi-joint isokinetic and isometric assessments in a healthy and patient population.
6. Cibulka MT, Threlkeld-Watkins J (2005) Patellofemoral pain and asymmetrical hip rotation.
7. Cichanowski HR, Schmitt JS, Johnson RJ, Niemuth PE (2007) Hip strength in collegiate female athletes with patellofemoral pain.
8. Deville WL, Bezemer PD, Bouter LM (2000) Publications on diagnostic test evaluation in family medicine journals: an optimal search strategy.
9. Elias JJ, Mattessich SM, Kumagai M, Mizuno Y, Cosgarea AJ, Chao EY (2004) In vitro characterization of the relationship between the Q-angle and the lateral component of the quadriceps force.
10. K. Thorborg, J. Petersen (2010) Hip strength, handheld dynamometer usage for measuring hip muscle strength and power
11. Elias JJ, Mattessich SM, Kumagai M, Mizuno Y, Cosgarea AJ, Chao EY (2004) In vitro characterization of the relationship between the Q-angle and the lateral component of the quadriceps force.
12. Callaghan MJ, McCarthy CJ, Al-Omar A, Oldham JA (2000) The reproducibility of multi-joint isokinetic and isometric assessments in a healthy and patient population.
13. F. Revelles Moyano, MC Valenza, L Martin Martin, Y Castellote, Caballero, E Gonzalez-Jimenez and G Valenza Demet (2004) Effectiveness of different exercises and stretching physiotherapy on pain and movement in patellofemoral pain syndrome.
14. Scott Darling, Hannah Finsaas, Andrea Johnson, Ashley Takekawa Risk Factors for Patellofemoral pain syndrome.
15. Schmitt JS, Johnson RJ, Niemuth PE, Cichanowski HR (2007) Hip strength in collegiate female athletes with patellofemoral pain.

Relationship between Depression and Oral Health Related Quality of Life among Institutionalized Elderly Population of Mysore City, India—A Cross Sectional Study

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ABSTRACT

Objective: The aim of the present study was to assess the prevalence of depression and to find out the association between depression and oral health related quality of life among institutionalized elderly population of Mysore city, India.

Background: Although depression is a significant co-morbid condition in chronic illnesses, little is known about the prevalence and relationship with oral health related quality of life among institutionalized elderly population.

Materials and Method: This cross sectional study was carried out in randomly selected four old age institutions of Mysore city, India. The total sample size of the present study was 135. Patient health questionnaire(PHQ-9) was used to assess depression. Oral health related quality of life (OHRQOL) was measured using geriatric oral health assessment index(GOHAI).

Results: The prevalence of depression was found to be 64(47.6%). Men demonstrated slightly higher prevalence of depression compared to women. This was statistically not significant. In binary regression analysis model, people with depression demonstrated significant association with GOHAI scores after adjusting all the other independent variables (OR-1.067).

Conclusion: The institutionalized elderly population had mild to moderate depression along with significantly associated with oral health related quality of life. Hence dentists and psychiatrists need to work together to reduce depression risk which in turn affects oral health.

Keywords: Depression, GOHAI, Elderly population

INTRODUCTION

As people age, biological and psychological changes occur. Some of these changes may be for the better while others are not. Mental disorders are associated with adverse health behaviors, chronic disease, obesity, inadequate social support and a poor health-related

quality of life. The morbidity, mortality and disability as people grow old may be due to mental disorders^[1]. Depression is a psychiatric disorder in which negative effect, depressed mood, disturbed thoughts, and altered behaviors persist for a minimum of two weeks, and potentially for more protracted periods. In patients with depression the major predictors are functional impairment, cognitive impairment and smoking. Angina, asthma, arthritis and nocturnal sleep are also associated with depression^[2].

Recently conducted world mental health surveys indicate that major depression is experienced by 10-15% people in their lifetime and about 5% suffer from major depression in any given year. In India, studies done in primary health care settings have indicated

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the prevalence of depression to be 21-84% [3]. A recent large population-based study from South India, which screened more than 24,000 subjects in Chennai using Patient Health Questionnaire (PHQ)-12 reported overall prevalence of depression to be 15.1% after adjusting for age using the 2001 census data [4].

Nandi et al^[5] conducted a study among elderly population of rural community in West Bengal. They found 60% of the population to be mentally ill with higher morbidity in women compared to men. An epidemiological study conducted in rural Uttar Pradesh has shown that depression is more common in geriatric group than in non geriatric group [6,7].

Traditionally oral health has been assessed by registering clinical and oral indices and presence or absence of disease. This perspective does not cover the people's perception of their oral health. Majority of the oral diseases and their consequences will have impact on daily activities of the life. In the last three decades, numerous instruments have been developed to measure Oral Health related Quality of Life (OHRQOL). One of these instruments is the Geriatric/General Oral Health Assessment Index(GOHAI) described by Atchison and Dolan in 1990 [8]. The 12-item GOHAI evaluates three dimensions of OHRQoL, which includes physical function, psychosocial function and pain or discomfort [9]. It is also designed to estimate the severity of psychosocial impacts associated with oral diseases, and is being tested as an outcome measure to evaluate the effectiveness of dental treatment [8].

Oral impairment or dysfunction, a subset of functional impairment, may be associated with depressive symptoms among seniors. According to a previous study [10], one in five patients may have depressive disorder [11]. Detailed analysis of relationship between depression and oral health related quality of life may provide a better understanding of this complex and multidimensional relationship between depression and oral health related quality of life of elderly population. Literature search revealed no studies associating the relationship between depression and oral health related quality of life among institutionalized elderly population. Hence the aim of our present study was to assess the association between depression and oral health related quality of life among institutionalized elderly population of Mysore city, India.

METHODOLOGY

This cross sectional study was carried out among the elderly population residing in institutionalized homes of Mysore city, India from January 2017 to August 2017. Permission obtained from the concerned authorities and Written informed consent was obtained from all subjects prior to data collection. Ethical approval was obtained from the Institutional Review Board at JSS dental college and hospital, JSS University Mysore, India.

Among the 11 old age institutions in Mysore city, 4 were randomly selected and included for the study. Elder people aged 60 years and above, not bedridden and with no cognitive impairment were included in the study. A total of 160 elder people were residing in these 4 old age homes. Among them, 15 were not interested to participate and 10 members were below the age of 60 years. Hence the total sample size of the present study was 135. To assess the prevalence and severity of depression self administered PHQ-9 instrument was used and to assess the level of oral health related quality of life, geriatric oral health assessment index(GOHAI-12) questionnaire was used.

Participants were interviewed by questionnaires about demographic factors, general health status, lifestyle and oral health behavior. These included – gender, formal educational background (< 10 years v/s > 10 years), smoking habits (never smoked v/s ever or current smoker), alcohol habits (alcoholic v/s non alcoholic), frequency of tooth brushing per day (once or less, twice, more than twice), use of extra cleaning device (yes or no) and presence of chronic medical disease such as hypertension, cardiovascular diseases and respiratory tract disease(absence v/s presence).

Depression instrument: The PHQ-9 is a self administered, nine item questionnaire specific to depression that is available free to end users. It was developed as a self report version of the Primary Care Evaluation of Mental Disorders (PRIME-MD). Each of the nine items of the PHQ-9 is scored as 0 (not at all), 1 (several days), 2 (more than half the days) or 3 (nearly every day). The score range of this screening tool ranges between 0-27 with 0 indicating no depressive symptoms and 27 indicating all symptoms occurring nearly daily. Kroenke et al^[12] suggested cut points to identify is none (0-4), mild depression (5-9), moderate depression (10-14), moderately severe depression (15-19) and severe depression (>20). Before using this questionnaire

construct validity has been done between PHQ scores and functional status & symptom related difficulty, which has shown good association.

Quality of life instrument: OHRQoL was measured using the GOHAI, which was originally developed for use in older adult population. The GOHAI instrument consists of 12 questions associated with the following three domains of OHRQoL: physical function (PF), psychosocial function (PSF) and pain or discomfort (PD). Score ranges for the dimensions of physical function, psychosocial function, and pain or discomfort were 4–20, 5–25, and 3–15, respectively. The original English Version of the GOHAI was translated into local language(kannada) and was used. Responses to GOHAI items were assessed using a 5-point Likert scale, ranging from 1 = never to 5 = always(range of sum score = 12–60).

Clinical examination: Comprehensive intra-oral examinations were performed after the interview by one of the co author who not involved in interview procedure, calibrated according to the standards of the World Health Organization (dentist were calibrated by a W.H.O. standardized dentist) and the results of the oral examination procedures will be published elsewhere.

Statistical analysis: Mean, standard deviation, frequencies and percentages were used for descriptive statistics. Independent sample t test was used to compare means of GOHAI scores in three domains along with and without people depression. Chi-square test was used to compare the gender wise distribution of depression people. Spearman correlation test was used to find out the relationship between depression and GOHAI scores. Binary logistic regression analysis was used to strength of the association between depression and GOHAI scores after controlling the confounders age, gender, education, brushing frequency, systemic diseases. SPSS-18 version was used for statistical analysis. P<0.05 was used for statistical significance.

RESULTS

The basic demographic characteristics are presented in table 2. The total sample for the present study was 135 with mean age of 70.67 and standard deviation of 9.02. Among 135 study participants,54(40%) were men and 81(60%) were women with majority of the participants educated till 6th to 10th grade.64.4%of the elderly population were brushing once daily and 9(6.7%) were doing extra cleaning practices. 105(77.8%) people never

smoked in their lifetime, 21(15.6%)people who smoked previously had stopped smoking and 6(4.4%) were smoking daily.

The prevalence of depression among institutionalized elderly population of Mysore city was found to be 64(47.6%). Out of the 64 elderly people,31(23%) had mild, 12(8.9%) moderate, 14(10.4%) moderately severe and7(5.2%) severe depression(table 3). Men demonstrated slightly higher prevalence of depression compared to women but this was found to be statistically not significant(table 4,p=0.208).

The GOHAI scores in all the three domains show significant difference between the two categories. Spearman’s correlation resulted in significant association between depression and GOHAI scores. In Binary regression analysis considering depression as the dependent variable and age, gender, education, brushing frequency, systemic diseases and smoking as the independent variables, the model shows that depression has significantly associated with the GOHAI scores after adjusting all the other independent variables(Table:- 5,OR-1.067, CI-1.024 to1.112, pvalue-0.002).

Table 1: Demographic characteristics

Variables	Groups	N	%
Gender	Male	54	40.0
	Female	81	60.0
Education	<5	48	35.6
	6-10	60	44.4
	>10	27	20.0
Brushing frequency	Once	87	64.4
	Twice	45	33.3
	More than twice	03	2.2
Extracleaning device	Yes	09	6.7
	No	126	93.3
Regular dental visit	No	12	8.9
	Yes	123	91.1
Marital status	Married	54	40.0
	Unmarried	09	6.7
	Widow	72	53.3
Smoking	Never	105	77.8
	Smoked previously	21	15.6
	Occasionally	03	2.2
	Daily	06	4.4

Table 2: Prevalence of depression among institutionalized homes of Mysore city

Severity of depression	Number of participants n (%)
None	71(52.6)
Mild	31(23.0)
Moderate	12(8.9)
Moderately severe	14(10.4)
Severe	07(5.2)
Total	135(100)

Table 3: Gender wise comparison of depression categories

Gender	Severity of Depression n (%)					Total N(%)
	None	Mild	Moderate	Moderately Severe	Severe	
Male	24(44.4)	16(29.6)	6(11.1)	7(13.0)	1(1.9)	54(40.0)
Female	47(58.0)	15(18.5)	6(7.4)	7(8.6)	6(7.4)	81(60.0)
Total	71(52.6)	31(23.0)	12(8.9)	14(10.4)	7(5.2)	135(100.0)
Statistical inference	$X^2 = 5.890, df = 4, P = 0.208$					

Table 4: Comparison of GOHAI scores among with and without depression

GOHAI scale domains	<u>Depression</u>	Mean(SD)	Statistical inference
Physical function	Absent	7.37(3.1)	$t = -2.399, df = 133, p = 0.018$
	Present	8.61(2.9)	
Psychosocial function	Absent	5.66(2.8)	$t = -2.936, df = 133, p = 0.004$
	Present	7.03(2.6)	
Pain & discomfort	Absent	13.24(6.4)	$t = -2.589, df = 133, p = 0.011$
	Present	15.95(5.7)	

Table 5: Correlation of depression categories with different domains of GOHAI scores

Independent variables (GOHAI SCORES)	Dependent variable (depression)	p-value
Physical function	0.284	0.001
Psychosocial function	0.335	0.000
Pain and discomfort	0.333	0.000

Table 6: Bivariate logistic regression analysis

Variable	Odds ratio	95% confidence interval	p-value
Age	1.066	1.015-1.120	0.011
Gender	0.493	0.195-1.246	0.135
Education	1.592	0.914-2.770	0.100
Brushing frequency	2.359	0.989-5.627	0.053
Smoking	0.791	0.446-1.402	0.422
Systemic diseases	0.891	0.391-2.033	0.784
GOHAI scores	1.067	1.024-1.112	0.002

DISCUSSION

This study, as per literature search, is the first to investigate the association between depression and oral health related quality of the life among institutionalized elderly population in Mysore city, India. PHQ-9 instrument has half the length of measures compared to other depression scales were used and has comparable sensitivity and specificity. Hence now a days this is the most commonly used instrument in both research as well as clinical settings^[12].

In the present study the prevalence of depression was found to be 47.5 % which is slightly lower than that reported by Nandi et al^[5] and Harish Negi et al^[13] which was 60%. This difference was due to different study setting, sociocultural practices and sample size. Men had higher prevalence of depression than women. Systemic reviews and previous studies have shown that women are more at risk of depression than men and this difference was due to influence of physical and socio economic conditions^[2]. The finding of the present study is consistent with the Harish Nagi et al study^[13].

The important finding of the present study was that as the age increases the risk of the depression also increases with an odds ratio of 1.066. This finding is consistent with the Raman DP et al study. Education level increased prevalence of the depression decreased this is similar to the Harish Negi et al study^[13]. In the present study as depression level increased, the oral health related quality of life decreased among elderly population. Many studies have reported that general health is related to the oral health and vice versa^[14].

The mean GOHAI scores of all the three domains have shown higher scores in elderly people with depression. Depression interferes with cognitive and communicative skills which in turn may act as barrier to identify oral health impacts and unmet treatment needs among institutionalized elderly population.

In binary regression analysis, age and GOHAI scores were significantly associated with depression. According to this, as the age increases risk of the depression also increases. Sprangers and Schwartz(1999)^[15] explain the process of the response shift. This theory explains community dwelling seniors and elderly population in general may report fewer impacts in certain dimensions. Due to age factor they themselves accept that oral health problems were less important than general health.

Despite the important findings, our study had many limitations which should be considered before interpreting the results. First, we did not consider scientifically calculated sample size so generalizability to the elderly population will be questionable. Future studies should give importance and focus to population based sample size among elderly population. Secondly, the study was of cross sectional origin. So causality and inferences cannot be made from the observed associations. To overcome these limitations longitudinal studies and clinical evaluation by combined efforts of oral health researchers and psychiatrists along with the survey findings could be conducted.

CONCLUSION

In conclusion, the sample of the institutionalized elderly population had mild to moderate depressive disorder along with low self perception of oral health which was measured from GOHAI. The depressive disorder significantly associated with oral health related quality of life of the institutionalized elderly population. Therefore both dentist and psychiatrist is necessary to work together to reduce both depression risk as well as oral health impacts.

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REFERENCES

1. A.C.O Solis, A.H. Marques, C.M.Pannuti, R.F.M. Lotufo, F. Lotufo Neto. Evaluation of periodontitis in hospital outpatients with major depressive disorder. *J Periodontal Res* 2014; 49(1):77-84
2. Tomoya T, Akihiro Y, Naoko T, Hideo M. Oral health and depression in older Japanese people. *Gerodontology* 2015 Feb 3. Epub 2015 Feb 3.
3. Pattanayak RD, Sagar R. Depressive disorders in Indian context: A review and clinical update for physicians. *Journal of the association of Physicians of India* 2014;62:55-60
4. Grover S, Dutt A, Avasthi A. An overview of Indian research in depression. *Indian J psychiatry* 2010;52(Supp1); S178-S188
5. Poongothai S, Pradeepa R, Ganesan A, Mohan V. Prevalence of depression in a large urban South

- Indian population--the Chennai Urban Rural Epidemiology Study (CURES-70). *PLoS One*. 2009 Sep 28; 4(9):e7185.
6. Kishore J, Reddaiah VP, Kapoor V, Gill JS Characteristics of mental morbidity in a rural primary health centre of haryana. *Indian J Psychiatry*. 1996 Jul; 38(3):137-42
 7. Nambi SK, Prasad J, Singh D, Abraham V, Kuruvilla A, Jacob KS Explanatory models and common mental disorders among patients with unexplained somatic symptoms attending a primary care facility in Tamil Nadu. *Natl Med J India*. 2002 Nov-Dec; 15(6):331-335.
 8. Garcia SS, Cedillo TJ, Bermudez CE, Pena CG.. Psychometric properties of the general oral health assessment index (GOHAI) And dental status of an elderly Mexican population. *Journal of Public Health Dentistry* 2010; 70: 300-307.
 9. Kshetrimayum N, Reddy CVK, Siddanna S, Manjunath M, Rudraswamy S, Sulavai S. Oral Health Related Quality of Life and nutritional status of institutionalized elderly population aged 60 years and above in Mysore city,India. *Gerodontology* 2013;30:119-125.
 10. D'Mello Da. Are your patients depressed ? Implications for dental practice. *J Mich Dent Assoc* 2003;85:26-32.
 11. Okoro CA, Strine TW, Eke PI, Dhingre SS, Balluz LS. The association between depression and anxiety and use of oral health services and tooth loss. *Community Dent oral epidemiol* 2012;40:134-144.
 12. Kroenke K, Spitzer RL. The PHQ-9 :A new depression diagnostic and severity measure. *Psychiatric annals* 2002;32(9):1-7.
 13. Harish Negi, Malay Sarkar, Amit D. Raval, Krishna Pandey, Pradeep Das: Presence of depression & its risk factors in patients with chronic obstructive pulmonary disease. *Indian J Med Res*. 2014 Mar; 139(3): 402–408.
 14. Dable RA, Nazirkar GS, Singh SB, Wasnik PB. Assessment of oral health related quality of life among completely edentulous patients in western India by using GOHAI. *J Clin Diagn Res* 2013; 7(9);2063-2067.
 15. Sprangers MA, Schwartz CE. Integrating response shift into health related quality of life research: A theoretical model. *Soc Sci Med* 1999;48(11):1507-1515.

Canine Index: A Tool for Determination of Sex

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ABSTRACT

Background: Canines have been found to show sexual dimorphism between males and female. But, there is a conflict in literature showing variation in results among maxillary and mandibular canines, as to which predicts sexual dimorphism accurately.

Aim: This study was undertaken to assess the morphometric difference in gender determination among Chennai population and to calculate the canine index to determine sexual dimorphism.

Materials and Method: The mesiodistal width of the maxillary and mandibular canines, intercanine distance of maxilla and mandible was recorded using digital vernier callipers in 75 males and 75 females. Canine index and sexual dimorphism were calculated using standardized equation. Data entered in Windows excel sheet and data analyzed using SPSS version 16 software. Student's t test was used to compare the mean difference of all measurements between males and females

The Results: The mesiodistal distal widths of the canines were more in females and a reverse sexual dimorphism was obtained. Maxillary left canine showed a greater dimorphism of 4.44 followed by maxillary right canine 4.17. Maxillary Canine Index showed 100% percent accurate prediction in the female population while mandibular CI has 88% percent accurate prediction in the male population.

Conclusion: Canines, though they show a difference between genders, it can be used only as a supplemental tool for gender determination as the percentage of accuracy is <70%.

Keywords: forensic dentistry; forensic sciences; canine index; odontometry; disasters; sex determination

INTRODUCTION

Every individual has a unique feature which distinguishes them from others. Personal identity is not only of importance in the court of law, but also in the identification of other persons and dead bodies^[1]. The identification of a deceased person can be confirmed through anthropological, odontometric, genetic and forensic science and dental records. Forensic Odontology deals with the examination and evaluation of dental

evidence which can be used as a key for identifying a victim or a convict in case of any uneventful death or environmental disasters.

The tooth is the most stable and hardest tissue in the body and has been a useful adjunct in identification when other body parts cannot be used due to decomposition or mutilation^[2]. Canines are considered to be the key teeth for personal identification^[3]. The mandibular canines are not only exposed to less plaque, calculus, abrasion from brushing, or heavy occlusal loading than other teeth, they are also less severely affected by periodontal disease and so, usually are the last teeth to be extracted with respect to age^[4]. Mandibular canine show the greatest degree of sexual dimorphism and play a highly valuable role in identification. Hence, they are exclusively used to analyze the role in determination of sex. Various studies have been carried out to test the reliability of canine in gender determination, but the results are conflicting as sexual dimorphism varies among maxillary and

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mandibular teeth among different races and ethnic groups [5-14]. Our study was undertaken to assess the morphometric difference in gender determination among Chennai population and to calculate the canine index to determine sexual dimorphism.

MATERIALS AND METHOD

Across sectional study was carried out after obtaining ethical clearance from the Institutional Review Board of Sathyabama University Dental College and Hospital, Chennai, Tamilnadu (Ref no. SathyabamaUniversity/IHEC/Study No 15). Individuals who had healthy state of gingiva and periodontium, DMFT (decayed, missing and filled teeth index) score of 0, normal overjet and overbite, Angles class I molar and canine relationship, the absence of supernumerary teeth and who signed the informed consent were included in the study. Individuals with any malocclusion and orthodontically treated teeth were excluded from the study.

75 males and 75 females in the age group of 18-22 years were selected randomly and informed consent was obtained from them before the start of the study. Method of study consisted of measuring maxillary and mandibular canine width and intercanine width. The mesiodistal width of all four canines and intercanine distance of the maxilla and mandible was measured using digital vernier calliper which has been calibrated with an error of ± 0.01 mm. Each parameter was recorded thrice and the mean of the recordings was considered as the corresponding value. The mean of mesiodistal width and intercanine distance was calculated and compared between males and females.

Canine index was calculated using the formula cited by Muller et al [13].

$$\text{Canine index} = \frac{\text{Mesodistal width of canine}}{\text{Intercanine distance}}$$

$$\text{Standard canine index} = \frac{\text{Mean male (CI - SD)} + \text{Mean female (CI - SD)}}{2}$$

Sexual dimorphism is calculated using the formula given by Garn et al [15]

$$\text{Sexual dimorphism} = \left(\frac{X_m}{X_f} - 1 \right) \times 100$$

Where CI=canine index; SCI=standard canine index; X_m = mean value of the male canine width; X_f = mean value of the female canine width.

Sexual dimorphism was predicted based on the observed canine index and standard canine index. If the observed canine index was more than the standard canine index, then the individual was considered to be male and if the observed canine index was less than the standard canine index, then the individual was considered to be female.

The collected data were entered in Microsoft excel version '93 and statistical analysis was done using SPSS version 16. Student's ttest was used to compare the mean difference of all measurements between males and females. The individuals with CI value less than the standard CI (SCI) were designated as males and those with higher values as females. The estimated gender was then compared with the known gender and percentage accuracy of the determination of sex using standard maxillary, and mandibular canine indices were derived.

RESULTS

The present study was carried out among 75 males and 75 females with mean age of 19.5 years.

Mesiodistal width of canine, intercanine distance and canine index:

From the Student's t-test results in table 1, it is clear that no measured parameter statistically differs between the genders.

Sexual dimorphism of canines: Sexual dimorphism (extent to which mesiodistal width of canine in males exceeds from females), based on the mesiodistal width of canines was calculated. Since the mesiodistal distal width of canine were more in females as shown in table 1, a reverse sexual dimorphism was obtained. Maxillary left canine in showed a greater dimorphism followed by maxillary right canine. The sexual dimorphism of mandibular left and right canines were -0.31 and -2.44 respectively, and, for maxillary left and right canines were -4.44 and -4.17 respectively.

Standard canine index: The standard canine index for the maxilla and mandibular arches were 0.18 and 0.21 respectively. Gender determination was estimated using a standard canine index. Subjects with canine index values greater than the standard canine index were considered as females and subjects with canine index values less than SCI are considered as males. The percentage accuracy of gender determination using such assumption based on SCI value was calculated. Percentage accuracy, using both standard maxillary and mandibular canine indices was <70%.

Table 1: Difference between males and females based on the mesiodistal width of canine, intercanine distance and canine index

Measurement of canine index	Mean		Std.deviation		Mean difference ± SE between males	T-test for equality of means	p-value
	Male	Female	Male	Female			
Right maxillary canine	6.89	7.19	0.66	0.50	0.304±0.166	1.827	0.074
Left maxillary canine	6.89	7.21	0.63	0.50	0.32±0.16	1.999	0.051
Right mandibular canine	6.39	6.55	0.54	0.44	-0.39±0.57	-0.692	0.492
Left mandibular canine	6.40	6.42	0.42	0.37	0.01±0	1.968	0.055
Maxillary ICD	37.71	37.31	2.26	1.72	0.16±0.14	1.143	0.259
Mandibular ICD	29.80	30.17	1.99	2.05	0.01±0.11	0.113	0.910
Maxillary CI	0.19	0.20	0.02	0.01	0.36±0.57	0.637	0.527
Mandibular CI	0.22	0.22	0.01	0.01	-0.001±0.004	-0.318	0.752

Table 2: Percentage accuracy of gender prediction using Standard canine index values

Gender	Number cases studied N	Number of cases with correct gender prediction using standard maxillary CI N(%)	Number of cases with correct gender prediction using standard mandibular CI N(%)
Male	75	24(32%)	66(88%)
Female	75	75(100%)	15(20%)
Total	150	99(66%)	81(54%)

From table 2 it is observed that standard maxillary CI has 100% percentage accurate prediction in the female population. However, this index has failed significantly to predict male population. Similarly, standard mandibular CI has 88% percentage accurate prediction in the male population, but failed significantly to predict female population.

DISCUSSION

Individual identification during mass disaster is often hindered by the state of soft tissues as it gets distorted following any massive health related event. Several methods have been developed to identify the individual based on the skeletal component that remains after the attack. Forensic professionals use four main characteristics to biologically identify an individual that includes gender, age, stature and ethnic or racial background of the individual. Gender determination is the first step in identification because once if gender is identified perfectly, it bounds the number of missing persons to one half of the population, and, methods to estimate age and stature are gender dependent.

Forensic odontologists play an important role in identifying the deceased individual as identifying the

individual by dental means is the most reliable method of identifying a victim or a convict in case of any uneventful death or environmental disasters. Canines have been found to show sexual dimorphism between males and female. But, there is a conflict in literature^[5-14] showing variation in results among maxillary and mandibular canines, as to which predicts sexual dimorphism accurately. The present study was carried out to know the sexual dimorphism in canines among the Chennai adult population. The mean age of this study population is 19.5 years. This age group was selected because there will be less attrition in this age group and so the effect of these on the mesiodistal width of the tooth will be minimal. Measurement of canines was performed clinically than using casts because we felt clinical examination would give us the exact measurements in millimetres than cast models avoiding minute unintentional errors.

The mesio-distal width of canine, intercanine distance and canine index of the study population showed no significant difference between genders when the corresponding mean values were compared. Similar observations were also found in studies conducted by Ayoub F et al^[16] in the Lebanese population among mandibular canines and Rathan S et al^[17] on mandibular

first permanent molars in Indian population. However, the mean of the mesiodistal width of females was found to be more than that of males. This is accordance with studies done by Acharya and Mainali^[18] on mandibular premolars Nepalese population, Rathan S et al^[17] on mandibular first permanent molars in Indian population and Yuen et al^[19] on mandibular incisors in Chinese population. A reverse dimorphism was estimated in the current study because of the increase in mesiodistal width of canines in females. In contrast to this a study conducted by Zorba et al^[20], in a Greek population found that males have bigger teeth than females.

Standard canine index values were calculated for both maxillary and mandibular arches and sexual dimorphism was obtained. Subjects with canine index values greater than the standard canine index were considered as females and those with canine index values less than the standard canine index were considered as males. It is also observed that the standard maxillary canine index has 100% accuracy in the female population, however significantly failed in predicting male population. Similarly, the standard mandibular canine index has 88% accuracy in predicting male population. Percentage accuracy, using both standard maxillary and mandibular canine indices was <70%. This is found to be varying in other studies. Rao et al^[6] obtained 85.9% accuracy in sex determination, Muller et al^[13] identified 63% accuracy in predicting sex. None of the studies, including the present study, showed more than 88% accuracy in gender determination. Hence we conclude that canine can be used only as a supplemental tool for gender determination.

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REFERENCES

1. Glaister's medical jurisprudence and toxicology, identification, Edgar Rentoul, Hamilton Smith, 1973, Churchill Livingstone, London, pp. 59–100
2. Shankar M, Bakkannavar S, Manjunath B, Vinod C, Nayak AG, Pradeep Kumar A. Canine index : a tool for sex determination. *Egyptian Journal of Forensic Sciences* 2015;5(4):157–161.
3. Dahlberg AA. Dental traits as identification tools. *Dent Prog* 1963;3:155-60
4. Kaushal S, Patnaik VVG, Sood V, Agnihotri G. Sex determination in North Indians using mandibular canine index. *J Indian Acad Forensic Med* (2004);26(2):45–49.
5. Al-Rifaiy MQ, Abdullah MA. Dimorphism of mandibular and maxillary canine teeth in establishing sex identity. *Saudi Dental Journal*. 1997 Apr;9(1):17-20.
6. Rao NG, Rao NN, Pai ML, Kotian MS. Mandibular canine index—a clue for establishing sex identity. *Forensic science international*. 1989 Aug 1;42(3):249-54.
7. Yadav S, Nagabhushana D, Rao BB, Mamatha GP. Mandibular canine index in establishing sex identity. *Indian journal of dental research*. 2001 Dec;13(3-4):143-6.
8. Wadhwan V, Urs AB, Manchanda A. Sex determination using three methodologies as a tool in forensic dentistry. *J Ind Dent Assoc* 2011;5:77-80.
9. Acharya AB, Mainali S. Limitations of the mandibular canine index in sex assessment. *J Forensic Leg Med* 2009;16:67-9.
10. Mughal IA, Saqib AS, Manzur F. Mandibular canine index (MCI); its role in determining gender. *Prof Med J*, Volume 17, Issue 3, 2010, pp. 459–463
11. Hashim HA, Murshid ZA. Mesiodistal tooth width. A comparison between Saudi males and females. Part 1. *Egyptian dental journal*. 1993 Jan;39(1):343-6.
12. Nair P, Rao BB, Annigeri RG. A Study Of Tooth Size, Symmetry And Sexual Dimorphism *J.Forensic Med Toxicol* 1999;16:10-3.
13. Muller M, Lupi-Pegurier L, Quatrehomme G, Bolla M. Odontometrical method useful in determining gender and dental alignment. *Forensic science international*. 2001 Oct 1;121(3):194-7.
14. Paramkusam G, Nadendla LK, Devulapalli RV, Pokala A. Morphometric analysis of canine in gender determination: Revisited in India. *Indian Journal of Dental Research*. 2014 Jul 1;25(4):425.
15. Garn SM, Lewis AB, Kerewsky RS. Buccolingual size asymmetry and its developmental meaning. *Angle Orthod* 1967;37:186-93

16. Ayoub F, Shamseddine L, Rifai M, Cassia A, Diab R, Zaarour I, Saadeh M, Rouhana G. Mandibular canine dimorphism in establishing sex identity in the Lebanese population. *International journal of dentistry*. 2014 Feb 10;2014.
17. Rathan S, Veena KM, Chatra L, Shenoy P and Prabhu RV. Molar Odontometrics in gender assessment- A panoramic Radiographic study. *IOSR Journal of Dental and Medical Sciences* 2017;16(2):28-31.
18. Acharya A, Mainali S. Univariate sex dimorphism in the Nepalese dentition and the use of discriminant functions in gender assessment. *Forensic Sci Int* 2007;173:47-56.
19. Yuen KK, So LL, Tang EL. Mesiodistal crown diameters of the primary and permanent teeth in southern Chinese: A longitudinal study. *Eur J Orthod* 1997;19:721-31.
20. Zorba E, Moraitis K, Manolis SK. Sexual dimorphism in permanent teeth of modern Greeks. *Forensic Sci Int*. 2011;210:74–81.

Medical Relief Post Urban Floods in a South Indian City- Lessons Learnt in Disaster Response and Planning

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ABSTRACT

Background: In December 2015 Chennai, experienced record breaking maximum rainfall of the whole century and was drowned with heavy floods. Medical relief was highly skewed, often a knee jerk reaction to a media report and the directives of the government.

Method: Forty-three camps were organized and conducted by Saveetha Medical College and Hospital post floods. Data regarding age and sex and diagnosis was analyzed using proportions. After the camps a focus group discussion was organized among faculty of various departments, staff and other paramedics who were involved in organizing and conducting the flood relief camps. Discussion was recorded and data was analyzed using qualitative methods.

Result: A total of 7845 people were screened and treated at these camps. Fever was the most common complaint followed by Respiratory tract infection. Critical review of medical relief camps via focused group discussion brought out many points like Setting up of Disaster Relief Coordinating Cell, Lack of proper infrastructure for camps, Duplication of work.

Conclusion: Health teams should be trained to manage the situations during disasters. Relief Coordination Center at the national level can be made to co-ordinate various disaster relief activities.

Keywords: *Floods, Disaster, Medical Relief Camps, Morbidity, Coordinating Cell*

INTRODUCTION

Each disaster is unique, and its impact on life, property and health depends on various factors including the geographic terrain, the status of civil planning, socio-economic profile of the population, nature and ferocity of the disaster, appropriateness and speed of disaster response.¹ There has been visible progress made in the disaster forewarnings, early response systems and the public health preparedness. However certain challenges and issues in disaster management and response still remain unaddressed.

The Chennai Flood, December 2015: Floods are a common disaster in the country, and strikes with remarkable regularity in many parts of the country. In December 2015 Chennai, experienced record breaking maximum rainfall of the whole century and was drowned with heavy floods. These floods were quite distinctive in nature, as it came post heavy rains and overflowing of lakes and rivers in the city. Many regions of the city were inundated with more than four to five feet of water for a week, most streets were water logged, the ground floors of many houses were in water. Chennai floods were declared as National disaster where in thousands of people were left homeless or got stranded in their homes without food or electricity.^{2,3}

Post floods there was an unprecedented social response. Help poured out from all directions, often unregulated and leading to further chaos and much wastage. There was also on the parallel a shameful race

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to gain political mileage from the disaster. Medical relief was highly skewed, often a knee jerk reaction to a media report and the directives of the government. As a result there was much mismanagement of medical expertise and resources, while many regions less politically connected or out of view of the media were left to fend for themselves. There was no concerted effort to study the damage or to assess the medial relief required. Most of the medical relief was reactionary, based on assumptions of floods related medical problems rather than actual assessment of ground situation.

Flood relief medical camps were organized by the Government of Tamil Nadu health department and various private sector hospitals and medical colleges covering all the affected areas.³ During that period various health camps were also organized by our medical college hospital in and around Chennai. Our experience of the medical relief of the camps taught us several lessons in disaster planning, manpower management, and medical education.

METHOD

Forty three camps were organised and conducted by Saveetha Medical College and Hospital post floods. A total of 7845 people treated at these camps.

Eight camps were conducted in our college service area in the rural settings, while the rest of the camps were in the urban and suburban areas inundated by floods.

We started the camps one day post floods, and continued the camps for another two weeks. Demographic details and the main clinical diagnoses was recorded and analyzed using proportions.

After the camps a focus group discussion was organized among faculty of various departments, staff and other paramedics who were involved in organizing and conducting the flood relief camps. A total of 10 team members including faculty, postgraduates, nurses and health workers were purposively sampled and involved in the discussion. Discussion was guided using a small question schedule. Discussion was recorded and data was analyzed using qualitative methods.

RESULTS

Demographic profile: Most of the participants were from 19-60 years, with 10% of the participants respectively less than 5 years old and more than 60 years old.

Male female ratio was same in less than 18 years and more than 60 years, however in 19-60 years, 71% of the participants were female.

Morbidity Profile: Fever was the most common complaint. Almost one third of the patients under 18 years complained of fever. Fever was relatively less common among the middle aged and old population.

Respiratory tract infection was the second most common complaint among the camp attendees. Among children less than 5 years, 60% of them reported with RTI, and 40% of the children 5-10 years.

Inter trigo was a common complaint among the patients, especially in the later days of the camp. Inter trigo was most commonly seen in the adolescents age group (26%).

Generalized body ache was the most common complaint among old population, with 30% of them reporting this symptom.

Table 1: Age and sex wise distribution of people who attended the flood relief health camps

Sex \ Age group	<5 YRS	6-10 YRS	11-18 YRS	19-60 YRS	>60 YRS	Total
Male	465	464	464	1224	423	3040 (39.05)
Female	328	408	504	3072	432	4744 (60.9)
TOTAL	793(10.2)	872 (11.2)	968(12.4)	4296(55.2)	855 (10.9)	7784

Table 2: Age and complaint wise distribution of people who attended the flood relief camps

	< 5 yrs (n = 793)	5-10 yrs (n = 872)	11-18 yrs (n = 968)	19-60 yrs (n = 4296)	> 60 yrs (n = 855)	Total (n = 7784)
Fever	281(35.4)	264(30.3)	312(32.2)	1007(23.4)	136(15.9)	2000(25.7)
URI/LRI	465(58.6)	384(44)	199(20.7)	561(13)	160(18.7)	1769(22.7)

Conted...

Musculoskeletal	0	33(3.7)	40 (4.1)	1216 (27.9)	264(30.8)	1553(19.8)
Intertrigo	0	104(11.9)	248 (25.6)	681(15.8)	95 (11.1)	1128(14.5)
GI Problem	48(6)	40 (4.6)	64 (6.6)	328 (7.6)	64 (7.5)	544(6.9)
Skin Problem	120(15.1)	47 (5.5)	80(8.2)	240(5.6)	33(3.8)	520(9.6)
Eye Problem	0	32 (3.6)	0	415 (9.7)	104 (12.1)	551 (7.1)
DM	0	0	0	88 (2)	64(7.5)	152 (1.9)
HT	0	0	83(8.2)	94(2.2)	40(4.7)	217(2.8)
Injury	0	16(1.8)	0	40 (0.9)	7 (0.9)	63(0.8)
						8497

FIRST FEW CAMPS-LESSONS LEARNT

Selection of Area and venue for the camp: First few camps were organised in the immediate neighbourhood based on the perceived needs of the villages in our hospital outreach service area, and in response to the demands of the Civic and NGOs working in the area.

The initial camps were not based on actual need of the society, but more to serve self interests of the agencies or individuals concerned. In some of the areas, there were multiple medical teams already working with no coordination between, while in some areas the floods had actually not impacted much. The demand for the camps were done by local political party leaders, whose primary intention was to demonstrate to the community that they have done so work to help them.

Unreasonable demands of leaders and population: The demands of the leaders and the population were unreasonable in many instances, people demanding freebies even though they did not actually needed those items. Even for medical areas, people were demanding treatment for illnesses which were neither emergency nor directly linked to the floods.

Lack of proper infrastructure for camps: Many times no proper place was provided to the camp team to conduct the camp. Many camps were conducted under the tree or in some corridors of factory or some shop were temporarily transformed into a mini clinic.

Duplication of work: There was lack of co-ordination between different health agencies like Government of Tamil Nadu health department and various private sector hospitals, medical colleges, individual doctors, who were involved in health camps which resulted in duplication of work in many of the places.

“Organizers had their hidden motives; nobody is bothered for helping people”

Lack of Community Involvement in organising camps: There was also a problem of law and order in few of the initial camps. This was especially so in the areas where there was an absence of strong support from the local community to help organise the camps. People felt that here was a free distribution of relief materials and a mad rush to grab whatever available. In many camps, people were not informed regards the camp, and hence the confusion.

Flood Related Morbidity different from that projected in media: There was actually not much of direct floods related morbidity. Most of the complains were of preexisting illnesses or regular common illnesses prevalent in the community. In a few days, most of the people started complaining of skin itching and rashes. This was seen in all ages, and in those people whose living spaces were inundated with flood water.

There was much of anxiety and fear regards drinking water, and infact many places a direct demand for drinking water or purification of drinking water tanks.

Communications systems were down for the first few days, people were unable to access their families and relatives, thus adding to the stress and anxiety.

Demand for Whitfield ointment and Drugs for diabetes, hypertension: During these health camps almost all the people attending them were asking for white ointment (Whitfield ointment) for fungal infection (*setu punnu*). They were not satisfied with any other ointment which was equally or more effective than Whitfield ointment. Whitfield ointment is a cheap medicine easily available in Government supplies. But

during this flood time these simple medicines were out of stock.

Many patients were asking drugs for Hypertension and Diabetes but since their previous prescriptions were lost and we could not properly investigate them during those camps, it was a challenge to address these patients.

Public demand for specialty camps, branded drugs and other freebies: In few places organizers were demanding for specialized health camps from hospitals as general health camps were already being organized in those areas by some other health agencies.

“Patients were not happy with paracetamol they wanted combiflam”

Need for Disaster training for medical and paramedical personnel: during the recent camps nursing and other medical personnel were found to be clueless of their role and responsibilities in organizing the camps in difficult places.

“We need to have a disaster group where people can be assigned designated roles”

REVISED STRATEGY

Fact finding teams and preplanning of camps: We changed our strategy, instead of responding directly to the demands of other agencies, we prepared few fact finding teams whose main purpose was to visit the flood affected areas, and identify the underserved and needy pockets of population. The fact finding teams coordinated with other relief agencies working in the region, visited the area one day prior and planned the medical camp well in advance. The areas within the city where multiple agencies were already working were avoided. We selected the areas where in we were able to elicit local demand and logistic support for organizing the camps. This strategy proved very effective, in focusing our efforts in the right direction.

Our team briefed the locals on the purpose of the camps, and explained clearly the scope of the camps to make their expectations reasonable and practical. We avoided distributing free relief material and maintained a strict professional approach.

Right team: We chose the specialists primarily based on the needs and expectations of the community. We ensured pediatricians and dermatology camps in certain

areas, while most of the camps consisted of physicians and general surgeons.

DISCUSSION

Floods are usually not associated with increased frequency of disease however there may be risk of communicable disease outbreaks especially water and vector borne diseases because of the interruption of basic public health services and the overall deterioration of living conditions. There may also be increased risk of respiratory tract infections due to exposure to water and cold especially in small children.⁴⁻⁶ In the present study majority population had fever, respiratory tract infections and body aches and pains. 59% children less than 5 years and 44% children between 5-10 yrs complained of respiratory tract infections.

There were not many people complaining of gastrointestinal problems, only 7% people complained of gastrointestinal problems as safe food and water was supplied by Government, NGOs and volunteers in almost all the places in Chennai and other flood effected districts.

While physical problems were found to be little, majority of the people wanted to attend the health camps so that they can talk to the doctors and get some relief or assurance that everything will soon get fine. Since crowd was big and camp people wanted to cover as many needy as possible adequate time was not spend talking and counseling with the people to treat their mental stress.^{7,8}

Despite the fact that an experienced camp team including health workers, medical and para-medical personnel organized the flood relief camps, lack of co-ordination, problems in time management and difficulty in working in unusual settings was observed. These results suggest need for training health personnel in various disaster situations. Disaster management courses with check list and protocols which are disaster specific should be developed and implemented for healthcare workers with clearly laid down individual responsibilities.⁹⁻¹⁶

In the present study duplication of work due to lack of co-ordination between different health agencies was found. Centralized monitoring and networking system should be made in the areas where some disaster has struck which can co-ordinate all the assistance coming from different directions and channelize them in right direction.^{17,18}

CONCLUSION

Floods are the most common form of natural disaster and usually do not lead to high risk of disease transmission unless until water sources are compromised. Yet people become stranded in their houses with water logging and suffer from common ailments like fever, respiratory tract infections and fungal infection of skin. Timely, accessible and coordinated help from different health agencies is needed for helping people. Health teams should be trained to manage the situations during disasters. Relief Coordination Center at the national level can be made to co-ordinate various disaster relief activities.

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REFERENCES

1. Maxy-Rosenay-Last (1992), Public Health and Preventive Medicine, 13th Edition.
2. Modi announces Rs.1,000 cr for Tamil Nadu flood relief, THE HINDU Dec 3 2015, Available from: <http://www.thehindu.com/news/national/tamil-nadu/chennai-floods-latest-updates-relief-rescue-operation-underway-imd-predicts-more-rains/article7944526.ece>
3. Now, struggle for survival in Chennai Displaced families count their losses Chennai, The Hindu December 8, 2015, Available from: <http://www.thehindu.com/news/cities/chennai/chennai-floods-aftermath-displaced-families-count-their-losses/article7958695.ece>
4. WHO; Flooding and communicable diseases fact sheet; Risk assessment and preventive measures. Available from: file:///C:/Users/medtscom008/Desktop/FLOOD/WHO%20_%20Flooding%20and%20communicable%20diseases%20fact%20sheet.html
5. PAHO (2000) Natural disasters, protecting the public's health, scientific publication no 575
6. Omar Shabir; A Summary Case Report on the Health Impacts and Response to the Pakistan

- Floods of 2010, Version 1. PLoS Curr. 2013 April 11; 5
7. Meredith LS, Eisenman DP, Tanielian T, Taylor SL, Basurto-Davila R, Zazzali J. Prioritizing “psychological” consequences for disaster preparedness and response: a framework for addressing the emotional, behavioral and cognitive effects of patient surge in large-scale disasters. *Disaster Med Public Health Prep.* 2011 Mar;5(1):73–80. Epub 2010 Nov 2. [PubMed]
8. Sudharsanam Manni Balasubramaniam, Yogesh Mohan, Gautam Roy; Experiences from tsunami relief activity: implications for medical education *Can Med Educ J.* 2012; 3(2): e138–e140 Published online 2012 Sep 30.
9. Wickramasinghe KK, Ishara MH, Liyanage P, Karunathilake M, Samarasekera D. Outcome-based approach in development of disaster management course for health care workers. *Ann Acad Med Singapore.* 2007 Sep;36(9):765–769.
10. Scott LA, Carson DS, Greenwell IB. Disaster 101: a novel approach to disaster medicine training for health professionals. *J Emerg Med.* 2010 Aug;39(2):220–226. Epub 2010 Jan 15. [PubMed]
11. Sabri AA, Qayyum MA. Why medical students should be trained in disaster management: Our experience of the Kashmir earthquake. *Plos Med.* 2006;3(9):1452–3. doi: 10.1371/journal.pmed.0030382. [PMC free article] [PubMed] [Cross Ref]
12. Bajow N, Djalali A, Ingrassia PL, Ragazzoni L, Ageely H, Bani I, Corte FD; Evaluation of a new community-based curriculum in disaster medicine for undergraduates. *BMC Med Educ.* 2016 Aug 26;16(1):225. doi: 10.1186/s12909-016-0746-6.
13. Nekooei Moghaddam M, Saeed S, Khanjani N, Arab M. Nurses requirements for relief and casualty support in disasters: a qualitative study. *Nurs Midwifery Stud.* 2014 Apr;3 (1):e9939. Epub 2014 Apr 17
14. Gebbie K, Merrill J. Public health worker competencies for emergency response. *J Public Health Manag Pract.* 2002;8:73–81. [PubMed]

15. Edbert B Hsu, Tamara L Thomas, Eric B Bass, Dianne Whyne, Gabor D Kelen, and Gary B Green; Healthcare worker competencies for disaster training, *BMC Med Educ.* 2006; 6: 19. Published online 2006 Mar 20. doi: 10.1186/1472-6920-6-19
16. Preeti Gupta, Anurag Khanna, and S Majumdar; Disaster Management in Flash Floods in Leh (Ladakh): A Case Study; *Indian J Community Med.* 2012 Jul-Sep; 37(3): 185–190. doi: 10.4103/0970-0218.99928
17. Abir M, Bell SA, Puppala N, Awad O, Moore M; Setting Foundations for Developing Disaster Response Metrics; *Disaster Med Public Health Prep.* 2017 Feb 6:1-5. doi: 10.1017/dmp.2016.173. [Epub ahead of print]
18. Bremer R; Policy development in disaster preparedness and management: lessons learned from the January 2001 earthquake in Gujarat, India. *Prehosp Disaster Med.* 2003 Oct-Dec;18(4):372-84.

Development and Validation of Eligibility Criteria for Homecare Services: A Case Study of Three Home Healthcare Providing Institutions in Bangalore

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ABSTRACT

The Indian healthcare market is blooming rapidly and so is the expense of the medical services in hospitals. With the increase in ageing population, prevalence of chronic diseases, rising rates of non-communicable diseases and nosocomial infections, hospitals are burdened and congested with patients with chronic conditions rather than acute diseases. Health challenges today are comprehensive and interrelated. The care delivery model should also use a multi-pronged, collaborative, and technology-enabled approach which would lead to more fruitful outcomes. The key constituents required would be safe, standardized, and evidence-based processes. The homecare model has been successful in reaching out to mass volumes with competitors in the industry offering range of specialized services, but it has its own challenges. It is imperative to evaluate whether homecare organizations use eligibility criteria to screen patients so that there is no deficiency in the quality of care provided. Inclusion and Exclusion criteria for screening patients should be need based and shouldn't act as a barrier for the eligible candidates.

The study aimed to develop eligibility criteria for home healthcare providing institutions for carrying out appropriate screening of homecare patients/applicant. The study approach was to identify and assess current screening practices in three homecare providing organizations in Bangalore and developing criteria based on the current practices and best practices across various organizations globally. The criteria were developed addressing the needs of both the patients and healthcare providers. The developed criteria were validated using Delphi method by domain experts. The validated criteria can be used by organizations to screen patients or applicants eligible for homecare and increase access to the needy in the community.

Keywords: *Eligibility Criteria, Homecare Services, Best Screening Practices, Validation, Delphi method*

INTRODUCTION

The healthcare industry, often also referred to as the “medical industry” is an aggregation and integration of services that are provided to treat patients with curative, preventive, rehabilitative and palliative care. Hospital care or medical care is the highest level of care which includes end-of-life care or palliative care provided to an individual in a medical setup. Of late due to the rising demand for healthcare, rapidly ageing population, growing prevalence of chronic disease, hospitals are stressed beyond means to cater to these demands. Home healthcare is complimentary to hospital services and serve as medium to reduce the burden on hospitals. There are many reasons why individuals may require medical assistance at home. Some are recuperating from surgery

or have a chronic condition requiring continuous care. Others require treatments or help with exercises of day to day living. Studies have demonstrated that recovery time reduces by 15% when the patient is at home, instead of a doctor's facility setup. Also, patients can decrease their everyday cost for healthcare services and thus benefit by up to 85% as they move from a facility center to their home, all without compromising the quality care provided [1]. According to a study conducted in Europe out of 5954 patients, the overall results suggested that 6.8% of patients developed at least one active healthcare-associated infection and 2.5% developed at least one homecare-acquired infection. Thus it can be assumed from the above results that the risk of healthcare acquired infections are less in homecare setting compared to hospitals and that the distribution of infections differ

for different settings ^[2]. Current challenges involved in homecare are employee retention, employee utilization, cost effectiveness, protocols for inclusion and exclusion criteria's, operational issues such as inconsistency in quality and lack of standard protocols for in-home healthcare training ^[3]. Eligibility criteria are set of requirements that need to be met by an individual before any further progress. The idea of devising eligibility criteria is generally in order to include eligible candidates and those who significantly need the service and not to act as a barrier for access to the particular service. Well defined and designed eligibility criteria help the screening staff to understand the applicant needs clearly and to assess whether the applicant is eligible or ineligible for the required service. Thomas et al in their study suggested that the screening staff should possess adequate professional skills and clinical insight in order to screen eligible candidates and avoid errors in the screening process ^[4]. But it has been observed that many times complex and stringent criteria lead to excluding patients who are really in need of the services ^[5].

Thus the criteria should be more oriented and based on the need rather than other factors (i.e. costs, age, diseases, race, treatment preferences, etc.). The other challenge for homecare is homecare associated hazards and risks. Rapidly increasing acute care provided in home health care and the increasing numbers of vulnerable patients that make up this patient population make it necessary to identify risk factors that affect patient health and safety in the home setting. Home care associated hazards adversely impact patient quality of care since the setting is not controlled ^[6]. Household health hazards that are not addressed can jeopardize the health and safety not only of the patient and their informal caregivers but also the professional home caregivers. Home care differs from hospital with respect to the nature of formal service, the role of family members, and the attributes of the individual receiving care ^[7]. Thus, the risk associated with providing chronic care at home is grievous and need to be considered by all homecare stakeholders.

Eligibility criteria form a basis for these guidelines as they are formulated for screening the patients or the homecare applicants before the enrolment is initiated. Having certain criteria for screening is imperative when a patient is fostered in an environment not equipped with sophisticated technologies. Eligibility criteria consist of predefined inclusion and exclusion criteria that help

the clinician or homecare staff to screen the patients or beneficiaries appropriately to prevent any future errors or risks.

In order to elevate the home healthcare status, regulatory structure should be introduced and the guidelines should be followed by all home healthcare service providers to deliver best quality of clinical care to patients at home ^[8]. The aim of the study is to develop eligibility criteria for homecare services from the patients as well as healthcare provider's perspective. The objectives of the study were to assess the existing practices adopted by the selected home healthcare institutions and conducting a patient perception study to assess patient's perception with respect to screening practices. Based on the obtained results eligibility criteria were developed for screening home healthcare applicants and validated the by domain experts.

METHOD AND METHODOLOGY

The study was conducted in three leading homecare providing organizations in Bangalore over a period of 6 months. Homecare stakeholders (Patients and Homecare Screening Personnel) were chosen for the study.

The current practices in the selected organizations were assessed using a structured checklist and key informant interviews with homecare personnel directly involved in the screening process. The interview guide was developed based on best screening practices and protocols followed in developed countries ^[9,10,11,12,13]. The interview was audio recorded with prior consent taken for the same. The transcribed interviews were then analysed through thematic analysis.

Patient Perception Study was carried out at a tertiary care hospital offering homecare services and catering to different strata of the population. A structured questionnaire to capture patient perception was face validated by subject matter experts and administered to 200 patients of all age groups and seeking various services. Patients were addressed with the questionnaire using random sampling technique in various areas which has a scope for homecare services. Once similar themes were found to be recurring and response saturated the survey was concluded. The questionnaire focused on 4 main attributes; Awareness, Willingness, Experience and Expectations.

FINDINGS & DISCUSSIONS

Current practices assessed through checklists and key informant interviews suggested that:

- Organizations mainly focused on the clinical condition for qualifying an applicant/patient for homecare services.
- The home survey or assessment was particularly conducted to analyze homecare staff safety but the physical home environment was not assessed comprehensively.
- Patients informal caregivers involved did not undergo any formal assessment.
- The checklist assessed that homecare organizations lacked proper standardized protocols and guidelines for screening patients.

To sum up, the organizations lack a well- defined, standardized format or protocol to screen homecare patients/applicants. There is a need for specific eligibility guidelines.

From the patient perception study it was evident that patient awareness about homecare services and screening is very low but the willingness for the same is significant. (Table 1)

- The patient perception study reveals that though the level of awareness is low (21%), the willingness for using homecare services and undergoing a screening process is high (77.5%).
- Out of the 21% that were aware, only 16.2% of the entire sample had experienced homecare services.
- Patients were willing to undergo pre-screening assessments in order to avail homecare services. Patients were asked if they would agree for the following assessment; Medical assessment (for assessing disability levels and need for homecare), Patients family members eligibility assessment (To assess family member capability as informal caregivers), Patients home survey/assessment (To ensure physical safety of home for patients and staffs)
- Figure 1 depicts the statistical results of the responses given by patients with respect to the following assessments.

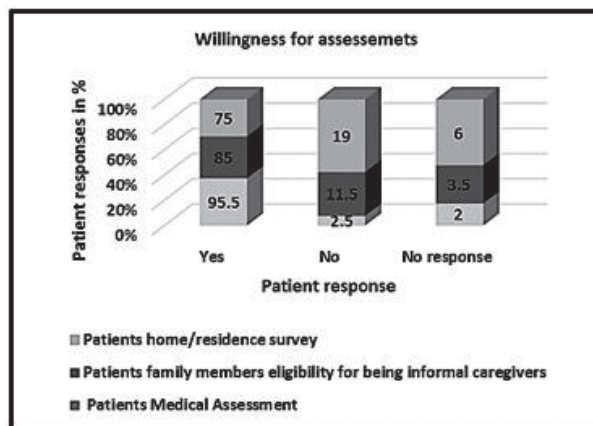


Figure 1: Willingness for pre-assessments by patient

Table 1: Correlation analysis for awareness and willingness

Correlations Bivariate			
		Awareness Total	Willingness Total
Awareness total	Pearson Correlation	1	.380**
	Sig. (2-tailed)		.000
	N	200	200
Willingness total	Pearson Correlation	.380**	1
	Sig. (2-tailed)	.000	
	N	200	200

** . Correlation is significant at the 0.01 level (2-tailed).

The Pearson Correlation Coefficient (r) obtained is 0.380 with a p-value of 0.01, indicating that there is a weak correlation between the two variables, but since the value obtained is positive the increase in one variable affects the other. (Table 1)

Proposed Criteria for Screening: The criteria for home healthcare services were developed using the best practices across developed countries and existing practices in the selected home care organizations in Bangalore [9, 10, 11, 12, 13]. The criteria are not specific to any particular demographic group or clinical condition and focuses primarily on the need for the required.

Inclusion Criteria: A patient is eligible for homecare services if -

1. Certified or warranted eligible by treating or referring physician or skilled medical professional (Registered Nurse or therapists) who directs the patient to a supplementary source of medical expertise for care and support.
 2. Homebound, Non-ambulatory and suffers for many chronic medical problems or disabilities that limits mobility.
 3. Requires continuous long term care or periodic skilled nursing care, physical, speech or occupational therapy that is otherwise impossible in normal institutional care
 4. A family member/ guardian is available always and is willing to participate and assist throughout the course of care
 5. The patient and the family member/guardian/ attendee need external aid and support to assist the patient at home
 6. The patient and the caregivers behavior and emotional status is stable
 7. Patient's physical home environment is feasible and safe to carryout activities for daily care and other services
 8. Patient/Applicants use of alcohol or illegitimate drugs or other narcotic substance does not alter his/her functional capabilities
 9. In case of rehabilitation or physiotherapy services,
 - Unavailability of a family member guardian to escort the patient to the center-based rehabilitation services
 - Lack of barrier free access from the clients/applicant/patients residence to care institutions or other centres.
 10. Patient's medical, nursing and social needs can be met adequately by the homecare compared to other alternatives for care.
2. The patient is unwilling to accept the assessment process or care plans or to participate in the plan intended for carrying out the service effectively
 3. The patient's safety between service visits cannot be reasonably assured because of inadequate/ deficient home support
 4. The patient's condition is too severe and life threatening and the program cannot promise effective delivery of the required services.
 5. Serious reservations about the benefits of providing the required services to the patient
 6. Services cannot be rendered safely due to applicants home /residence physical condition and environment
 7. Require services aren't services that home care program is authorized to provide
*In case an applicant belongs to a Special Care Home, the required services are the legal responsibility of the operator of the patient's place of residence
 8. Serious reservation of care giving staffs safety in case applicant has violent, disruptive or unmanageable behaviors which cannot be uncontrolled (despite intervention)

The developed criteria were validated through Delphi method by 3 domain experts. The criteria were developed using the best screening practices across developed countries which are used widely for screening homecare candidates. But it had to be re-validated again because the criteria were modified according to Indian context and current practices followed in homecare organizations selected for the study. Delphi technique was chosen since it allows for anonymity of the reviewers and a controlled feedback can be obtained effectively from the interaction and avoid bias^[14]. The validation consists of two Delphi rounds of revision after which the final draft of guidelines was approved by experts and subjected for field tests.

Exclusion Criteria: A patient cannot enroll for homecare services or is refused for one if,

1. An individualized assessment does not indicate such a necessity for skilled care, including where services needed do not require or demand skilled nursing care or therapy and can be provided or performed safely and effectively by the patient or their unskilled family members

Recommendations: Hospitals could play a major role for increasing awareness among the population and cater to the demands of the size of the population willing to opt for homecare services^[15].

- Hospitals that offer homecare services could develop marketing strategies like screening camps,

counseling sessions and discounts for the target population that would highly benefit from homecare services to increase the accessibility for the services and utilize the available resources efficiently.

- Hospitals can develop promotional activities in order to advertise and promote homecare services and reach out to the majority
- Hospitals that do not offer homecare services could actuate one since the demand for the services are high and people are willing for availing homecare services and are ready to shell out money for the same.

CONCLUSION

The evolving home healthcare concept supports the healthcare delivery by reducing the average length of stay, ensuring efficient utilization of existing bed capacity, reducing chances of re-admission and increase patient satisfaction at an affordable cost. The study assessed the current scenario in the selected homecare providing organizations related to screening practices and focused on the eligibility guidelines for patient enrolment in homecare services. The study also tried to understand the patients' as well as the healthcare provider's perception with respect to screening practices.

The key findings of the informant interviews indicated that there was no standardized protocol or guidelines to screen patients before enrolling them for homecare services and that patients were enrolled based on their clinical conditions. The main criterion for patients to enroll for homecare services was their medical conditions which made them homebound or which resulted in taxing efforts to perform activities of daily living.

According to the patients' perception, homecare services should allow informal caregivers to participate in the care giving. Patients were ready to consider few changes at their homes/residence in case the services demanded the change for efficient care delivery. The Eligibility Criteria developed were validated by domain experts and the revised guidelines were field tested. The eligibility guidelines would bring in certain standardization in the screening practices across homecare organizations.

Limitations

- Confidentiality of documents: Not all documents could be observed due to confidentiality issues.

- Further studies can be conducted to generalize the developed criteria across various homecare institutions on a larger scale.

Conflict of Interest: The authors declare that they have no competing interests.

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Ethical Clearance: Taken from RUAS Research Committee

REFERENCES

1. Arockiasamy A. Challenges in home health care. *Economic Times* [Internet]. 2015 [cited 6 June 2017]; Available from: <http://health.economictimes.indiatimes.com/news/industry/challenges-in-home-health-care/46391118>
2. Melville N. Healthcare Infection Risks Extend to Home, Community [Internet]. *Medscape*. 2014 [cited 28 August 2017]. Available from: http://www.medscape.com/viewarticle/836113#vp_2
3. Agarwal N. Expanding Healthcare Delivery in India: From Hospitals to Home [Internet]. *Asian Healthcare Management System*. 2017 [cited 5 April 2017]. Available from: <https://www.asianhnm.com/articles/expanding-healthcare-delivery-in-india-from-hospitals-to-home>
4. Inui T, Stevenson K, Plorde D, Murphy I. Needs assessment for hospital-based home care services. *Research in Nursing & Health*. 1980; 3(3):101-106.
5. Fishman J, O'Dwyer P, Lu H, Henderson H, Asch D, Casarett D. Race, treatment preferences, and hospice enrollment: Eligibility criteria may exclude patients with the greatest needs for care. *Cancer*. 2009; 115(3):689-697.
6. Gershon R, Qureshi K, Samar, S2nd ed. [ebook]. (n.d.). pp.1-16. Available at: https://www.ahrq.gov/downloads/pub/advances2/vol1/advances-gershon_88.pdf [Accessed 11 Jul. 2017].
7. Beck-Friis B, Strang P. The organization of hospital-based home care for terminally ill cancer patients: the Motala model. *Palliative Medicine*. 1993; 7(2):93-100.
8. Mazumdar S. For a few bucks more, now get healthcare at your doorsteps. *The Indian Express*

- [Internet]. 2015 [cited 8 May 2017]; Available from: <http://indianexpress.com/article/india/india-news-india/for-a-few-bucks-more-now-get-healthcare-at-your-doorsteps/>
9. Government of Saskatchewan. Homecare Policy Manual. Regina: Saskatchewan Ministry of Health; 2006 p. 15-20.
 10. Guide to Home Care Services for Health Care Professionals. Manitoba: Winnipeg Regional Health Authority; 2013 p. 1-17.
 11. Health Regulation, Health Financing and Strategy Division. HAAD Standards for Homecare Health Services in Emirate of Abu Dhabi. Abu Dhabi: Health Regulation, Health Financing and Strategy Division, 2016 p.6.
 12. Division of Home health. Rules and Regulations for Home Healthcare Agencies. Harrisburg: Department of Health, Pennsylvania, 1992.
 13. Department of Health & Human Services. Medicare & Home Health Care. Baltimore: U.S. Department of Health and Human Services; n.d. pp.5-6.
 14. Yousaf M. Using Experts' Opinions through Delphi Technique [Internet]. 12th ed. Rawalpindi; 2017 [cited 4 June 2017]. Available from: <http://pareonline.net/getvn.asp?v=12&n=4>
 15. A C. Home care services and development perspective: a study on customer perception and acceptability in the urban parts of India [Ph.D.]. Manipal Institute of Management.

Knowledge, Food Intake Pattern, and Body Mass Index of Overweight and Obese Adolescent Before and After Giving Social Media Health Education in Bulukumba Regency

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ABSTRACT

Obesity is starting to become a health problem worldwide. Therefore, it must be addressed immediately. It is important to develop and evaluate interventions to reduce obesity prevalence by focus on behavioral therapy through health education. This study was aimed to determine differences in knowledge, intake patterns and BMI after giving health education for overweight and obese adolescent in Bulukumba District. This study was Quasi Experiment, which is pre-test and post-test with control group design. The groups in this study were divided into four; two treatment groups and two control groups. The first group was given health education through lectures with a booklet with WhatsApp application, the second group was given health education through lectures with booklets accompanied by text messages, the third group was given health education with lectures accompanied by leaflets and the fourth group was only given health education through media without lectures. The number of samples was 91 respondents. The results of Friedman's test analysis showed that there were differences in knowledge ($p < 0.001$), differences in intake and BMI ($p < 0.001$) in groups 1, 2 and 3, but no difference in intake patterns (energy $p = 0.008$ and carbohydrates $p = 0.027$) and BMI ($p = 0.140$) in group 4. The use of booklets in the provision of health education for adolescents is added by re-education through the use of social media WhatsApp application to increase knowledge, changes in intake patterns and BMI in overweight and obese adolescents.

Keywords: Health education, overweight, obese, adolescent, BMI

INTRODUCTION

Obesity is starting to become a health problem worldwide, even the WHO states that obesity is a global epidemic, so obesity is a health problem that must be addressed immediately. The prevalence of obesity continues to increase. In 2010, globally, the number of children under the age of five with more nutritional status was estimated at more than 42 million¹.

According to the World Health Organization (WHO) in 2014 the highest prevalence of overweight and obesity was in the United States 61% were overweight for all ages and 27% were obese, while the lowest was in South Asia which was 22% overweight for all ages and 5% for obesity. The prevalence of overweight among boys and girls aged between 11 years was highest in Greece (33%), Portugal (32%), Ireland (30%) and Spain

(30%) while the lowest in the Netherlands (13%) and Switzerland (11%)².

Based on data from the Ministry of Health in 2007, the prevalence of obesity in children aged 6 and 14 reached 9.5% for men, 6.4% for women while in South Sulawesi, men were 7.4% and women were 4.8%. This condition increased from the 1990s which ranged from 4%³. In 2010 nationally, the problem of obesity at the age of 6-12 years was still high at 9.2% or still above 5.0%. The prevalence of obesity in boys aged 6-12 years is higher than the prevalence in girls, which is 10.7% and 7.7% respectively. Based on residence, the prevalence of obesity is higher in urban areas compared to the prevalence in rural areas, which is 10.4% and 8.1% respectively⁴. In 2013, the prevalence of nutritional status (BMI for Age) of children aged 5-12 years was 18.8% consisting of 10.8% overweight and 8% obesity

while in Indonesia aged 13-15 in 10.8 percent, consists of 8.3 percent fat and 2.5 percent very obese⁵.

Obesity is a nutritional problem that is often encountered and has the potential to cause health problems due to various complications. This is important to note because obesity has a high risk of comorbidity, which in turn can also increase mortality⁶. (6) Therefore, it is important to develop and evaluate interventions to reduce the prevalence of obesity. The way to address childhood obesity can be through behavioral therapy, namely diet and exercise combined with behavior modification through health education⁷. Health education is a dynamic process of behavior change with the aim of changing or influencing human behavior which includes components of knowledge, attitudes, or practices related to the goals of healthy living both individually, in groups and in the community, and is a component of health programs⁸. The purpose of this study was to determine differences in knowledge, intake patterns and BMI before and after being given health education for overweight and obese children in Bulukumba Regency in 2016.

MATERIALS AND METHOD

The design of this study uses “Quasi Experiment”, which is pre-test and post-test with control group design. The study group in this study was divided into four groups consisting of two treatment groups and two control groups. The first group was given health education through lectures with a booklet with WhatsApp application, the second group was given health education through lectures with booklets accompanied by text

messages, the third group was given health education with lectures accompanied by leaflets and the fourth group was only given health education through media without lectures. This research was conducted in September 2016 to March 2017 in public junior high schools 1,2,4 and 10 located in the city of Bulukumba district. The study population was all overweight and obese children in junior high school located in the city of Bulukumba district, the samples obtained in this study were 91 people who would be divided into 4 (four) groups including 2 (two) groups in treatment and 2 (two) group on control. Group 1 (first) consisted of 25 people, groups 2,3 and 4 each consisting of 22 people. The research sample was obtained by purposive sampling method. Data were presented and analyzed univariately and presented in the form of frequency distribution tables, bivariate tests using Friedman and repeated Anova tests to determine differences in knowledge, lifestyle and body mass index, before and after health education.

RESULTS

Characteristics of respondents showed that in groups 1, 2, 3 and 4 most of them were female, low father education, low maternal education, high family income, nuclear family structure, family culture supporting the incidence of obesity, and family health risks. While the characteristics of the obesity history of the elderly, in groups 1 and 4 are mostly in the risk category while the group 2 is risky and not risky in the same number and group 3 is mostly in the non-risk category. The homogeneity test (the Leneve’s test) shows the existence of sample equality in all groups (Table 1).

Table 1: Characteristics of participant

Characteristics	Groups								p*
	I		II		III		IV		
	n (25)	%	n (22)	%	n (22)	%	n (22)	%	
Sex									
Male	12	48	8	36.4	9	40.9	6	27.3	0.048
Female	13	52	14	63.6	13	59.1	16	72.7	
Father’s education									
High	9	36	8	36.4	6	27.3	1	4.5	0.000
Low	16	64	14	63.6	16	72.7	21	95.5	
Mother’s education									
High	10	40	6	27.3	1	4.5	1	4.5	0.000
Low	15	60	16	72.7	21	95.5	21	95.5	

Conted...

Family Income									
High	18	72	18	81.8	8	36.4	6	27.3	0.064
Low	7	28	4	18.2	14	63.6	16	72.7	
Family Structure									
Core family	18	72	16	72.7	18	81.8	15	68.2	0.162
Big family	7	28	6	27.3	4	18.2	7	31.8	
Family Culture									
Support	25	100	20	90.9	22	100.0	22	100.0	0.398
Not support	0	0	2	9.1	0	0.0	0	0.0	
Obesity of parents									
Risk	13	52	11	50.0	9	40.9	13	59.1	0.702
Not risk	12	48	11	50.0	13	59.1	9	40.9	
Family health history									
Risk	20	80	13	59.1	14	63.6	17	77.3	0.008
Not risk	5	20	9	40.9	8	36.4	5	22.7	

*Leneve's test

Table 2: The changes of knowledge, intake, and BMI among overweight/obese adolescent

Variables	Measurement series (months)							Δ	p
	T0	T1	T2	T3	T4	T5	T6		
Knowledge*									
Group 1 (n = 25)	8.56	12.48	13.84	14.12	15.76	18.8	19.84	11.28	< 0.001
Group 2 (n = 22)	8.45	12.55	13.41	13.09	13.73	17	18.55	10.1	< 0.001
Group 3 (n = 22)	6.64	7.95	12.14	13.09	14.64	14.32	16.59	9.95	< 0.001
Group 4 (n = 22)	6.82	8.14	7.5	8.32	8.45	8.45	8.91	2.09	< 0.001
Energy intake pattern*									
Group 1 (n = 25)	182.4	179	174.68	171.44	167.24	164.24	160.2	-22.16	< 0.001
Group 2 (n = 22)	134.1	131.4	127	124.5	120.36	118.04	114.2	-19.89	< 0.001
Group 3 (n = 22)	151.1	148.7	145.81	143.63	140.86	138.6	136.0	-15.05	< 0.001
Group 4 (n = 22)	131.3	129.5	129.72	128.18	128.54	126.95	127.1	-4.22	0.008
Carbohydrate intake pattern*									
Group 1 (n = 25)	151.8	149	145.32	142.68	139.12	136.8	133.4	-18.44	< 0.001
Group 2 (n = 22)	87.72	85.68	82.86	80.86	78.4	76.45	73.9	-13.82	< 0.001
Group 3 (n = 22)	106.4	104.6	102.72	101.18	99.09	97.77	95.81	-10.59	< 0.001
Group 4 (n = 22)	170.3	168.7	169.72	168.22	169.27	167.9	169.1	-1.18	0.270
Body mass index**									
Group 1 (n = 25)	2.49	2.44	2.36	2.28	2.2	2.12	2.09	-0.4	0.000
Group 2 (n = 22)	3.06	3.04	2.97	2.86	2.83	2.88	2.81	-0.25	0.000
Group 3 (n = 22)	1.89	1.85	1.83	1.79	1.71	1.68	1.61	-0.28	0.034
Group 4 (n = 22)	2.02	2.08	2.03	1.97	1.91	1.88	1.83	-0.19	0.140

*Friedman test; **Repeated ANOVA test

Table 2 shows that at the final measurement all respondents experienced an increase in knowledge scores compared to the initial measurements. This shows that there is a difference in knowledge at the beginning of the measurement compared to the second, third, fourth, fifth, sixth and seventh measurements. Friedman test results obtained $p < 0.001$ for all groups, this indicates that there is a difference in children's knowledge in each group.

DISCUSSION

The differences (Δ) of knowledge among groups shows an increase when compared to between initial and endline measurement (T0-T6). This proves that by providing health education using booklets added with re-education through WhatsApp application can improve knowledge continuously. Judging from the difference in average knowledge increase, it turns out that the highest increase in knowledge was group 1 compared to group 2, group 3, and even group 4.

This is in line with the *Bullet Theory* reveals that the effectiveness of messages using media can be directly related to the intended target⁹. Techniques and media that can be used including text, images/ audio only, audio visual and others. The level of media involvement in percent retention includes: 10% reading, 20% hearing, 30% viewing, 50% listening and seeing, saying 70% yourself, saying 90% and doing it yourself. The involvement of children in providing care will have a positive effect on their health. Providing information or health education especially to children should use interesting media. The use of technology can be another alternative in providing interesting health information to children¹⁰.

This study used booklets in groups 1 and 2 in providing health education interventions. The results of the study proved that the mean difference before and after the intervention was greater in the group using the booklet than in the control group. This is in line with research conducted by Erika¹¹, with health education interventions using modules, showing the results that changes in mean knowledge before and after intervention were greater in the treatment group than in the control group¹². A research conducted showed that there are significant differences in knowledge of elementary after booklets interventions³. The results showed that the highest change in group 1 was given health education interventions through lectures and booklets accompanied by education through social media (WhatsApp). Using

social media in providing health education has an influence on increasing knowledge in adolescents. A study showed that health education programs for adolescents through social media are very useful¹⁴.

Delivery techniques and methods are important factors that support the success of information transfer. The advantage of the method of delivering information through the WhatsApp application is that almost all students who were made as respondents in group 1 have a mobile that is equipped with WhatsApp and unpaid applications, and the communication can be more interactive and students are familiar with the application so that the acceptance of information about obesity is easily accepted by students. By providing education, this also has an effect because the more often children listen, read and see information about obesity and a healthy lifestyle, the better their knowledge will be.

The final measurement of the intake pattern of all respondents experienced a decrease in the average score of energy and carbohydrate intake compared to the initial measurement. The average energy and carbohydrate intake of all groups showed a decrease compared to the initial measurement and final measurement (T0-T6). This proves that the provision of health education using media can reduce energy and carbohydrate intake continuously and the use of booklet media is added with re-education through WhatsApp application can reduce energy and carbohydrate intake greater. In the analysis of each group found differences in groups 1,2 and 3 but there was no difference in group 4. Related research conducted by Kinard, in his research related to the effect of healthy food posting on consumer weight revealed that obese individuals are encouraged to build and maintain social network relationships with other people who regularly post healthy food pictures on their social media¹⁵.

Intake of energy and carbohydrates. Aside from being a source of energy, food is also needed to replace damaged body cells and growth. Problems will arise if the food consumed exceeds the need. Excess energy will be stored in the body. If this condition occurs continuously, it will cause accumulation of fat in the body so that the risk of being overweight. The mother's behavior of unhealthy food preference, such as consuming sweet foods or high-energy drinks, can affect a child's food intake to similar foods. This, when viewed from the respondent's family culture related to food supply, it was found that in all the majority groups had a culture that

supported the occurrence of obesity distributed in group 1 (100%), group 2 (90.9%), group 3 (100%) and group 4 (100%).

The difference (Δ) of the average BMI score of all groups showed a decrease compared to the initial measurement and the final measurement (T0-T6). Repeated Anova test results obtained p groups 1 and 2 ($p < 0.001$), group 3 ($p = 0.034$), group 4 ($p = 0.140$). This shows that there are differences in child BMI in groups 1, 2 and 3 while in group 4 there is no difference. The highest increase in the mean BMI score in group 1, then group 3, group 2 and the lowest was the score in group 4. The results showed that the provision of health education could change children's BMI to decrease. Health education can change children's knowledge which in turn affects attitudes and behavior especially in the pattern of food intake. Changes in dietary intake patterns will affect BMI as a measure of children's nutritional status, because dietary patterns and physical activity are part of the causes of obesity amongst children.

Along with the increased knowledge in children about obesity related to understanding, causes, effects, ways of preventing and handling obesity and healthy lifestyles related to food intake patterns, this has an impact on changes in food intake patterns between initial measurements and final measurements. Changes in knowledge before and after the intervention are in line with changes in dietary intake patterns (energy and carbohydrates). The results showed that the average changes in energy and carbohydrate intake scores decreased in the final measurements compared to the initial measurements.

CONCLUSION

There are differences in knowledge, intake patterns and BMI of overweight and obese children after intervention. The provision of health education using booklets plus re-education through WhatsApp application shows changes in knowledge, intake patterns and BMI compared to other media.

Conflict of Interest: Nil

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Ethical Clearance: This study has received an ethical approval from the Hasanuddin University Ethics

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REFERENCES

1. World Health Organization, UNICEF, UNFPA and The World Bank. Trends in maternal mortality: 1990 to 2010. World Health Organization, UNICEF, UNFPA, and The World Bank Estimation. 2012; 1-59.
2. Bibiloni MM., Pons A., and Tur JA. Prevalence of Overweight and Obesity in Adolescents: A Systematic Review. *ISRN Obese* 2013; pp 1 – 14.
3. MoH. Basic Health Research year 2007. National Report 2008: pp.1 - 384. Available from: <https://www.k4health.org/sites/default/files/laporanNasional%20Riskasdas%202007.pdf>
4. MoH. Basic Health Research year 2010. National Report 2011: pp.1 – 354. Available from: <http://kesga.kemkes.go.id/images/pedoman/Riskasdas%202010%20Nasional.pdf>
5. MoH. Basic Health Research year 2007. National Report 2014: pp.1 – 306. Available from: <http://www.depkes.go.id/resources/download/general/Hasil%20Riskasdas%202013.pdf>
6. Faizah Z. Risk factor of obesity among school children aged 6 to 7 years old in Semarang. Thesis 2004.
7. DHO of South Sulawesi. Health Profile in South Sulawesi Province. Report of District Health Office of South Sulawesi Province 2013.
8. Notoatmodjo S. Public Health: Art and Science. Rineka Cipta 2007: Jakarta.
9. Liliweri A. Basics of Health Communication. Pustaka Pelajar 2007: Yogyakarta.
10. Raaff C, Glazebrook C, Wharrad H. A systematic review of interactive multimedia interventions to promote children's communication with health professionals: implications for communicating with overweight children. *BMC medical informatics and decision making* 2014; 14(1):1.
11. Erika KA. The influence of family empowerment modified model on the ability of family to control lifestyle and body mass index of overweight/ obese children in Makassar. Theses 2014.

12. Erika KA. The Effect of the Transtheoretical Model Approach Towards the Body Mass Index of Overweight and Obese Children in Makassar. *The Indonesian Biomedical Journal* 2014; 6(1):51-56.
13. Zulaekah S. The effectiveness of nutrition education through booklet on nutritional knowledge of school age children. *Jurnal Kesehatan Masyarakat* 2012; 7(2).
14. Park BK, Nahm ES, Rogers VE, Choi M, Friedmann E, Wilson M, et al. A Facebook-Based Obesity Prevention Program for Korean American Adolescents: Usability Evaluation. *J Pediatr Health Care* 2017; 31(1): 57-66. PubMed PMID: 26952300. Epub 2016/03/10. eng.
15. Kinard BR. Insta-Grams: The Effect of Consumer Weight on Reactions to Healthy Food Posts. *Cyberpsychol Behav Soc Netw* 2016 Aug; 19(8):481-6. PubMed PMID: 27494330. Epub 2016/08/06. eng.

Effectiveness of a Structured Teaching Programme on Knowledge Regarding Food and Water Borne Diseases among School Children

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ABSTRACT

Purpose: To assess the effectiveness of a structured teaching programme on knowledge regarding food and water borne diseases and its prevention among upper primary school children in selected schools in Kochi.

Method: The research design of the study was Quasi experimental, pre test post test control group design. The sampling technique was convenience sampling. There were 100 students selected from two schools in which 50 subjects each in experimental and control group. Data was collected with the help of a structured knowledge questionnaire to assess the level of knowledge and the demographic details. The analysis was done by using frequency, percentage, chi-square and paired t-test.

Results: The findings showed that the mean post test knowledge score 23.96 of children in the experimental group was significantly higher ($p < 0.05$) than the pre test knowledge score of 13.96. Similarly the mean post test 23.90 knowledge score of upper primary school children in the experimental group was significantly higher ($p < 0.05$) than the mean post test knowledge score of 11.66 of control group. There is significant association ($p > 0.05$) between knowledge score and sex of the children. The structured teaching programme regarding food and water borne diseases and its prevention was found to be effective in improving the level of knowledge of school children.

Conclusion: The study depicts the importance of implementing structured teaching programmes for upper primary school children on various topics as it would help to improve knowledge and follow healthy practices, through which the children can build up a healthy generation.

Keywords: Food and waterborne diseases, School Children, Teaching Programme, Knowledge

INTRODUCTION

Children are considered as the budding roses in a garden, to flourish them fully, adequate care and protection from the entire harmful environment is required.

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Children are the vulnerable group for developing various infectious diseases because of unhealthy habits and thereby consumption of contaminated food and drink¹. Some of the major diseases transmitted through the consumption of unsafe water are Diarrhoea, Dysentery, Hepatitis A, Hepatitis C and Typhoid. Suhakar was reported a study of case reports for two years in a referral hospital in Hyderabad and most of the outbreaks (88%) of water borne diseases were found to involve 2-10 persons. About 52% of them were below 14 years of age, and also the seasonal characteristic outbreak was occurred in summer due to the consumption of unhygienic food items¹.

According to WHO, the global incidence of food borne disease is difficult to estimate, but it has been

reported that 1.8 million people died from diarrheal diseases in 2005. A great proportion of these cases can be attributed to contamination of food and drinking water².

Srinivasa Chakrapani reported that water scarcity in India is widespread in all states. Around 65% of schools lack drinking water facilities. The toilets are found in neglected condition in 75% of schools. The statistics also says that 60,9500 children die from poor hygiene in India which is the highest in the world³.

According to a report from India's Planning Commission, major efforts to improve the access to drinking water across India have not been matched by a proportionate decline in death and illness due to waterborne diseases. Between 400,000 and 500,000 under five children die each year from diarrhea, citing a failure to improve personal and home hygiene as a factor. The data in the report indicated that the incidence of viral hepatitis is 12 cases per 100,000 people⁴.

A longitudinal study was conducted in Kerala by Thayyil Jayakrishnan, Thomas Bina, Kuniyil Vidya, Biju George, Bhaskar Rao, Selvam Paramasivam including 1459 persons from 300 households as study subjects. Water samples were collected and analysis was done. During the 12 months follow up period 72 episodes of water borne disease were reported with an incidence rate of 49/1000 person. Dug wells were the major household water sources (93.3%) and up to 30% water sources contain indicator bacteria *Escherichia coli*, and more than 60% water sources contain *Fecal coli* from >10MPN/100 ml in all the seasons. Stagnant water at their premises was found to be associated with WBD (RR=3.58, 95% CI 1.90 -6.73, P=0.01) and proximity within 15meters from the septic tanks was found to be associated with increased incidence of WBD (RR=2.2, 95%CI 1.00- 4.63, P=0.04)⁵.

A case control study was conducted by Ramakrishnan to identify the source of infection during the outbreak of Cholera in West Bengal. In total 197 patients were identified among 5910 residents. The outbreak was due to a contaminated municipal piped water supply and *Vibrio Cholera* was the causative organism. Apart from that 82% of the population are at attributable risk percentage for cholera⁶.

The purpose of this study was to identify the knowledge of children about the various food and water borne diseases as well as the effectiveness of a teaching programme to improve their knowledge on the same.

MATERIALS AND METHOD

Setting: The study was conducted at St. Joseph's U.P.S. Koonammavu and St. Francis School, Pizhala, Kochi, Kerala.

Study design: Quasi experimental, pretest posttest control group design.

Tools:

1. Semi Structured Knowledge Questionnaire:

Section A: Demographic Data of the Child

Section B: Structured Questionnaire to assess the Knowledge of Children. Includes 30 items with total score of 30. Level of knowledge is categorised as good (20 /above), Average (10-19), Poor (0-9). Reliability of the knowledge questionnaire was 0.7, by split half method.

Sampling and sample size: Convenience sampling technique. Sample size was 50 in each group.

Inclusion criteria

Children between 10 to 11 years.

Children who can read and write Malayalam.

Exclusion criteria

Children who have learning difficulties/Autism.

Data Collection procedure

Experimental group: The pre test for 30 minutes was carried out with the questionnaires, section A and B. One hour session on the topic was given by the researcher with audio visual aids on the second day. A post test was administered on the sixth day.

Control group: Pre test was carried out with the same questionnaire on the sixth day. Comparison of pre test and post test was done thereafter. The data collection was carried out over a period of four weeks.

RESULTS

Table 1: Distribution of subjects based on demographic characteristics

(n = 50)

Sl. No.	Demographic Variables	Experimental (n = 50)		Control (n = 50)	
		Frequency	Percentage	Frequency	Percentage
1.	Age				
	a. 10 years	11	22	28	56
	b. 11 years	39	78	22	44
2.	Sex				
	a. Male	21	42	25	50
	b. Female	29	58	25	50
3.	Waste Disposal				
	a. Burning	39	78	47	94
	b. Dumping	11	22	3	6
4.	Source of Drinking water				
	a. Tap water	29	58	41	82
	b. Rain water	1	2	6	12
	c. Borewell	1	2	2	4
	d. Well	19	38	1	2
5.	Type of Drinking water				
	a. Filter water	9	18	13	26
	b. Boiled water	30	60	31	62
	c. Unboiled water	11	22	6	12
6.	Drainage				
	a. No	29	58	42	84
	b. Yes	21	42	8	16

Table 1 shows that majority of the subjects in the experimental group 30(78%) belongs to 11 years and in control group were 10 years, 21(42%) were males in experimental group. Regarding the waste disposal, 39(78%) in experimental and 46(92%) in control group following burning method. Tap water is used for the

Table 3: Comparison of pre test and post test knowledge scores of experimental group.

(n = 50)

Knowledge	Mean	SD	Mean Score%	Mean Difference	't' value
Pre test	13.96	3.14	27.92	19.88	15.39***
Post test	23.90	4.32	47.80		

T(49) = 3.52, ***significant at p < 0.001

drinking for most of the family and about 20(40%) and 19(8%) of subjects in experimental group consume unboiled water. Most of the subjects did not have drainage facility at home, 20(40%) in experimental and 8(16%) in control group had previous knowledge about food and waterborne diseases.

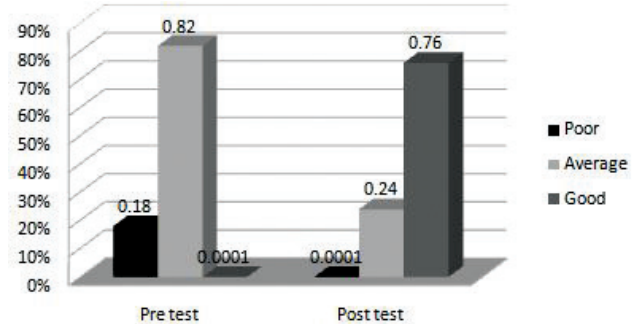


Fig. 1: Pre test and Post test knowledge of the children in the experimental group.

Fig.1 shows that 8(16%) of subjects in the experimental group had poor knowledge and 42(84%) had average knowledge before the intervention. Whereas after the intervention, the knowledge level of subjects were increased, 38(76%) of subjects in experimental group acquired good knowledge and 12(24%) of them have average knowledge.

Table 2: Areawise knowledge score of subjects in the experimental group.

(n = 50)

Knowledge	Pre test		Post test		t' value
	Mean	SD	Mean	SD	
Predisposing factors	2.86	1.21	5.64	1.14	10.47***
Transmission of disease	4.94	1.64	8.64	1.75	11.26***
Prevention	6.13	2.01	10.59	1.88	10.86***

t(49) = 3.52, *p < 0.001, ***significant at 0.001 level

The table 2 shows that there is an improvement in all the areas, the calculated test statistics values are higher than the table value 3.52, the null hypothesis has to be rejected and the alternative hypothesis is accepted. The mean post test knowledge score of the children is significantly higher than the pre test score.

The mean pretest score is 13.96 and the mean post test score is 23.90. A paired t-test is used to compare the pretest and posttest scores. As the calculated test statistic value is 19.88 which is higher than the table value of 3.52, H_{01} has to be rejected and the alternative hypothesis is accepted. The mean posttest knowledge score of children in experimental group is significantly higher than the pre test knowledge score.

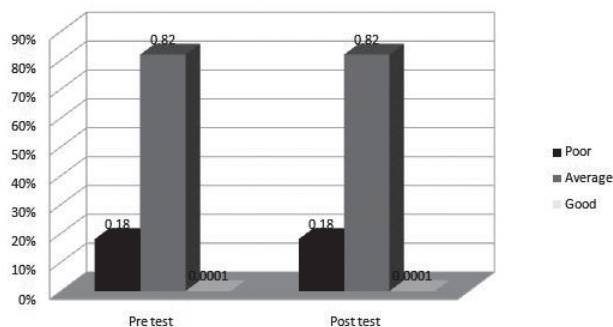


Figure 2: Pre test and Post test knowledge score of children in the control group.

(n = 50)

Fig. 2: shows 9 (18%) of subjects in control group had poor knowledge, 41(82%) of them had average knowledge.

Table 4: Comparison of pre test and Post test knowledge scores of control group

(n = 50)

Knowledge	Mean	SD	Mean Score %	Mean Difference	't' value
Pre test	11.76	2.16	23.52	0.20	1.41 ^{ns}
Post test	11.66	2.15	23.32		

t(49) = 2.01, p = < 0.05, ns- non significant

The mean pre test knowledge score is 11.76 and the mean post test knowledge score is 11.66. A paired 't' test is used to compare the pretest and posttest knowledge scores. As the calculated test statistic value 1.41 is lesser than the table value of 3.52, H_{02} is accepted and the alternative hypothesis is rejected.

Table 5: Comparison of post test knowledge scores of the two groups

(n = 50)

Parameter	Mean	SD	t	df
Experimental	23.90	4.32	17.49***	98
Control	11.66	2.15		

T(98) =3.39, ***significant at p<0.001

The mean posttest knowledge score in experimental group is 23.90 and in control group is 11.66. An independent 't' test is used to compare the posttest knowledge score of both groups. As the calculated test statistic value of 26.40 is higher than the table value of 3.39, H_{03} is rejected and accepting the alternative hypothesis. The mean posttest knowledge score of the children in experimental group is significantly higher than the posttest knowledge score of control group.

Association of pretest knowledge of experimental group and selected demographic variables.

The association of pretest knowledge score of children in experimental group with selected demographic variables. There is an association between sex of the children and the knowledge score hence H_{05} is rejected, whereas all the other demographic variables did not have any association with the knowledge scores of children, so H_{04} is accepted.

DISCUSSION

Objective 1: Identify the pretest knowledge of children regarding food and water borne diseases and its prevention.

The objective was met with the help of a pretest. Out of the 50 subjects in experimental and control group no one got score of more than 66%. Most of the subjects were in the average category with 30% - 63% and eight in experimental and nine in control group who were in poor category, with less than 30%.

The findings of the study is similar to a study conducted by Kumiko that the risk of diarrhoea is more in children whose mothers preparing food in an unhygienic manner. The study was conducted with a sample of 206 mothers in Viet Nam in 2009⁷.

Objective 2: Assess the posttest knowledge regarding food and water borne diseases and its prevention among children in experimental and control group.

The study shows that the mean posttest knowledge score of experimental group is 23.90 is higher than the pretest knowledge score.

A cross sectional study was conducted by Rizwana Riaz among residents of Rawalpindi and Islamabad in which 55 individuals were included by convenience sampling. Among them 59% of them were used domestic water disinfection techniques by following information attained from campaigns⁸.

On the other hand the posttest knowledge score of subjects in control group is 11.66 and there was no difference in knowledge level of children in control group in posttest. Most of them obtained same score of pretest in the posttest.

Objective 3: Compare the pretest and posttest scores of the school children in experimental and control group.

A paired t' test was used to compare the pretest and posttest scores. The mean pretest knowledge score of experimental group was 13.96 and post test score was 23.9. The calculated statistical t' value showed that the result is highly significant($p < 0.001$).

A paired t' test was used to compare the pretest and posttest knowledge scores of control group. The mean pretest score was 11.76 and posttest score was 11.66. The calculated statistical t' value showed that the result is not significant($p < 0.05$).

Objective 4: Compare the posttest knowledge scores of the children in experimental and control group.

The mean posttest score in experimental group is 23.90 and in control group is 11.66. An independent t' test is used to compare the posttest score of experimental group and posttest score of control group. The calculated statistical t' value showed that it is significant($p < 0.05$).

A study by Rahul among food handlers in Delhi in order to assess the change in knowledge, attitude, and self reported hand washing practices among 136 subjects, 3 months after providing them health education. Significant increase in knowledge about hand hygiene measures, namely washing hands before handling food (23.5% to 65.4%) and keeping nails cut and clean (8.1% to 57.4%) was observed⁹.

Objective 5: Find Association Between Knowledge and Selected Demographic Variables of school children.

The majority of the respondents being in the age group of 11 years 61% and 39% children were 10 years. Regarding the qualification of the parents, 67% of them had primary education whereas 27% of them were completed secondary education. The study shows that there is significant association between knowledge scores and the sex of school children.

CONCLUSION

The study depicts the need and importance in implementing various teaching programmes for school children on various topics as it would help to improve knowledge and follow healthy practices, through which the children can build up a healthy generation.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Considerations: The research proposal was presented before the Research Committee of Amrita College of Nursing. Obtained Ethical clearance certificate from the Thesis Protocol Review Committee of Amrita Institute of Medical Sciences. Obtained permission from the Heads of the schools. Written Informed consent was obtained from each parent of the participants.

REFERENCES

1. Gupta C P, Bhat R V, Sudhakar P, Rao. A study of recorded cases of foodborne diseases at Hyderabad. *Journal of Tropical Med Hygiene*. 1989;92(5):320-324.
2. WHO fact sheet. Food safety and food borne illness. 2007;237.
3. Srinivasa Chakrapani. Water shortage in India and diseases caused. Ananthapuri.com. 2010 Source: <http://Ezine Articles.com/>
4. Indian planning Commission. Water supply and sanitation. *BMJ*, 2003 June;vol.326.
5. Thayyil Jayakrishnan, Thomas Bina, Kuniyil Vidya, Biju George, Bhaskar Rao, Selvam Paramasivam. Relation of Sanitary Conditions of Water Sources and Water Borne Diseases in Rural House Holds of South India. *The Journal of Community Health Management*. 2016 April-June;3(2):80-86.
6. Mridha P, Biswas AK, Ramakrishnan R. The 2010 outbreak of Cholera among workers of a jute mill in Kolkata, West Bengal, India. *Journal of Health, Population and Nutrition*. 2011 Feb;29(1):9-13.
7. Yuko Chonan, Kumiko Takanashi. Survey of food hygiene practices at home and childhood diarrhoea in Viet Nam. *J Health Popul Nutr*. 2009 Oct; 27(5): 602-611.
8. Abdus Sattar Chaudhry, Abda Sultana, Rizwana Riaz. Relationship of Drinking water with water related diseases in Rawalpindi and Islamabad. *RMJ*. 2010;35(2):231-233.
9. Rahul Malhotra, Panna Lal. Evaluation of a Health Education Intervention on Knowledge and Attitudes of Food Handlers Working in a Medical College in Delhi, India. *Asian Journal of Public Health*. 2008 Oct;20(4):277-286.

Stakeholder Analysis of Active Alert Village Program for Sustainability of Public Health Empowerment in Ogan Ilir District

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ABSTRACT

Active alert village program is one of Indonesian government's health promotion efforts involving various stakeholders. The aim of this research was to analyze stakeholders' understanding of active alert village program in Ogan Ilir district. This research used qualitative approach with 29 informants. The results indicated that majority of the stakeholders understand well concerning active alert village in accordance with the guidelines of the Indonesian Ministry of Health but informants from communities as the target of this program did not well understand the program. All stakeholders stated their support in implementing this program because it has positive benefits to understand community health problems. The stakeholders were aware of the importance of cooperation amongs cross-sectoral parties. Stakeholders from local government and health office have the power to mobilize efforts to implement and develop active alert villages due to work authority. Improving good communication and coordination among stakeholders needs to be conducted to create same perceptions.

Keywords: *stakeholders, health promotion, active alert village*

INTRODUCTION

The active alert village program, a health program that has been implemented since 2010, has overcome health problems and contributed to the improvement of community health outcomes. The concept uses community-based health efforts (UKBM) to engage communities and enhance community empowerment. In 2011, the development of alert villages in Ogan Ilir District has not fully utilized UKBM^[1].

The preliminary policy on the implementation of the alert village program was established in 2006^[2]. The policy was then accelerated into active alert village^[3]. Furthermore, Indonesian Ministry of Health targeted that the coverage of active alert villages in 2015 were 80%^[4].

The Health Profile of Ogan Ilir District indicated that in 2014 active alert villages were 76.34% (184 villages from 241 villages) and no village was categorized as

independent (Mandiri) category^[5]. Implementation and development of active alert village program in Ogan Ilir district requires strong support of local government. The sustainability of this program is highly dependent on the support of local stakeholders and resource availability, such as adequate health personnels, facilities, infrastructures and focus on empowering communities. Therefore, a stakeholder analysis needs to be conducted for stengthening program implementation in the future.

MATERIALS AND METHOD

This was a qualitative research conducted in three subdistricts of Ogan Ilir district including: Indralaya Utara, Sungai Pinang and Tanjung Raja. The informants were stakeholders of active alert village program at the district/subdistricts/villages level. Primary data were collected through in-depth interviews and direct observation. Secondary data on active alert village program were obtained from documents/reports produced by various relevant agencies. A total of 29 informants were selected using purposive methods based on suitability and adequacy of information referring to Indonesian Ministry of Health's general guideline on active alert village program. Data were analyzed using content analysis.

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FINDINGS

Characteristics of informants

Table 1: Characteristics of Informants

Representatives of...	Interviewed (n)	Sex (Male/Female)
Facilitator at district level(SA)	1	M
Health office(WP)	1	F
District working group(BR)	1	M
Subdistricts government: Tanjung Raja(MC), Indralaya Utara(YA)	2	M,F
Alert villages forum: Indralaya Utara(HA), Tanjung Raja(EY), Sungai Pinang(PA)	3	F,F,F
Health centers: Tanjung Raja(RK), Sungai Pinang(FB), Payakabung(DR)	3	F,M,F
Villages government: Tanjung Raja(SY), Sungai Pinang(LS), Payakabung(FR)	3	M,F,M
Villages consultative board: Tanjung Raja(MA), Sungai Pinang(HK), Payakabung(JH)	3	M,M,M
Health volunteers: Tanjung Raja(SM,NM), Sungai Pinang(LI,ZA), Payakabung(RH,YT)	6	F,F,F,F,F,F
Residents:Tanjung Raja(SR,SO), Sungai Pinang(NU,SB), Payakabung(SL,SD)	6	F,F,F,M,F,F

The study had a total of 29 informants, the majority of who were female.

Implementation of Active Alert Village Program in Ogan Ilir District: Administratively, Ogan Ilir district is located in South Sumatera Province in Indonesia that consists of 16 subdistricts covering 227 villages and 14 urban villages. The implementation of active alert

village program in Ogan Ilir district is based on Decree of the Ogan Ilir Regent No. 112/KEP/KES/2011^[6].

The human resources for implementing this program are under the coordination of Health Promotion Unit of Ogan Ilir district health office which consists of 6 people. At the village level, the program is supported by 23 village midwives and 760 health volunteers. The program is funded by district budget (APBD) allocated to the Health Promotion unit. Health centers are responsible for the development of active alert villages in their working areas. They are funded by health operational funding (BOK). In addition, self funding managed by the village was also one of sources of funding for the program^[3]. Activities that have been implemented in this program include: health service at village health posts (Poskesdes) and at integrated health posts (Posyandu), monitoring of health problems in the villages and surrounding environment through community self survey (SMD) and village community consultation forum (MMD) as well as environmental sanitation.

Stakeholder Analysis of Active Alert Village Program in Ogan Ilir District: Policy is often thought of as decisions taken by those with responsibility for a given policy area^[7]. Policy is implemented through laws, regulations or other government enforced rules, or funding arrangements^[8]. A policy analysis framework was developed specifically for health^[9]. The framework describes that health policy research focused largely on the content of policy, actors, context and processes and how actors or stakeholders have central role then are interacted to three other variables to shape policy-making.

In reality, actors are influenced (as individuals or members of groups or organizations) by the context within which they live and work^[7]. Other concepts defined that stakeholders are actors (persons or organizations) with a vested interest in the policy being promoted^[10] and stakeholders as any group or individual who can affect, or is affected by, an organisation or its activities^[11].

A. Analysis of stakeholders' knowledge :

Knowledge is all that has been learned^[12] and health knowledge is linked to the awareness, motivation, and competence of people in accessing, understanding, appraising, and applying health information^[13]. With good enhanced health knowledge, it is hoped that people will behave

well in prevention of a disease. Based on the results of in-depth interviews, stakeholders' knowledge were quite good.

"...villages where people have the readiness of resources and willingness to prevent health problems."(DR)

"...the government's efforts in dealing with health problems in the community such as maternal and infant mortality and malnutrition."(WP)

"The villages whose population is in health preparedness and have resources to overcome health problems in emergencies cases."(ZA)

"Villages where people have capabilities and willingness to prevent and solve health problems independently."(SB)

"A health program aimed to improve clean and healthy living behavior."(SY)

"A program with activities to overcome community health problems such as monitoring outbreaks and environmental sanitation."(SM)

"...villages where people are prepared for handling their health problems."(YA)

Based on document review in the health office and health centers, guidebooks were found along with leaflets/booklets of active alert village as socialization materials. Stakeholders of active alert village program in Ogan Ilir district are informed concerning active alert villages from various sources, the main way was from dissemination by the provincial and district health offices^[14].

Most of stakeholders understand that active alert villages are villages where people have readiness of resources, willingness and ability to prevent and overcome health problems in their villages independently. Previous study from Hill PS, *et.al*^[15] explored the evolution of creative concept 'siaga' in health programmes in Indonesia with an emphasis on community empowerment and ensuring basic health care, disease and lifestyle surveillance and disaster preparedness to local communities.

There were several local people who have not fully understood the concept of active alert village, as illustrated below.

"...I do not know much about alert village program."(HK)

"Mmmm... perhaps for immunization, babies weighing, monitoring of under nutrition babies, and measuring child growth."(NU)

"Oooh, a new health program, but I still do not understand much."(SR)

The level of knowledge on how each stakeholder defined active alert village is important in order to avoid misunderstandings that allow stakeholders to reject the policy implementation.

B. Analysis of stakeholders' position: No single individual/institution has full authority to manage the program on their own. Therefore dividing the tasks according to their capacity is one way to sustain the program. Collaboration among stakeholders is necessary to influence the benefits of the policy so that the success of the policy can be achieved^[16]. Majority of stakeholders mentioned benefits or positive impacts of the program implementation. This is stated by in-depth interviews quotes as follows:

"... all activities of active alert village are strongly supported. We are making coordination with village consultative board, village government, health centers, UKBM and family wealthy program (PKK)."(WP)

"I think it is important for us to support development of UKBM, public awareness of the environmental cleanliness, especially role of health centers."(MC)

"I do believe there is anything unsupported. This is our government program, must be supported."(SA)

C. Analysis of stakeholders' interest: Stakeholders' interest is usually based on their role in influencing or being influenced by the program. It is important to identify interests of stakeholders in anticipating the expectations of the different stakeholders from the project and preventing any real conflicts^[17]. As mentioned by previous research that stakeholders have a vested interest in a project for numerous reasons such as mission relevancy, economic interest, legal right, political support, health and safety, lifestyle, opportunism and survival^[18].

This research indicated that active alert village program in Ogan Ilir district has benefits for individuals and groups. This created stakeholders' interest.

“Benefit? Ummm...communities can know its health problems and prevention efforts.”(ZA)

“Yes the program has positive impacts to accelerate reducing MMR and IMR.”(YA)

“...villages are more independent in terms of health therefore people will be healthy.”(SM)

“People are fostered in health problems. Then it will improve health status.”(HA)

“...there is benefit such as personal satisfaction in dealing with health problems in communities.”(FB)

There were benefits received by the communities and health officers in term of understanding regarding health problems. On the other hand, the feeling of satisfaction felt by health officers in contributing to the program becomes a motivator to run the program well. It has been argued that job satisfaction is an emotional response accompanying actions or thoughts relating to work, whereas motivation is the process that activates behavior^[19].

At poskesdes Payakabung, health volunteers and local people were actively planting family medicinal plants (TOGA) in poskesdes yard. It is the real contribution of several stakeholders related to efforts to live healthy. Contribution from supportive stakeholders are necessary to carry out a project successfully^[20].

D. Analysis of potential of stakeholders’ alliances:

In implementing active alert village program, stakeholders have potential to make alliances with other individuals or organizations.

“Making cooperation with subdistrict government, health centers, PKK and also public figures.”(SY)

“... eemmm mutual alliance among community leaders, health volunteers and heads of village.”(FB)

“We cooperate with heads of village, village midwives, local people, and health volunteers.”(RH)

The stakeholders recognize the importance of cooperation or alliances with subdistrict government, health centers, PKK, public figures, community leaders, health volunteers, heads of

village, village midwives and local people. This indicated that all stakeholders of both individuals and organizations support this program.

The success of the project depended significantly on forming effective partnerships and there were three factors to develop and maintain partnerships: building trust, problem solving, and open communication^[21]. According to Herald LR, *et.al.*(2012)^[22], alignment in an alliance context is critical for leveraging the unique knowledge, skills, and abilities of stakeholders in ways that can build capacity to improve the health of the community in ways that cannot be achieved independently by stakeholders.

The result of observation at poskesdes showed that the activity at poskesdes is held by the village midwives, accompanied by officers from health centers including health promotion and health service. Local heads of village sometimes provide financial support for activities held at poskesdes or posyandu. Alert village policy is effective if resources are well-supported and well prepared as well as comprehensively undertaken by cross-sectoral parties^[23]. Okello, ES, *et.al.*(2015)^[24] stated that partnership can create effective synergy if stakeholders are involved in a way that makes it possible for them to contribute their knowledge, resources, and skills.

E. Analysis of stakeholders’ power-leadership:

The ability of stakeholders to influence program implementation and development is called power. Power can be assessed based on financial incentives, technical expertise, and influential position and technical expertise, which is the simplest to improve in low-income countries^[25]. Majority of stakeholders in this research have leadership and power because of their position as local government officers who have oversee implementation of the program. Meanwhile, health volunteers and communities are passive participants who only receive the impact of what has been established and implemented from the program and they have no strong influence in initiating a policy change.

In the event of emergencies such as outbreaks, the public will report to the local health center then to be forwarded to the health office to respond to any health problems.

“... Once we have that information about disaster or emergency cases, we do not have to wait for the next day, so we are ready to respond in one-time twenty-four-hours. Health office will direct health officers at health centers and village midwives to respond it “(WP)

CONCLUSION

Stakeholder analysis of active alert village programs is important as a step in understanding the knowledge, position, interests, potential alliances and power of stakeholders. Good communication and coordination among stakeholders are essential to create similar perception and share equal role among stakeholders in pursuing the objective of the program. In addition, it is suggested to improve socialization by the central government to the communities and strengthen the participation of all stakeholders.

Conflict of Interest: None declared

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REFERENCES

- Misnaniarti, Ainy, A., Fajar, N.A., Study of the development of alert villages in Ogan Ilir District. *Health Service Management Journal*. Gadjah Mada University. Yogyakarta. 2011:14(02), 78-83.
- Decree of Indonesian Minister of Health No: 564/Menkes/SK/VIII/2006 regarding Implementation guidance of alert village development. Jakarta. 2006.
- Decree of Indonesian Minister of Health No: 1529/Menkes/SK/X/2010 regarding General guidance of active alert village development. Jakarta. 2010.
- Regulation by the Indonesian Minister of Health No: 741/Menkes/Per/2008 regarding Minimum service standard of health sector in district/municipality. Jakarta. 2008.
- The Health profile of Ogan Ilir District in year 2014. Indralaya. 2014.
- Decree of The Ogan Ilir Regent No: 112/KEP/KES/2011 regarding Establishment of alert village coordination forum in Ogan Ilir District. Indralaya. 2011.
- Buse, K., Mays, N., Walt, G., Making health policy: Understanding health policy. Open University Press, McGraw-Hill Education. 2005.
- Evans G., Manning N., Helping governments keep their promises: Making ministers and governments more reliable through improved policy management. Report no. IDP-187 South Asia Region- Internal Discussion Paper. 2003.
- Walt G., Gilson L., Reforming the health sector in developing countries: The central role of policy analysis, *Health Policy and Planning Journal*. 1994, 9.
- Schmeer, K., Guidelines for conducting a stakeholder analysis. Bethesda, MD: Partnerships for health reform, Abt Associates Inc. 1999.
- Partridge, K, Jackson, C., Wheeler, D., Zohar, A., The stakeholder engagement manual: The guide to practitioners’ perspectives on stakeholder engagement. Stakeholder Research Associates Canada Inc. 2005.
- Notoatmodjo, S., Health Promotion and Behavioural Science. Rineka Cipta. Jakarta. 2007.
- He, Z., Cheng, Z., Shao, T., Liu, C., Shao, P., Bishwajit, G., Feng, D., Feng, Z., Factors influencing health knowledge and behaviors among the elderly in rural China. *International Journal of Environmental Research and Public Health*. 2016:13(975), 1-16.
- Ainy, A., Budi, I.S., Qualitative study of stakeholders’ knowledge regarding alert village program in Ogan Ilir Regency. 2nd International Conference of Medical & Health Sciences and the Life Sciences Conference 2016. Yogyakarta. 2016.
- Hill, P.S., Goeman, L., Sofiarini, R., Djara, M.M., “Desa Siaga” The “Alert Village”: The evolution of an iconic brand in Indonesian public health strategies. *Health Policy and Planning Journal*. Oxford University Press. 2014:29, 409-420.

16. Putra, P.P.H., Arso, S.P., Wigati, P.A., Stakeholder analysis on policy of public health workers' registration in Semarang. *Public Health Journal (e-Journal) Diponegoro University*. 2017: 5(3), 33-38.
17. Mathur, V.N., Price, A.D.F., Austin, S., Moobela, C., Defining, identifying and mapping stakeholders in the assessment of urban sustainability. *International Conference on Whole Life Urban Sustainability and its Assessment*. M. Horner, C. Hardcastle, A. Price, J. Bebbington (Eds). Glasgow. 2007.
18. Waghmare, Y.M., Bhalerao, N., Wagh, S.V., Analysis of the factors affecting the stakeholder management process in building construction project. *International Journal of Innovative Studies in Sciences and Engineering Technology (IJISSET)*. 2016: 2(7), 48-56.
19. Tan, T.H., Waheed A., Herzberg's motivation-hygiene and job satisfaction in the Malaysia retail sector: Mediating effect of love of money. *Asian Academy of Management Journal*. 2011:16 (1), 73-94.
20. Jepsen, A.L., Eskerod, P., Stakeholder analysis in projects: Challenges in using current guideline in the real world. *International Journal of Project Management* 2009: 27, 335-343.
21. Chu, J.T.W., Chan, S.S., Stewart, S.M., Zhou, Q., Leung, C.S., Wan, A., Lam, T.H., Exploring community stakeholders' perceptions of the enhancing family well-being project in Hong Kong: A qualitative study. *Frontiers in Public Health*. 2017:5, 1-9.
22. Herald LR., Alexander, J.A., Beich, J., Mittler, J.N., O'Hora, J.L., Barriers and strategies to align stakeholders in healthcare alliances. *The American Journal of Managed Care*. 2012:18, 148-155.
23. Kusuma, R.M., Analysis of alert village policy in District Sleman, Yogyakarta. *Indonesia Journal of Health Policy*. 2013:02(03), 126-133.
24. Okello, E.S., Nankumbi, J., Ruzaaza, G.N., Bakengesa, E., Gumikiriza, J., Arubaku, W., Acio, C., Samantha, M., Matte, M., Gaps and gains from engaging districts stakeholders for community-based health professions education in Uganda: A qualitative study. *Perspect Med Educ* 2015:4, 314-322.
25. Fischer S., Larsen, M.S., Power and agenda setting in Tanzanian health policy: An analysis of stakeholder perspectives. *International Journal of Health Policy and Management*. 2016:5, 355-363.

Prevalence and Mycological Diagnosis of Dermatophytosis among People Living in the Coastal Community of Puducherry, India

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ABSTRACT

Background: Dermatophytes are fungi that affects people of all geographic areas. The current study aimed at the prevalence and laboratory diagnosis of dermatophytosis among people living in the coastal community of Puducherry for a period of one year.

Method: Clinical and mycological study of dermatophytosis was conducted on 356 cases from coastal areas of Puducherry. Direct microscopy (KOH mount), culture of samples on Sabourauds dextrose agar (SDA) and Dermatophyte test medium (DTM) was carried out.

Results: 139 out of 356 cases (39%) were positive by culture, 89(25%) were positive by KOH and 141 (39.6%) were positive by either microscopy / culture on SDA and DTM. *Tinea corporis* 107 (30.1%) and *Tinea unguium* 82 (23.1%) being the most common presentation in this population whereas *Tinea pedis* 10 (2.8 %) and *Tinea faciei* 8 (2.2%) being the least encountered clinical condition. *Trichophyton mentagrophytes* 60(43.2%) was the most frequent pathogen isolated followed by *Trichophyton rubrum* 47 (33.8%). Out of 25 (7.0%) Cases whose culture was positive and direct microscopy KOH did not yield a positive result.

Conclusion: To conclude the dermatophytosis being a disease of lower socio economic population causes greater annoyance as many a time people living in coastal community are more involved in outdoor manual labor. Hence it's mandatory to create awareness in this population regarding its prevention. This study also signifies the importance of mycological findings by both direct microscopy and culture along with clinical diagnosis for the specific detection of dermatophytosis.

Keywords: *Dermatophytosis, coastal community, mycological findings. Tinea infections.*

INTRODUCTION

Cutaneous fungal infections in human are a wide variety of disease and has increased worldwide. The majority of these infection are caused by keratinophilic fungi dermatophytes ¹. The dermatophytes are a group of closely related fungi that have the capacity to invade and degrade the skin, hair, nails commonly referred

as 'ringworm' ². Dermatophytes are differentiated up to species level mainly based on the microconidia, macroconidia and the diseases caused by them are classified based on the site involved. Dermatophytosis has been found to be more common in adults and adolescents with up to 20% of the population getting infected ^{3, 4}. Dermatophytes are few fungi causing communicable diseases and are slow growers compared to other pathogenic fungi. Dermatophytes causes redness, burning, itching and drug resistant lesions ⁵. Dermatophytosis is not life threatening in healthy individuals, it is of major concern in immunocompromised individuals and in many cases it is recurrent, hard to cure and long lasting ⁶. Depending on the body site affected and the etiological agent's symptoms of dermatophytosis

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vary from chronic to highly inflammatory lesions⁴. Dermatophytic infections are often confused with other skin disorders hence early laboratory diagnosis is essential for the better management of the condition⁷. Skin infections caused by dermatophytes are a serious problem worldwide mainly due to poor sanitation and lack of education⁸. The distribution of dermatophytes varies mainly based on the geographical pattern. *Trichophyton rubrum* and *Trichophyton mentagrophytes* are the commonly isolated dermatophytes in Asia^{2,9}. *Tinea capitis* has been reported to be higher in developing countries. Whereas *Tinea pedis* and onychomycosis has been reported more in developed countries¹⁰. Despite its high prevalence in tropical countries very few studies have been done among coastal population of Puducherry besides the people living in coastal areas are economically and socially marginalized. Puducherry Union Territory situated in the tropical regions with hot and humid climatic conditions in association with poor hygiene plays a vital role in growth of dermatophytes¹¹. Hence the present study was undertaken to determine the prevalence of dermatophytosis among people living in the coastal community of Puducherry visiting our tertiary care center.

METHOD

A cross sectional study conducted during April 2015 to March 2016 in the department of Microbiology, SLIMS, Puducherry. A total of 356 patients living in coastal areas clinically diagnosed with dermatophytosis in all age groups and of both sexes were included in the study. Patients were excluded from the study if they were on any antifungal therapy within the previous three weeks. The nature of the study was explained and then written consent was obtained from the patients. Medical history, clinical history and clinical material was obtained from the patients with various types of dermatophytic infection who were enrolled in this study. Skin scrapings, nail clippings and hair was collected from the affected area after sterilization³. Direct microscopic examination was done in 10% KOH wet mount. After direct microscopic examination, irrespective of demonstration of fungal elements, the specimen was inoculated onto SDA and DTM. The growth was identified based on colony morphology and microscopic examination of culture for the presence of hyphae and other accessory structures of vegetative hyphae such as microconidia and macroconidia. Urease test was done for the identification and to differentiate various genera and species of dermatophytes^{3,12}.

RESULTS

In the present study mycological diagnosis and prevalence of dermatophytosis was done among the coastal population of Puducherry. Of the 356 dermatophytic cases from coastal community of Puducherry 139 (39.0%) were culture positive cases and 217 (61.0%) were culture negative (Table no: 1). Among the clinical types *Tinea corporis* 107 (30.1%) was the most common dermatophytosis in this population followed by *Tinea unguium* 82 (23.1%), *Tinea capitis* 68 (19.1%), *Tinea barbae* 42 (11.8%), *Tinea cruris* 26 (7.3%) and *Tinea manuum* 13 (3.6%). *Tinea pedis* 10 (2.8%) and *Tinea faciei* 8 (2.2%) was the least encountered clinical condition in this population (Table no: 2). Comparison of various clinical types and culture positive cases has shown higher culture positivity rate was observed in *Tinea corporis* 57 (53.3%) followed by *Tinea cruris* 13 (50%) and *Tinea barbae* 20 (47.6%). However lowest culture positivity was encountered for *Tinea capitis*, *Tinea faciei* and *Tinea pedis* 18 (26.5%), 2 (25%) and 2 (20%) respectively. In the present study the culture positivity rate for *Tinea manuum* was 4 (30.8%) and *Tinea unguium* was 23 (28%) (Table no: 2). The various dermatophytes isolated is listed in (Table no: 3). *Trichophyton mentagrophytes* was the most frequently isolated species 60 (43.2%) followed by *Trichophyton rubrum* 47 (33.8%), *Trichophyton tonsurans* 15 (10.8%), *Microsporum gypsum* 07 (5.0%), *Trichophyton verrucosum* 4 (2.9%), *Epidermophyton floccosum* 3 (2.2%) and *Trichophyton violaceum* 3 (2.2%). Out of 356 patients clinically diagnosed with dermatophytosis 139 (39.0%) were positive by culture on DTM, 137 (38.5%) was positive by culture on SDA, 89 (25%) cases was positive by KOH and 141 (39.6%) was positive by either direct microscopy KOH or culture on both SDA and DTM (Table no: 4). From (Table no: 5) it is evident that in 114 (32.0%) cases both KOH and culture were positive. In this study 2 (0.6%) was positive only by KOH and did not grow any dermatophytes by culture. In 25 (7.0%) cases were culture was positive and direct microscopy KOH did not yield a positive result. No laboratory evidence of fungal infection was seen in 215 cases (60.4%).

Table No. 1: Overall Prevalence of Dermaphytosis

Total number of cases	No. of culture positive cases (%)	No. of culture negative cases (%)
356	139 (39.0%)	217 (61.0%)

Table No. 2: Comparison of Various Clinical Types and Culture Positive Cases

Sl. No.	Clinical types	Number of cases (%)	Culture positive cases (%)
1.	Tinea corporis	107 (30.1 %)	57 (53.3%)
2.	Tinea unguium	82 (23.1%)	23 (28.0%)
3.	Tinea cruris	26 (7.3%)	13 (50.0%)
4.	Tinea capitis	68 (19.1%)	18 (26.5%)
5.	Tinea pedis	10 (2.8%)	02 (20.0%)
6.	Tinea manuum	13 (3.6%)	04 (30.8%)
7.	Tinea barbae	42 (11.8%)	20 (47.6%)
8.	Tinea faciei	08 (2.2%)	02 (25.0%)
	Total	356 (100%)	139 (39.0%)

Table No. 3: Dermatophytes Isolated From the Culture Positive Cases

Sl. No.	Dermatophyte Species	No. isolated	Percentage (%)
1.	Trichophyton rubrum	47	33.8
2.	Trichophyton mentagrophytes	60	43.2
3.	Trichophyton tonsurans	15	10.8
4.	Trichophyton violaceum	03	2.2
5.	Microsporum gypseum	07	5.0
6.	Epidermophyton floccosum	03	2.2
7.	Trichophyton verrucosum	04	2.9
	Total	139	100

Table No. 4: Comparison of positive cases by KOH and culture results of SDA and DTM

Sl. No.	Laboratory findings	Number (%) n = 356
1.	No. Of cases positive by KOH	89 (25%)
2.	No. Of cases positive by SDA	137 (38.5%)
3.	No.of cases positive by DTM	139 (39.0%)
4.	No. of cases positive by KOH, SDA & DTM	141 (39.6%)

Table No. 5: Comparison between culture and KOH in diagnosis of dermatophytic cases

Culture And Microscopic Findings	No. of cases	Percentage (%)
KOH positive and culture positive	114	32.0 %
KOH positive and culture negative	2	0.6 %
KOH negative and culture positive	25	7.0 %
KOH negative and culture negative	215	60.4 %
Total	356	100.0 %

DISCUSSION

Superficial fungal infections such as dermatophytosis are more common in the tropical regions. Although not life threatening spreads to other individuals, they have serious impact or debilitating effects on individual's quality of life, psychological and physical well-being. Moreover these infections could be diagnosed easily and readily treated¹². A total of 356 cases living in the coastal community of Puducherry visiting our tertiary care center clinically suspected with dermatophytosis were analysed to determine the prevalence of dermatophytosis. The overall prevalence of dermatophytosis by culture in the present study was 39.0%. The results of our study is well correlated with earlier studies carried out by Surendran KA et al., in 2014 and Jain S et al., in 2015^{13,14}. The results of our study was also found to be in close proximity with other studies carried out in India by several authors^{2,9,15}. Tinea corporis was the most common clinical manifestation reported in this population with 30.1% of cases which is in conformation with other studies^{2,15,16,17}. Tinea unguium was the second most common condition with 23.0% cases. The high occurrence of Tinea unguium in this population may be attributed to people living in coastal community more involved in fishing and fishing related activities mainly due to repeated mechanical trauma, more technical work performed with fingers and more exposure to moist conditions predisposes them to fungal nail infections¹⁸. Tinea pedis 2.8% and Tinea faciei 2.2% was the least encountered clinical condition in this population. Venkatesan G et al., in 2007 also observed a lower occurrence of Tinea pedis in their study, The authors opine that majority of the patients belonged to

lower economic groups who mostly walked barefooted¹⁶. The genus *Trichophyton* was the most common cause for majority of dermatophytosis which is in accordance with other studies^{2,3}. Tinea corporis and Tinea cruris were the two predominant clinical types which showed higher culture positivity. Preponderance in culture results of Tinea corporis, 53.3% was seen in the present study, was also encountered by Venkatesan G et al., in 2007¹⁶. From the different species isolated *Trichophyton mentagrophytes* was found to be the commonest etiological agent 43.2% followed by *Trichophyton rubrum* 33.8%, the findings are endorsed by earlier reports^{14,19}. Though Most of the reports published so far in India unequivocally, shows *Trichophyton rubrum* to be the most common dermatophyte isolated from various lesions followed by *Trichophyton mentagrophytes*, which is inconsistent with our study results^{11,16,17,20}. However, Karmakar S et al., 1995 encountered *Trichophyton violaceum* as the predominant dermatophyte followed by *Trichophyton rubrum*⁹. *Epidermophyton floccosum* and *Trichophyton violaceum* was the least isolated dermatophyte from various lesions in this study 2.2%. In our study demonstration of dermatophytes was more by culture on DTM compared to other methods which specifies that DTM serves to be a best method for isolation and demonstration of dermatophytes²¹. Culture is imperative for a correct and efficient laboratory diagnosis of Dermatophytosis and is undertaken in all mycological laboratories and remains the gold standard²², whereas KOH is considered simple, inexpensive, faster and effective²³. A report by Surenderan KA et al., 2014 has stated fungal culture may be helpful in identification of the species, but it is not essential for the diagnosis as it is not a sensitive test¹³. Mycological analysis revealed direct microscopic evidence of fungal infection by KOH in 25%, whereas by culture in 39% and by either microscopy/Culture in 39.6% which signifies the importance of both microscopy and culture in precise diagnosis of dermatophytosis²². Both KOH and culture positive result was seen in 32.0 % of cases in the present study as is comparable with that obtained in the study of Bindu V et al., in 2002¹⁵. These cases can be considered as true positives wherein probable fungal elements visualized on microscopy were confirmed by a positive culture which remains the gold standard. KOH negativity and culture positivity was seen in 7.0% cases and it is in par with most workers^{15,20}. The reason for this discrepancy could be due to the fungus being missed

in the KOH preparation. Use of Calcofluor white might have improved the rate of identification which was found to be Quick, reliable, more sensitive and specific than KOH mount²⁴ or Use of Parker Quink blue Ink method might have improved the rate of KOH positivity²⁵. Unfortunately this was not tried in our study.

CONCLUSION

The overall prevalence of dermatophytosis in this study was 39.0% which is of major discomfort for this underprivileged people of the society as they are more involved in outdoor manual labor in hot temperature and humid weather which is the characteristic of this geographical location. Moreover dermatophytosis being linked with socioeconomic standard of the population. People living in coastal community of Puducherry need to be educated or informed regarding the prevention of dermatophytosis. In the present study Tinea corporis and Tinea unguium was the most frequent clinical presentation and *Trichophyton mentagrophytes* being the most common isolate. Our study also suggests that practitioners in our region should make attempts for compulsory laboratory confirmation of dermatophytosis along with clinical diagnosis rather than economizing by purely relying on clinical diagnosis. This study also emphasis that conventional methods such as direct microscopy and Culture is essential for precise diagnosis of dermatophytosis. Dermatophyte test medium was found to be satisfactory for primary isolation of dermatophytes from various lesions.

REFERENCES

1. Dinesh Kaliyamoorthi. Prevalence of dermatophytic infection among Diabetic and Non Diabetic Patients in a Tertiary Level Hospital in Chennai, India. Int.J.Curr.Microbiol.App.Sci. 2018;7(06): 2516-2536.
2. Singh S, Beena PM. Profile of dermatophyte infections in Baroda. Indian Journal of Dermatology, Venereology, and Leprology. 2003 ;69(4):281.
3. Yadav A, Urhekar AD, Mane V, Danu MS, Goel N, Ajit KG. Optimization and isolation of dermatophytes from clinical samples and in vitro antifungal susceptibility testing by disc diffusion method. Research & Reviews: Journal of Microbiology and Biotechnology. 2013;2(3):19-34.

4. Degreef H. Clinical forms of dermatophytosis (ringworm infection). *Mycopathologia*. 2008;166(5-6):257.
5. Jyothilakshmi M, Jyothis M, Latha MS. Antidermatophytic and protease inhibiting activities of the rhizome of *Zingiber zerumbet* (L) Roscoe ex JE: Smith from central Kerala, India. *Int J Pharm Pharm Sci*. 2015;7:56-9.
6. Borgers M, Degreef H, Cauwenbergh G. Fungal infections of the skin: infection process and antimycotic therapy. *Current drug targets*. 2005;6(8):849-62.
7. Huda MM, Chakraborty N, Sharma JB. A clinico-mycological study of superficial mycoses in upper Assam. *Indian journal of dermatology, venereology and leprology*. 1995;61(6):329-32.
8. Desta B. Ethiopian traditional herbal drugs. Part II: Antimicrobial activity of 63 medicinal plants. *Journal of Ethnopharmacology*. 1993;39(2):129-39.
9. Karmakar S, Kalla G, Joshi KR, Karmakar S. Dermatophytoses in a desert district of Western Rajasthan. *Indian Journal of Dermatology, Venereology, and Leprology*. 1995;61(5):280.
10. Vinod Kumar. Dermatophytosis in Meerut. *Indian journal of pathology and Microbiology*. 1977;163-168.
11. Maulingkar SV, Pinto MJ, Rodrigues S. A clinico-mycological study of dermatophytoses in Goa, India. *Mycopathologia*. 2014 ;178(3-4):297-301.
12. Patel P, Mulla S, Patel D, Shrimali G. A study of superficial mycosis in south Gujarat region. *Natl J Commun Med*. 2010;1(2):85-8.
13. Surendran KA, Bhat RM, Bloor R, Nandakishore B, Sukumar D. A clinical and mycological study of dermatophytic infections. *Indian journal of dermatology*. 2014;59(3):262.
14. Jain S, Sharma V. Clinicomycological study of dermatophytes in Solan. *Int J Curr Microbiol Appl Sci*. 2015;4:190-3.
15. Bindu V, Pavithran K. Clinico-mycological study of dermatophytosis in Calicut. *Indian Journal of Dermatology, Venereology, and Leprology*. 2002; 68(5):259.
16. Venkatesan G, Singh AR, Murugesan AG, Janaki C, Shankar SG. *Trichophyton rubrum* the predominant etiological agent in human dermatophytoses in Chennai, India. *African Journal of Microbiology Research*. 2007;1(1):9-12.
17. Jain N, Sharma M, Saxena VN. Clinico-mycological profile of dermatophytosis in Jaipur, Rajasthan. *Indian journal of dermatology, venereology and leprology*. 2008 May 1;74(3):274-5.
18. Aman S, Haroon TS, Hussain I, Bokhari MA, Khurshid K. *Tinea unguium* in Lahore, Pakistan. *Medical mycology*. 2001 Jan 1;39(2):177-80.
19. Sharma R, Adhikari L, Sharma RL. Recurrent dermatophytosis: A rising problem in Sikkim, a Himalayan state of India. *Indian Journal of Pathology and Microbiology*. 2017;60(4):541.
20. Sen SS, Rasul ES. Dermatophytosis in Assam. *Indian journal of medical microbiology*. 2006 Jan 1;24(1):77.
21. Rich P, Harkless LB, Atilasoy ES. Dermatophyte test medium culture for evaluating toenail infections in patients with diabetes. *Diabetes care*. 2003;26(5):1480-4.
22. Robert R, Pihet M. Conventional methods for the diagnosis of dermatophytosis. *Mycopathologia*. 2008;166(5-6):295-306.
23. Kurade SM, Amladi SA, Miskeen AK. Skin scraping and a potassium hydroxide mount. *Indian Journal of Dermatology, Venereology, and Leprology*. 2006 ;72(3):238.
24. Dass SM, Vijayraj EV, Pavavni K, Pallam A, Rao MS. Comparison of KOH, calcofluor white and fungal culture for diagnosing fungal onychomycosis in an urban teaching hospital, hyderabad. *Indian J Microbiol Res*. 2015;2(3):148-53.
25. Karaman BF, Topal SG, Aksungur VL, Ünal İ, Ilkit M. Successive potassium hydroxide testing for improved diagnosis of tinea pedis. *Cutis*. 2017;100(2):110-4.

The Performance of Program Manager in Tuberculosis Case Detection Rate (Study at Public Health Center in Banjarbaru 2017)

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ABSTRACT

Tuberculosis (TB) is a global emergency and the burden of TB in the community is still very high. Progress since 2003 is estimated to contain about 9.5 million new TB cases, and about 0.5 million people die from TB. This study aims to analyze the motivation, training, incentives, and workload related to the performance of tuberculosis manager in TB case finding in Banjarbaru. The research used observational analytic with a cross-sectional design. The population in this study all the managers of the TB program in 8 public health centers, which are 6 managers in each public health centers. The result of correlation test showed that there was no significant correlation between the training of TB program managers and there was significant influence between motivation, incentive, and workload with the performance of TB program manager in Banjarbaru. The result of logistic regression test shows that there is a strong correlation factor to the performance of tuberculosis manager in the finding of tuberculosis case that the workload variable is more related to the performance of TB program manager, significant ($p = 0.039$). The Expected Beta (Exp. B) value of 1.078 where TB program managers who have a high workload, 1.078 times will have low performance.

Keywords: *motivation, training, incentives, workload, performance, manager, tuberculosis*

INTRODUCTION

Tuberculosis remains a major global health problem. In 1993, the World Health Organization (WHO) declared public health emergency TB globally, currently estimated at 7-8 million cases and 1.3-1.6 million deaths occur annually. In 2010, an estimated 8.5 to 9.2 million cases and 1.2-1.5 million deaths. Tuberculosis is the leading cause of second death from infectious diseases worldwide estimated at 1.8 million deaths in 2008. The number of new cases of diseases caused by the bacterium

Mycobacterium tuberculosis in 2010 was 8.8 million cases and the number of deaths due to TB is 1.1 million people, this number fell compared to the year 2009 ie 9.7 million cases.¹

The WHO states that TB is a global emergency for humanity. The DOTS strategy (Directly Observed Treatment Short-course) has proven to be very effective for TB control, but the burden of TB disease in the community is still very high. Progress since 2003 is estimated to contain approximately 9.5 million new TB cases, and about 0.5 million people die from TB worldwide.²

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Indonesia was the first country among the High Burden Country (HBC) in the South-East Asian region to achieve global TB targets for case detection and treatment success in 2006. In 2009 some 294,732 TB cases have been found and treated and more than 169,213 of them were detected AFB+. TB patients can spread to 10-15 people around within a year. TB disease

without treatment after 5 years, 50% of patients will die, 25% will heal themselves with high immunity and 25% as chronic cases that remain contagious.³

The National Strategy of the National TB Control Program 2015-2019 is the development of previous national strategies with several new development strategies to address larger targets and challenges, with TB Management, TB program management, comprehensive TB control.⁴ The effort of the program manager is carried out gradually in the public health center with the DOTS strategy recommended by WHO.⁵ The rate of finding new cases of smear-positive TB in Indonesia from 2010-2012 has exceeded the target set by the WHO by 70%.

Based on data obtained from Banjarbaru City Health Office 2016 from 8 public health centers in Banjarbaru got 1956 suspect with Positive TB 247 people from a total population of Banjarbaru as many as 241,369 people.⁶ Development of health human resources in Tuberculosis Control Program as a competent program implementer is required in the implementation of TB program.⁴

MATERIALS AND METHOD

This research uses the quantitative approach with observational analytic using a cross-sectional study design. The research will be conducted at the Public Health Center of Banjarbaru, Sungai Besar, Cempaka, Landasan Ulin, Guntung Payung, Banjarbaru Utara, Liang Anggang and Sungai Ulin. Research subjects who became respondents in this study were all managers of TB program in 8 health centers, each public health center has 6 people managing the program the number of population as many as 48 people.

FINDINGS

The motivation of the respondents analyzed includes responsibility, job dedication, commitment, rewards in work, and teamwork. It is known that from 43 respondents about the motivation of low program managers as much as 22 (51.2%) ie program managers feel have performed tasks in accordance with the authority (6.97%), has not carried out the responsibility (18.6%), lack of communication, skill, self-reliance and working relationship in duty (13.9%), (11.6%), according to the employment awards officer, job performance, low job promotion (16.2%), reward, and unsatisfactory income (23.2%).

The training on the respondents analyzed that from 43 respondents with untrained respondents as much as 16 (37.2%) related in the training items that were followed by the respondents only most of the basic training (16.2%), retraining and refreshing (11.6 %), advanced training on the job training (9.3%). From 43 respondents with low incentives of 20 (46.5%) related in item about according to officer giving bonus, incentive and incentive of team not yet according to requirement (20,9%), officer feel if incentive, bonuses not in accordance with the workload (13.9%), awards, promotions, and praise can increase morale (16.2%). From 43 respondents with a high workload of 26 (60.5%) related in items about duties and responsibilities felt by heavy officers (13.9%), dual jobs (16.2%), (9.3%), exhausted, saturated, many patients, poor nurses (11.6%), confused with task orders, unsuitable job competence and high work risk (6.9%).

Performance in the respondents analyzed included recording and reporting, targets and responsibilities, teamwork. It is known that from 43 respondents with low performance of 19 (44.2%) related in the items that respondents feel recording and reporting is still less appropriate (9,3%), target and responsibility not yet as expected (6,9 %), teamwork (16.2%), feel that they have done the initiative, according to skill, dexterous, always focus and spirit (11,6%).

The result of the Spearman Rank Correlation test between motivation variable and tuberculosis program performance obtained P-value = 0.045 (<0.05), so H_0 is rejected and H_a accepted. It shows there is a relationship between motivation and the performance of TB program managers.

It was obtained P-value = 0.230 ($\geq 0,05$) between training variables and tuberculosis program manager performance, so the performance of TB program managers who are not trained in their work has an average performance score of 2.219. This is lower when compared to the performance of TB program managers who are trained with work that has only an average performance score of 1.817. The result of correlation significance showed no significance. There is no positive relationship between training and TB program manager performance.

The result of the chi-square test with 95% confidence level, to see the relationship between incentives and the performance of tuberculosis program manager found

that, p -value = 0.018. From the p -value in the statistical test results obtained H_0 decision accepted ($p < 0.05$) which means there is a significant influence between incentives with the performance of tuberculosis program manager. OR results of 0.214 (95% CI 0.58-797), which means low incentives affect the performance of low TB program managers 0.214 times greater than respondents who have high incentives.

There is a relationship between incentives and the performance of TB program managers P -value = 0.018 (≥ 0.05). The significance of Pearson correlation value of 0.360 correlation > 0.05 is no correlation between incentive and performance. There is a positive relationship between incentives and the performance of TB program managers.

The result of the chi-square test to see the correlation between workload and tuberculosis program performance shows that p -value = 0.029 which means there is a significant relationship between the workload with the performance of tuberculosis program manager. OR results of 0.242 (95% CI 0.66-887), which means that high workload has a low TB program manager performance of 0.243 times greater than the respondents who have a low workload. The most respondents with high workload (41.8%) than low workload with low workload (25.6%).

In the multivariate test, only variable with a p -value less than 0.25 can enter modeling, that is variable that is an incentive and workload. The variable of workload, significant ($p=0.039$). The Expected Beta (Exp. B) value of 1.078 where TB program managers who have a high workload, 1.078 times will have low performance compared to TB program managers with low workload or light workload. The results of more closely related variables are incentives for TB program manager performance. The result of the analysis shows that the incentive variable is 4.97 (rounded to 5) means that respondents who get low incentive 5 times will have low performance compared to TB program manager with high incentive after controlled by motivation, training and workload variable.

DISCUSSION

Motivational variables have a relationship with officer performance this is because an officer having high motivation have a chance to have good performance.

This is in accordance with the results of research that states that people in carrying out their work is influenced by two factors that are needs, namely: Hygiene Factors, are the factors of maintenance associated with the nature of humans.⁶

Training variable has no relationship with the case finding of TB. There are some respondents who have never attended DOTS training at all. In fact, DOTS training is very important, because training is one of the efforts undertaken to improve the knowledge and skills of a person primarily in the discovery of TB patients. There are several things that are considered as an important aspect in addition to training and improvement of science to improve employee performance within an organization, among others; mutually supportive relationships and mutual trust must be developed, the organization and its members set specific and measurable objectives, skills should be developed, the experience of members in the work should be developed to turn into a positive experience.⁵

It is different according to Aditama, 2013 that there is a close relationship between training and the practice of TB suspect findings. The training concept in the TB program consists of pre-service training by incorporating the DOTS strategy TB control program material, and in-service training in the form of basic training in basic DOTS implementation, which is full training, where all material is given. Retraining, ie formal training conducted on participants who have attended previous training, but still found many problems in their performance, and not enough just through supervision. Refresher training is formal training conducted on participants who have attended the previous training for at least 5 years or there is a material improvement. On-the-job training (refresher training), which has attended previous training but still found problems in its performance, and simply overcome only by supervision. For advanced training, training means to gain higher program knowledge and skills, where the material differs from basic training.⁷

Training includes an individual character component, which is an important part of performance improvement, but training requires a large budget in its implementation so that training is rare and constrained by previously trained personnel who have mutated or moved programs. So that is done only the transfer of knowledge that has been obtained from the previous officer. Without training the officer can continue his

work well (Saomi, 2015). The training carried out by the officers is a more in-depth instructional effort. Training is one effort to increase the knowledge, attitude, and skill of the officer in order to improve the quality and performance of the officer. Training programs need to be well-organized for experienced personnel as well as for staff who have worked.⁶

The results of this study indicate, regarding the incentives received in the discovery of new cases, respondents said they have received incentives in the form of money. A good incentive system is a system capable of ensuring the satisfaction of members of the organization which in turn allows the organization to acquire, maintain and employ a number of people with positive attitudes and behaviors to work productively for the benefit of the organization. Rewarding should be associated with employee performance level, that is, with increasing rewards it will spur employees to achieve high levels of performance.⁸ High incentive officers stated that incentives with officer performance were found that there was no significant relationship between incentives and officer performance. The presence of officers who received incentives given less appropriate cause their performance is not optimal. Thus some of the officers feel less satisfied with the incentive policies they get so that they are low performers. TB officers who have good achievement and ability, but received less attention and support from the direct leadership of their achievements so that in carrying out their work without targets and only carry out activities of a routine nature only. TB officers were not compensated after carrying out TB case finding work so there was no appreciation for the achievement and ability of their work that was heavier than other employees.⁶

The workload is the responsibility of the obligation to be performed due to certain occupations as well as the responsibility. Workload affects the performance of a person in doing his job. Workers who have excessive workload will reduce the quality of the work and allow for inefficiencies of time. Managers should take into account the optimal level of the workload of employees. The workload is not only seen as a physical burden but as a mental workload.⁸

The respondents with high workload will affect the performance of the tuberculosis program manager. In this study, officers with high workloads stated that they have a double burden of work that many, concurrently

and do work in other programs, so that in doing the task just to fulfill the obligations that are charged only without any clear target and motivation, the officer feel tired, boredom, boredom with excessive work so that the minds and power dumped by the many tasks that must be run, this affects the performance of officers to perform basic tasks. The dual tasks of the TB officials caused the lack of attention of the officers in the TB program and also caused TB program managers to not focus on TB programs because of many other tasks that resulted in the lack of performance to be achieved.⁶

According to the results of this study incentive factors are strongly related to the performance of TB program managers and then incentive factors. The performance of TB program managers is actually many related factors besides factors in this research such as social factors, organization, knowledge, respondent characteristics (age, education, and gender), cross-sectoral cooperation, cross-program cooperation, cadres, public and others. Many things can relate to the performance of officers both from individuals and from the TB management environment in the case of TB.⁶

The results of this study are in line with the research conducted by Sujatmoko explaining incentives have a positive and significant impact on Performance. Incentives contain a professional relationship where one of the employee's goals of work is to get rewarded to meet various needs. Incentive programs pay an individual or group for what exactly they produce. Provision of Incentives that are more feasible and accepted by the manager because in accordance with the energy and ability issued and appreciate the hard work of tuberculosis program manager, then the manager will be more professional by working hard and make efforts to achieve better work results so that its performance can be more increased. With better performance will certainly advance the course of TB program.⁶

CONCLUSION

Motivation, incentives, and workload significantly related to the performance of tuberculosis management officers. The training was not significantly related. Factors that are strongly related are the workload.

Ethical Clearance: Before conducting the data retrieval, the researchers conducted a decent test of

ethics conducted at the Faculty of Medicine, Lambung Mangkurat University to determine that this study has met the feasibility. Information on an ethical test that the study is eligible to continue. The feasibility of the research was conducted in an effort to protect the human rights and security of research subjects.

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REFERENCES

1. World Health Organization. *Global Tuberculosis Control*. <http://www.who.int> accessed July 26, 2017.
2. Health Ministry of Indonesia. *The National Strategy on TB Control in Indonesia 2010-2014*. Jakarta: Ministry of Health Republic of Indonesia. 2011.
3. National Stop TB Strategy. *TB Control in Indonesia Year 2010-2014*. Directorate General of disease control and environmental sanitation. Jakarta: Ministry of Health Republic of Indonesia. 2011.
4. National Guidelines. *Tuberculosis Control*. Directorate General of disease control and environmental sanitation. Jakarta: Ministry of Health Republic of Indonesia. 2014.
5. Cory Febriana. Analysis of Case Management Tb BTA (+) In Tanah Datar Year 2013. *Journal of Human Care*. 2017. 1(2); 4-5.
6. Saomi. Individual Characteristic Relationship With Invention of Pulmonary Tuberculosis Cases in the Ex-Patient AchaY of 2013. *UJPH Unnes Journal of Public Health*. 2015. 4 (1); 15-22.
7. Aditama, et al. Evaluation of Lung Tuberculosis Control Program in Boyolali District. *Journal of National Public Health*. 2013. 7 (6); 243-250.
8. Anwar PM. *Human Resource Management*. Company. Bandung: PT Remaja Rosdakarya. 2009; 63.
9. Wijayanti RA. Management Factor Analysis at Alam Public Health Center Improve Tuberculosis Case Detection Rate. *Journal of Health*. 2016. 4(1).

Measure Effectiveness of Different Approaches of Patient Education in Rehabilitation Services

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ABSTRACT

Introduction: Patient education is an important aspect in rehabilitation area. Effective patient education can increase compliance of medical treatment regime and hence early recovery. The study was conducted as there is paucity of data with respect to effectiveness of different approaches to patient education in rehabilitation.

Objective: To measure effectiveness of different approaches of patients' education.

Materials and Method: This cross sectional and qualitative study were conducted among 345 adult patients who sought rehabilitation services from rehabilitation department at KAMC. Using purposive sampling method. Data were collected by using suitably standard questionnaire that was developed by Research Center of Stanford University School of Medicine with necessary modification to protect cultural sensitivity of Saudi Arabia and were analyzed by SPSS (version 22). Frequencies and percentages were used to analyze the data.

Results: Majority (78%) of therapists use practical aspect of patient education and was observed as most preferred type of patient education method as reported by the respondents (76.8%) followed by oral instructions (26.4%), videos/picture (15.9%) and handout (13.6%).

Conclusion: The different approaches followed in the hospital were handouts (written materials), video/picture, oral instructions and practical approach (demonstrations). The study indicated that practical aspects of patient education is most effective and most preferred practiced patient education approach in rehabilitation area.

Keywords: Patient education, Rehabilitation, Oral instructions, Videos/picture. Handout

INTRODUCTION

There are different approaches of educating the patients such as visual, auditory and kinesthetic approaches. The selection of a particular approach depends on the lifestyle and health condition of the patient. Engagement of patients in education rise their performance, satisfaction and coping skills⁴. Visual approach uses visual aids that can help the patients to make a picture in their mind about what they are being

taught⁸. For health care team charts, videos, pictures, even gestures and symbols to make the patient understand about his/her health management⁸. The visual approach can be accompanied with written description in simple language. Gagliano⁷ has discovered that visual approach, such as videos, has strengthen patients' knowledge and cooperation because it is a practical teaching technique, cheap and attracts audience attention⁷.

For auditory approach, patients were provided with health education verbally, so as to make them learn better as health education content is presented in active interaction between the therapists and patients⁸. Through auditory the therapists ask them to repeat what they heard or ask to say what they understand from the conversation⁸. According to an earlier study the verbal education combined with written materials had improved

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home care, reduced patient hospitalization and provided more effective information with respect to treatment⁹.

Kinesthetic approach is education by action and motion in front of the patients and ask them to do it and practice it¹⁰. In kinesthetic, the term usually refers to the position and movement, so it provides acuteness in kinesthetic identification of directions and awareness of task challenges⁶.

The variety of patient education methods and approaches depends on the individual performances of the patients, so that the patients can understand and remember easily by asking them which approach that they like to use for learning⁵. Barriers that might hinder patient education include age, cognitive and physical ability of patients and illiteracy². Elderly people often have many health problems such as low hearing and eye sight or cognitive problems like memory loss which prevent effective learning².

Therefore, individuals need to be assigned to education program, before discharging, to gain knowledge and feedback about their conditions, and assess patient and family’s understanding and skills for self-care⁵.

MATERIALS AND METHOD

The research was conducted in rehabilitation department in King Abdul-Aziz Medical City (KAMC), Riyadh, KSA, under the ministry of National Guard health affairs.

The Study Subjects were patients who seek rehabilitation services from rehabilitation department at KAMC and KASCH formed the respondents of the current study. The inclusion and exclusion criteria for selecting the respondents are given below:

Literate adult females and males in the age range of 18 to 60 years. Those having normal cognitive level. Those who are willing to give informed consent voluntarily. Outpatient. Exclusion Patients under 18 years old and above 60 years old. Illiterate patients. Patients with cognitive problem. The study followed cross sectional and qualitative research design.

According to the records of KAMC ascend 1500 patients sought rehabilitation services from KAMC per month. The sample size was calculated by using Rao soft

sample size calculator. The calculated sample size for the study was fixed as 345 with a margin of error of 5% and confidence level 95%. The respondents of the study selected from these who come to KAMC for rehabilitation services by using purposive sampling method.

Suitably structured questionnaire developed by Research Center of Stanford University School of Medicine¹¹ with necessary modifications to protect cultural sensitivity of KSA used to collect the data. The questionnaire contains both closed ended as well as open ended questions. The reliability of the modified tool was assessed by conducting a pilot study. The questionnaire administered among the selected respondents and asked to select their options. Later, it was edited for more clarification and simplicity. Data was coded and entered in Microsoft excel, and then analyzed by using SPSS (version22) and the results presented in tables and graphs. An informed consent was taken from the patients prior to data collection.

RESULTS

The demographic characteristics of study subjects were presented a majority of female than male (206 F,139 M) most of them were live in Riyadh(91%) 214 of them are married and 98 are single divorce and widow make small percentage of almost 9%

Table 1 and figure 1 gives the learning techniques used by the therapists. The most common learning technique used by the therapists was practical aspects (269 (78%).

Table 1: Learning techniques used by the therapists

Learning Techniques*	No.**
Hand outs	67 (19.4)
Video/Picture	12 (3.5)
Oral instructions	179 (51.9)
Practical aspects	269 (78)

*The respondents were asked to choose more than one option

**The numbers in parenthesis indicate percentage

Benefit of learning techniques on study subjects: Benefit of learning techniques were calculated solely for each technique and it can be seen in table 2.

Table 2: Benefit of learning techniques on respondents

Learning techniques**	% of Benefit as reported by respondents					Total*
	Almost totally (75)	Moderately (50)	Slightly (<50)	Use it but doesn't benefit (0)	Do not use (0)	
Hand out	22 (32.8)	24 (35.8)	16 (23.9)	1 (1.5)	4 (6)	67 (100)
Video/ Picture	6 (50)	3 (25)	3 (25)	-	-	12 (100)
Oral instructions	85(47.5)	63(35.2)	23 (12.8)	4 (2.2)	4 (2.2)	179 (100)
Practical aspects	162 (60.2)	85(31.6)	17(6.3)	-	5(1.9)	269 (100)

*Numbers in parenthesis indicate percentages

**Respondents have chosen more than one learning technique

Opinion of respondents on instructions given by the therapists was detailed in table 3. Most patients are moderately commitment to health care provider instructions 164 (47.5%). Not committed patients are show very low percent 4 (1.2%). Very committed is highest choice of Interest in understanding the instructions 225(65.2%). Not committed also was the lowest choice of interest in understanding the instructions 2(0.6%). The patient asked about Recall & Retention for instructions in treatment session. Most of them choose very committed 161(46.7%). Not committed of Recall & Retention for instructions in treatment session is very low 2(0.6%).

Table 3: Opinion of respondents on instructions given by the therapists

Particulars	Response*				Total
	Very committed	Moderately committed	Slightly committed	Not committed	
Commitment to health care provider instructions	123 (35.7)	164 (47.5)	54 (15.7)	4 (1.2)	345 (100)
Interest in understanding the instructions	225 (65.2)	89(25.8)	29 (8.4)	2(0.6)	345 (100)
Recall & Retention for instructions in treatment session	161 (46.7)	132 (38.3)	50 (14.5)	2(0.6)	345 (100)

*Numbers in parenthesis indicted percentage

Table 4 gives the preference of learning techniques by the respondents and the reasons for it. The respondents were asked to choose more than one learning technique. Most patient prefer Practical aspects are 265. The reason to prefer practical aspect they mentioned because it is easy to remember – 48 (18.1%) % out of 265 and Easy to understand- 42 (15.8 %). Oral instruction is preferred by 91 (26.4%). Video and pictures is preferred by 55 (15.9%). The lowest percent of technique is handouts 47 (13.6%).

Table 4: Preference of learning techniques by the respondents

Learning Techniques	Details of respondents*
Hand outs	47 (13.6)
Video/Picture	55 (15.9)
Oral instructions	91 (26.4)
Practical aspects	265 (76.8)

*Numbers in parenthesis indicate percentage

The opinion of respondents on learning techniques is highlighted in the following table. 245 (71%) of respondents said there is no another technique and all the technique they know it we mentioned in the questionnaire. There some patients said yes there is another technique can help in patient education 100 (29%).

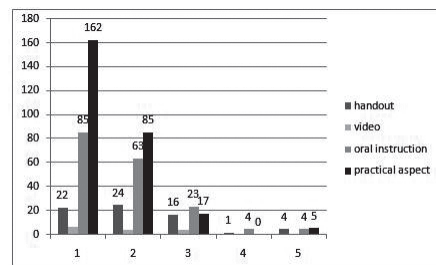


Fig. 1: Benefit of learning techniques were calculated solely for each technique. Respondent were given the choice to choose more than one techniques

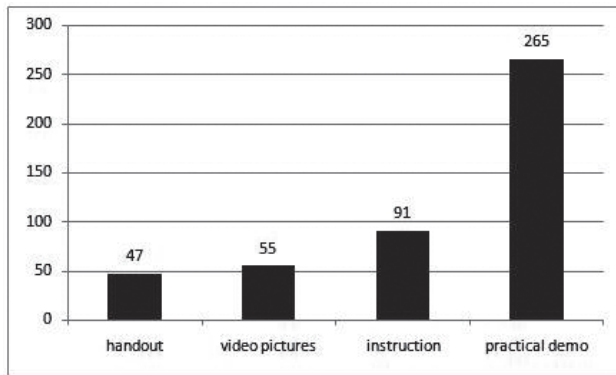


Fig. 2: Preference of learning techniques by the respondents. Almost 77% prefer practical live demo.

DISCUSSION

The study applied on both gender, the majority were female. The majority of respondents were from Riyadh, since the surveys were collected in different hospitals but same city which is Riyadh. Demographic of marital status, the married patients were the highest that is expected in our age criteria which are the minimum age was 18 years and maximum age was 60 years. Single patients who filled the questionnaires come next then divorced patients. The lowest percent in our study was widow patients.

The majority agreed that practical aspects in rehab education were the most common one given to patients. Next, were oral instructions then handouts and finally video/pictures.

From our data results, most patients benefit almost totally and moderately from practical aspect which indicate its goodness for education. Oral instructions also seem to be scoring a good beneficial approach where majority of patients benefited almost totally and moderately. For handouts, patients also benefited almost totally and moderately. Due to insufficient information about using video/pictures, we cannot determine how effective they are.

For commitment part, it was seen generally that most patients fall in very and moderate commitment category which indicate that patients are serious about attending to what the therapists provide. Also, patients showed interest in understanding the instructions of the therapists, and they memorize and recall almost all the information or moderately. In All, high commitment and interest in understanding the therapist indicate patients' well to recall and memorize.

Many people preferred the practical aspects for various reasons such as some easy to remember and easy to understand. Other study showed the same result as ours in effective teaching strategies and methods of delivery for patient education (Houts PS¹⁶). Second preferred aspect is oral instructions for the same reasons but few said it complete the learning complex which consist of oral, visual and practical aspect according to what they have explained to us. Other studies shows different results on using oral aspects (Theis and Johnson¹⁵, Johnson A, Sandford J, Tyndall J⁹). Thirdly is videos and pictures due to easy access and simple instructions that is easily followed through pictures. Very few said pictures and videos can be used as reference when forgetting how to do an activity or Home program treatment and there is previous studies that support this aspect (Friedman A¹). Least preferred patient education approach was handouts and respondents who chose it reported that they need handouts as reference material. Our study was contradictory to different earlier studies conducted in different cultures and different patient science areas such as oncology, outpatient clinics...etc(McPherson CJ¹³, Johnson and Sandford⁹). The contradiction is due to the fact that the respondents were from rehabilitation seeking patients.

Finally, we asked the respondents about their opinion on other learning techniques they think it can be used to education the patient. Huge number of respondents said there is no another technique and all the technique they know where mentioned in the questionnaire. There are some patients who said yes there is another technique to help in patient education. They suggested many methods and more advanced ones such as using Video and SMS messages to facilitate the treatment. Also they mentioned using phone's apps like WhatsApp which can help in case the patient want to asked or forget something important in treatment. Using dummies to demonstrate on, lectures and social media to aware people about very important aspect of their life.

The first strength of this research is the number of sample size which is big since the surveys' results are more credible with a larger sample size. Moreover, larger sample size will help to reduces the margin of error. The used of survey provided answers directly from the patients which removed bias from the collectors and provided honest answers. Many of patients and therapists in both areas KAMC and KASCH were cooperative with

us where they gave us some of their appointment time to fill the questionnaire. We practiced to explain the questions if patient asked in a way that doesn't give the answer and this removed bias.

The main limitation while collecting the data where choosing KAMC and KASCH only to collect data which consumed time of data collection and it took more effort due to lack of sufficient number of patients and repetition of same patients whom we already collected surveys from. We were forced to stop collecting data two weeks to avoid the repetition of patients. Moreover, some of the patients in the age range (18-60) were illiterate which was time consuming because we couldn't collect enough surveys each day and it was unexpected because we assumed that at this range of age we will get literate people to fill in the surveys. At the same time, there were patients who were over 60 that are literate. Furthermore, some patients who met the criteria were unable to write because of physical problems (broken hand etc.) so we had not given them the questionnaire. Many patients that met the criteria, refused to do the survey and we respect their desire. The last limitation, there is no enough resources while doing the literature review so we found it hard to cover the whole aspect of the study.

CONCLUSION

In all approaches the clearness and comprehensive patient education were stressed by most of the study population. Practical approach was found to be the most favorite and useful way compared over the other approaches. Verbal instruction comes 2nd. It is worth mentioning the suggestion raised by some patient to find a tale-education approaches utilizing the hi-tech communication facilities.

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Conflict of Interest: Nil

REFERENCES

1. Friedman A, Cosby R, Boyko S, Hatton-Bauer J, Turnbull G. Effective Teaching Strategies and Methods of Delivery for Patient Education: A Systematic Review and Practice Guideline Recommendations. *Journal of Cancer Education*. 2010;26(1):12-21.

2. Gold D, McClung B. Approaches to Patient Education: Emphasizing the Long-Term Value of Compliance and Persistence. *The American Journal of Medicine*. 2006;119(4):S32-S37.
3. Benefits of Patient Education LiberateHealth [Internet]. Liberatehealth.us.2014. Available from: <http://liberatehealth.us/benefits-of-patient-education/>
4. Adams R J. Improving health outcomes with better patient understanding and education. *Risk management and healthcare policy*. 2010;3(1):61-72.
5. Chang M, Kelly A E. Patient education: Addressing cultural diversity and health literacy issues. *Urologic Nursing*. 2007;27(5):411-417.
6. De Santis D, Zenzeri J, Casadio M, Masia L, Riva A, Morasso P, Squeri V. Robot-assisted training of the kinesthetic sense: enhancing proprioception after stroke. *Front. Hum*. 2014;8(1037):10-3389.
7. Gagliano M E. A literature review on the efficacy of video in patient education. *Academic Medicine*. 1988;63(10):785-92
8. Hamilton S [Internet]. How do we assess the learning style of our patients? . *Rehabilitation Nursing* 2005; 30(4), 129. [cited 23 February 2016]. Available from:<http://search.proquest.com/openview/3fa93e8adc8a1f10a66a69155b487635/1?pq-origsite=gscholar>
9. Johnson A, Sandford J, Tyndall J. Written and verbal information versus verbal information only for patients being discharged from acute hospital settings to home. *Cochrane Database Syst Rev*. 2003;4(1).
10. Freudenthal, J. J. (n.d.) [Internet]. Create the informed dental patient. *Dimensions of Dental Hygiene* [cited 23 February 2016]. Available from:<http://www.dimensionsofdentalhygiene.com/print.aspx?id=18673>
11. Sample Questionnaire Chronic Disease.[internet] Stanford Patient Education Research Center of Stanford University school of Medicine. 2007. [cited 3 April 2016]. Available from: <http://patienteducation.stanford.edu/research/cdquest.pdf>
12. Gaston CM, Mitchell G. Information giving and decision-making in patients with advanced

- cancer: a systematic review. *Social science & medicine*. 2005 Nov 30;61(10):2252-64.
13. McPherson CJ, Higginson IJ, Hearn J. Effective methods of giving information in cancer: a systematic literature review of randomized controlled trials. *Journal of Public Health*. 2001 Sep 1;23(3):227-34.
 14. Theis SL, Johnson JH. Strategies for teaching patients: a meta-analysis. *Clinical Nurse Specialist*. 1995 Mar 1;9(2):100-5.
 15. Houts PS, Doak CC, Doak LG, Loscalzo MJ. The role of pictures in improving health communication: a review of research on attention, comprehension, recall, and adherence. *Patient education and counseling*. 2006 May 31;61(2):173-90.

Early Marriage and Its Relationship with Child Development

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ABSTRACT

Background: Early marriage is still a problem in the world, especially in developing countries including Indonesia. The problem of early marriage in Indonesia takes place both in urban and rural areas with diverse population economic status.

Objective: This study aimed to analyze the relationship between early marriage and child development.

Method: This study used a cross-sectional approach design. The independent variable in this research was early marriage, while the dependent variable in this research was the development of the child. The population in this research was all toddlers residing in a region of Situbondo Regency.

The total sample was 67 respondents who got married when 18 years old or younger. Data were collected through questionnaires and measurements of height, weight, and nutritional status and progress was assessed through interviews and the Denver Development Screening Test (DDST) II. Data were analyzed with the Pearson correlation test with $p < 0.05$.

Results: Early marriage has no association with child growth but it has a relationship with child development. In this study there was a significant relationship found between early marriage of the mother and child development ($p < 0.001$). The risk of a child experiencing developmental disorders when the mother marries early was found to be 62 times compared to mothers who married at an early age.

Conclusion: Early marriage does not cause growth disorders of children, but early marriage has the potential to cause delay in child development. Early childbirth does not cause growth disorders of children. Women who experienced early childbirth might cause general developmental delays in children.

Keyword: *early marriage childhood, child development, child growth.*

INTRODUCTION

Early marriage remains a problem especially in developing countries like Indonesia.¹⁻³ The latest data released in the year 2017 show that the prevalence of early marriage is high.⁴ Previous data showed that Indonesia ranks second as the country with the highest rates of child marriage among ASEAN Countries.⁵ Average births to adolescents aged 15-19 years in Indonesia increased from 35 per 1,000 live births in 2007 to 45 per 1,000 in

2012.⁶ Although many countries have decided on a legal minimum age of marriage of 18, Indonesia is struggling to change its policy.⁴ The problem of early marriage is a classic problem faced in Indonesia, considering the marriage rule has been legalized since 1974.⁷ The increasing number of adolescents who give birth might be correlated with the increased phenomenon of early marriage in some areas.⁵

Physical and psychological development of immature babies at an early age causes health and social problems.⁸ Some of the problems in child marriage include factors that encourage the marriage of children, their effect on education, the occurrence of domestic violence, the impact on reproductive health, childbirth and child psychological health, and legal views related to child marriage.⁹ Indonesia has been gradually improving

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its maternal health services across the nation.¹⁰⁻¹³ However, some of the targets are behind track in the national development such as maternal mortality,⁶ child mortality and early marriage prevalence.^{14,15}

Research related to the relationship between early marriage and child growth and development is still very limited and more research on growth and social aspects is needed.¹⁶ lower educated people, and rural residents. Females, more educated people and rural residents enter first marriage sooner following intercourse initiation than their corresponding counterparts. People who engage with premarital sexual intercourse enter first marriage later than their counterparts. The long time span to first marriage following premarital sexual intercourse initiation needs to be addressed and considered in the current policy which is to accommodate comprehensive sexual reproductive health (SRH). The purpose of this study was to analyze the relationship between early marriage and child growth and development.

METHOD

This study design was cross-sectional with children all under 5 years old born to an early married couple when less than or equal to 18 years of age. The inclusion criteria of this study were adolescent marriages having children under 5 years old. The independent variable in this research was early marriage, while the dependent variable was the growth and development of the child. Growth in this study was measured by nutritional status as a WH/BB z-score plot.

Parameters assessed in regard to child development were collected using DDST II. Selection of the sample was undertaken by total random sampling in married couples who had children under 5 years old. Data were collected from couples with children in one of the community health centers in Situbondo Regency, with permission from the local authority. This study has passed the ethical clearance of the Faculty of Medicine, Universitas Airlangga, Surabaya. The data obtained are tabulated and presented in the form of descriptive statistics and Pearson correlation statistics test at $p < 0.05$.

RESULTS

Half of the respondents were male numbering 37 (55.2%) and 30 (44.8%) were female with an average age of 28.21 (SD = 16.50) months. The maternal age average in this study was 26.48 (SD = 6.12) years and the marriage age of mothers had a mean value of 18.51 (SD = 5.17) years.

Table 1: Demographic characteristics of the respondents (n = 67)

Characteristics	n	%	SD
Gender of Child			
Male	37	55.2	
Female	30	44.8	
Child's Age (month); mean (SD)	28.21		16.50
Mother's Age (year); mean (SD)	26.48		6.12
Age of married mother (year); mean (SD)	18.51		5.17
Age of mother (year); mean (SD)	21.58		5.04
Mother's education			
Didn't complete Elementary School	1	1.5	
Completed Elementary School	37	55.2	
Graduated from junior high school	7	10.4	
Graduated from senior high school	21	31.3	
Father's age (year); mean (SD)	31.55		6.67
Age of married father (year); mean (SD)	23.21		5.50
Father's Education			
Didn't complete Elementary School	2	3.0	
Completed Elementary School	37	55.2	
Graduated from junior high school	7	10.4	
Graduated from senior high school	21	31.3	
Father's Job			
Labor	6	9.0	
Farmer	29	43.3	
Private	18	26.9	
Employees	14	20.9	

The results of bivariate analysis of ≤ 18 years and > 18 years among adolescent mother listed in Table 2 below.

Table 2: The relationship between maternal marriage age and the characteristics of the subjects

	≤ 18 years	> 18 years	p
Gender			
Male	24 (64.9%)	13 (35.1%)	0.682
Female	18 (60.0%)	12 (40.0%)	
Daily care taker			
Mother	31 (62.0%)	19 (38.0%)	0.842
Family member	11 (64.7%)	6 (35.3%)	
Mother's education			
Didn't complete Elementary school	1 (100%)	0	<0.001
Completed Elementary school	32 (86.5%)	5 (13.5%)	
Graduated from junior high school	8 (72.7%)	3 (27.3%)	
Graduated from senior high school	1 (5.6%)	17 (94.4%)	
Mother's Job			
Housewife	42 (62.7%)	25 (37.3%)	0.758
Father's Education			
Didn't complete Elementary school	1 (50%)	1 (50%)	<0.001
Completed Elementary school	33 (89.2%)	4 (10.8%)	
Graduated from junior high school	5 (71.4%)	2 (28.6%)	
Graduated from junior high school	3 (14.3%)	18 (85.7%)	
Father's Job			
Laborer	6 (100.0%)	0	<0.001
Farmer	25 (86.2%)	4 (13.8%)	
Private	8 (44.4%)	10 (55.6%)	
Employees	3 (21.4%)	11 (78.6%)	

This study found that age at marriage and nutritional status is not significantly related to the age of the mother (Table 3). In the same vein, age at birth is not significantly related to child's nutritional status.

Table 3: The relationship between maternal marriage age and maternal birth age with child's nutritional status

Age of married mother			
	≤ 18 years	> 18 years	p
Nutritional status of children			
Normal	27 (56.3%)	21 (43.8%)	0.393
Skinny	1 (100.0%)	0	
Risk of obese	7 (70.0%)	3 (30.0%)	
Fat	3 (100.0%)	0	
Very fat	4 (80.0%)	1 (20.0%)	
Age of delivery mother			
Nutritional status of children			
Normal	12 (25.0%)	36 (75.0%)	0.279
Skinny	1 (100.0%)	0	
Risk of obese	3 (30.0%)	7 (30.0%)	
Fat	2 (66.7%)	1 (33.3%)	
Very fat	2 (40.0%)	3 (60.0%)	

In Table 4 it can be seen that the developmental status of the child at the marriage age of the mother ≤ 18 years at most is the delay of 30 children (71.4%) and the normal development of 12 children (28.6%). Mothers who married at the age of 18 years or more had all children with normal development, that is as many as 2 children (100.0%). Analysis of the relationship between maternal marriage age and child development status was found to have a significant relationship with p-value < 0.001 and OR (95% CI) of 62 (7.44-1359,19). The analysis of the relationship between maternal age and the developmental status of children showed a significant relationship with the p-value of 0.001 and OR (95% CI) of 6.40 (1.96-20.90).

Table 4: The relationship of the marriage age of the mother and the age of giving birth by the mother with child development

Age of married mother			
	≤ 18 years	> 18 years	p
Child development			
Delay	30 (71.4%)	0	<0.001
Normal	12 (28.6%)	25 (100.0%)	
OR (95% CI)	62 (7.44-1,359.19)		
Age of delivery mother			
Child development			
Delay	15 (75.0%)	15 (31.9%)	0.001
Normal	5 (25.0%)	5 (25.0%)	
OR (95% CI)	6.40 (1.96-20.90)		

DISCUSSION

Of the 67 children, the married mothers had an average age of 18.51 years (SD 5.17 years) and the average marriage age of the father was 23.21 years (SD 5.50 years). This is in accordance with the study by Khaerul Umam that in couples who are married at an early age, the husband is often older than the wife.¹⁷ Establishment and economic security are one of the reasons for choosing to marry young to a more mature man but on the other hand it increases the risk of domestic violence which is experienced by young wives by an authoritarian husband.¹⁸

Many factors lie behind the occurrence of early marriage, among which are low education, low economic, customs and culture.¹⁹⁻²² the literature reveals gaps in the empirical evidence on the link between child marriage and the dropout of girls from school. This study identifies the 'tip-ping point' school grades in Nepal when the risk of dropout due to marriage is highest, measures the effect of child marriage on girls' school dropout rates, and assesses associated risk factors. Weighted percentages were calculated to examine the grades at highest risk and the distribution of reasons for discontinuing school. Using the Nepal Multiple Indicator Cluster Survey (MICS) in this research, most mothers' and fathers' education was primary school graduation (55.2%) with most fathers working as farmers (43.3%) and all the mothers not working, but housewives (100%). From this research, most children are taken care of by their own mother (74.6%) and the rest of the children are taken care of by the mother and other family members (25.4%). In this study it appears that in this study the majority of mothers were married at an early age (62.7%) but the age of giving birth was more than age 18 (70.1%). This shows that not always mothers who marry at an early age will give birth at an early age as well.

The characteristics of education show a large role in the occurrence of early marriage. Education plays a role in delaying early marriage.²³ This study found a significant relationship between early marriage age and a low maternal and paternal education level and the father's work. In this study, most children under five years old have the appropriate nutrition either at the age of marriage or age of delivery. Analysis of the relationship between marriage age/early childbirth and the growth (nutritional status) of children gave results

that are not meaningful in the sense that early marriage and early childbirth do not cause growth disorders (nutritional status) of children. This is likely due to high public awareness of the nutritional status of children and the role of cadres and health workers, as well as the presence of other family members who participate in the role of childcare.

In this study, all mothers were housewives so they have plenty of time to take care of their children and to take them for a child growth check at Posyandu. The mothers also entirely exclusively breastfeed their child. All of the under-five years children in this study had a Towards Health Card (KMS) and undergo regularly weighing at Posyandu. Immunization is done on schedule until the age of 9 months (measles). The role and participation of midwives and cadres and local government support is instrumental in this area of Situbondo in monitoring the nutritional status of children in this subdistrict.

Growth and development are the results of two-factor interaction. Internal factors consist of race/ethnic or national differences, family, age, gender, genetic disorders, and chromosomal abnormalities, and children born of a certain race. External/environmental factors that affect the growth and development of children include nutrition, stimulation, psychology, and socio-economics.²⁴ Stimulation of the environment is essential for child growth. Children who receive directional stimulation regularly will develop faster than children who do not receive stimulation. Stimulation also maximizes genetic potential which belongs to the child.²⁵

In this study there was a significant relationship found between early maternal marriage and child development. The risk of a child experiencing developmental disorders after a mother marries early is 62 times compared to an early marriage. The father's education remains low as well as his employment and income so that probably he still cannot receive enough information about what is the meaning of development and how to optimize his children's progress and stimulate optimal developmental aspects which the child needs.

CONCLUSION

Early marriage does not cause childhood developmental disorders, but early childhood marriage causes child developmental delays. On the other hand, early childbirth causes general developmental delays

in children. Early marriage and early childbirth result in an increased risk of children experiencing stunted growth and developmental delays so it is necessary to perform screening and monitoring of child growth and development on a regular basis. How early marriage and early childbirth age affect a child's development should be used as a consideration in the current policy. Providing information to the public about the impact of early marriage on the growth of children can be used to promote public awareness on this issue.

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INTRODUCTION

- Jalal, F. Paparan Kepala BKKBN Pada Konferensi Pers Rakernas Program Kependudukan dan Keluarga Berencana Tahun 2014. (2014).
- Utomo, A. J., Reimondos, A., Utomo, I. D., McDonald, P. F. & Hull, T. H. Transition into marriage in Greater Jakarta. *South East Asia Res.* **24**, 492–509 (2016).
- Yunitasari, E., Pradanie, R. & Susilawati, A. Early Marriage Based on Transcultural Nursing Theory in Kara Village Sampang. *J. Ners* **11**, 164–169 (2016).
- Aditya Budiman. UNICEF Minta Indonesia Hapus Pernikahan Usia Anak - Nasional Tempo.co. (2017). Available at: <https://nasional.tempo.co/read/850685/unicef-minta-indonesia-hapus-pernikahan-usia-anak>. (Accessed: 28th February 2018)
- Albasit, A. Jumlah Pernikahan Dini Indonesia Terbanyak Kedua di ASEAN. **2013**, (2013).
- BPS *et al.* *Indonesia Demographic and Health Survey 2012*. (BPS, BKKBN, Kemenkes, and ICF International, 2013).
- Government of Indonesia. Undang-undang Republik Indonesia Nomor 1 Tahun 1974 Tentang Perkawinan. *I* (1974).
- Yakubu, I. & Salisu, W. J. Determinants of adolescent pregnancy in sub-Saharan Africa: a systematic review. *Reprod. Health* **15**, 15 (2018).
- Efevbera, Y., Bhabha, J., Farmer, P. E. & Fink, G. Girl child marriage as a risk factor for early childhood development and stunting. *Soc. Sci. Med.* **185**, 91–101 (2017).
- Rumaseuw, R. *et al.* Factors Affecting Husband Participation in Antenatal Care Attendance and Delivery. doi:10.1088/1755-1315/116/1/012012
- Efendi, F., Chen, C.-M., Kurniati, A. & Berliana, S. M. Determinants of utilization of antenatal care services among adolescent girls and young women in Indonesia. *Women Health* **57**, 614–629 (2017).
- Kurniati, A., Chen, C.-M. M. C.-M., Efendi, F., Elizabeth Ku, L.-J. J. & Berliana, S. M. M. S. M. Suami SIAGA: male engagement in maternal health in Indonesia. *Heal. Policy Plan* **32**, 1203–1211 (2017).
- Kurniati, A., Chen, C.-M., Efendi, F. & Berliana, S. M. Factors influencing Indonesian women's use of maternal health care services. *Health Care Women Int.* 1–16 (2017). doi:10.1080/07399332.2017.1393077
- Utomo, I. & Utomo, A. *Indicators and Correlates of Adolescent Pregnancy in Indonesia: Results from 2010 Population Census and 2012 Indonesian Demographic and Health Survey*. (UNFPA, 2013).
- Nur, A. W. I. *et al.* Analysis of the Survival of Children Under Five in Indonesia and Associated Factors. doi:10.1088/1755-1315/116/1/012014
- Berliana, S. M., Utami, E. D., Efendi, F. & Kurniati, A. Premarital Sex Initiation and Time Interval to First Marriage Among Indonesians. *Bull. Indones. Econ. Stud.* **0**, 1–27 (2018).
- Noer, K. U. Angka Kematian Bayi Dan Persoalan Kesehatan Ibu Hamil Dalam Budaya Madura. (2010). Available at: https://archive.org/stream/AkbDanKesehatanReproduksiDiMadura/AkbDanKesproDiMadura_djvu.txt.
- UNICEF. *Early Marriage A Harmful Traditional Practice A Statistical Exploration 2005*. (UNICEF, 2005).
- Sekine, K. & Hodgkin, M. E. Effect of child marriage on girls' school dropout in Nepal: Analysis of data from the Multiple Indicator

- Cluster Survey 2014. 1–13 (2017). doi:10.1371/journal.pone.0180176
20. Gurmu, E. & Dejene, T. Trends and differentials of adolescent motherhood in Ethiopia: evidences from 2005 Demographic and Health Survey. *Afr J Reprod Heal.* **16**, 162–174 (2012).
21. Kamal, S. M. M. & Hassan, C. H. Child marriage and its association with adverse reproductive outcomes for women in Bangladesh. *Asia Pacific J. Public Heal.* **27**, NP1492-NP1506 (2015).
22. Mishbahatul, E., Has, M., Syaltut, M., Kusumaningrum, T. & Efendi, F. Early weaning food for infants (0-6 months old) in madurese people based on transcultural nursing theory. doi:10.1088/1755-1315/116/1/012059
23. Fadlyana, E. & Larasaty, S. Pernikahan Usia Dini dan Permasalahannya. *Sari Pediatr.* **11**, 136–141 (2016).
24. Narendra, M. B. Penilaian pertumbuhan dan perkembangan anak. *Jakarta EGC* (2003).
25. Soetjiningsih. *Tumbuh Kembang Remaja dan Permasalahannya.* Sagung Seto. Jakarta **320**, (2004).

Return Migration of Nurses: A Concept Analysis

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ABSTRACT

Background: Return migration is a complex, challenging phenomenon and to date it remains a concept that is not well understood. A concept analysis would help to clarify what is meant by return migration. This paper aims to report on an analysis of the concept of return migration of nurses.

Design: Concept analysis using the Walker and Avant approach.

Data Sources: Google Scholar, Pubmed, EBSCO, JSTOR and Web of Science databases were searched without a timeframe. Twenty-one articles meeting the inclusion criteria were included.

Method: This study employs eight steps of Walker and Avant's method to conduct the concept analysis.

Results: Return migration of nurses can be defined by five attributes: the motivation and decisions of migrant nurse, return as human right, resource mobilisation, reintegration and return itineraries. Antecedents of return migration include the economic, social, geographical, political, family and life cycle that comprise the cause and effect framework. With regards to return migration, the consequences are beneficial or detrimental depend on the point of view migrant nurses, source country, receiving country, nursing profession and country health system. Empirical referents have been identified and support potential area to undertake a research on return migration.

Conclusion: This concept analysis has clarified current understandings and enhance the clarity of return migration concept. It recognises the centrality of return as a component in migration stage that needs a comprehensive approach.

Keywords: *concept analysis, return migration, nurse migration, brain gain.*

INTRODUCTION

Migration of skilled health workers in a global context has increased significantly over the last two decades.^{1,2} Nurses as a large part of professional health care workforce have contributed to the significant flows of this migration movement.³⁻⁵ Migration has long been assumed as a one direction process,⁶ such that migrants who emigrated would permanently stay in the destination country. However, there is increasing evidence showing that the migrants are returning to their country of origin known as return migration.⁷⁻⁹

Acknowledging the importance of return migration, The International Centre of Nurse Migration recognised this movement as a means of benefiting the countries of origin and called for serious attention.¹⁰ The International

Organization for Migration (IOM) also support this idea by emphasising on the need for comprehensive and cooperative approaches to managing return as a part of the human movement.¹¹ The issue of return has become increasingly significant among immigrants although in the absence of statistical data. The study pointed out the need for global attention on the nurses' return migration that is highly complex and needs further action from nursing profession.¹⁰

Concept analysis as Walker and Avant (2005) has argued can provide a knowledge base to get a clear picture of phenomenon, object or idea.¹² The aim of this concept analysis was to examine the concept of return migration as it is used in global nurses' migration, to provide a brighter understanding of the phenomenon and suggestion for future study can be developed and measured.

Data sources: An electronic search using the keyword “return migration nurse”, “return emigrant nurse”, “return immigrants nurse” was undertaken using databases relevant to nursing, medicine and social sciences, Pubmed, EBSCO, JSTOR, Web of Science and Google Scholar.

Data Selection and Analysis: The final sample of 21 documents was selected with inclusion criteria for the selection of papers were: a) reported on migrants returning or having returned to their country of origin; and (b) focused on qualified nurses.

RESULTS

Uses of the concept in literature: There is no available definition of return migration from commonly referred dictionaries, Oxford and Merriam-Webster dictionary. The first definition of return migration proposed by Bovenkerk (1974) which define as the return of people after emigrating to origin country for the first time.¹³ Above terms have various interpretations. For example with regards to the movement, Dumont and Spielvogel (2008) define the movement as the initial migration only to be called return migration.¹⁴

Defining attributes

Motivation and decisions of nurse migrant: Individual motivation and decision for going back to the country of origin is one of key distinctive associated with return nurse migration. It has been argued that individual decision to return home as a response of personal factor, career path and others.^{15,10} Individual initiatives to return has been decided on the early stage of migration or during they stay in foreign country.^{16,17} Motivation to return home was reported influenced the willingness and readiness of migrant which consider the circumstances in both, home and host countries.¹⁸

Return as human right: Freedom of return under the umbrella of migration was described in the literature on return home. Recognising the significant mobility on health professional, the WHO issued the global code by recommending the Member States to take into account individual right to migrate and leave any country.¹⁹ Recalling resolution WHA57.19 in which the World Health Assembly requested the Director-General to develop a voluntary code of practice on the international recruitment of health personnel in consultation with all relevant partners; Responding to the calls of the Kampala Declaration adopted at the First Global Forum on Human

Resources for Health (Kampala, 2013⁷ March 2008 Back to the past, referring to the article 13 section 2 of The Universal Declaration on Human Rights stated that “Everyone has the right to return to his country”.²⁰ The positions statement by International Council of Nurses (2007) recognise the potential benefit of migration and call for support to nurse who wishes to return home by putting the nurses right on priority.

Resource mobilization: Bringing resources back to the countries of origin marked the character of return migration. Nurse returnees not only bringing the financial capital but also human and social capital.¹⁰ It is undeniable that the flow of remittances to the low and middle- income countries plays a significant role in the nation’s development.²¹ Even though we are a lack of data on the impact of remittances from nursing workforce, evidence showed that in Philippine as a source country of nurses share 10% remittances of Gross Domestic Product, 14 % for Jamaica and 8.5% for Uganda.²² Brain gain is the most expected of returned migrants which brings new skill, knowledge and idea to contribute to the advancement of their origin’s country.²³ Studies of return migration in Jamaica and Pacific Island countries described that most returnees have gained new or additional capabilities.^{21,16}

Reintegration: Return migration was characterised by reintegration phase into the family, group and society in his or her country. Reintegration found quite complex, dynamic and challenging aspect of return migration.¹¹ Reintegration to be influenced by situation and condition in both countries.²⁴ When migrants feel that they have achieved their goals, they are more ready to reintegrate into the home country.¹⁸ Complex reintegration problems have been investigated by Arowolo for instance joblessness, social maladjustment, boredom and frustration among non-nurses migrants.²⁵ This study consistent with research of nurses migrant who returns to Indonesia, the majority of nurses were unemployed and faced difficulty in building a career.²⁶

Return itineraries: The journey of return was complex which generally divided into voluntarily and involuntarily. These types were explained in the literature of return migration of nurses. Majority the studies support the benefits of voluntarily return as a form to contribute in the nation development.²⁷ Voluntary return due to the completion of work contract, and goals achievement was reported by another study.¹⁶ However, some study also noted that forced return migration might become the push factor from country of residence to make them back home.¹⁰

Model case of return migration of nurses: In the Walker and Avant method, model case was constructed to further clarify the concept. The case may be derived from our real life, invented or found in published document.¹² A model case adapted from return migration study in which exist in real life context.

Sumiati (Pseudonym) is a 28 years old who hold a bachelor’s degree in nursing. She has been working in Japan for three years as foreign nurses. Working as nurses in Japan allows her to earn around 2000 USD per month, eight times higher than Indonesia. Having this wage, she was thinking to return home after she reaches her personal goals. She also sent the money back to home country for her family. After Tsunami disaster hit Japan in 2011, her family was worried about her safety and tried to persuade her for return. Even though she has passed the Japanese Nursing Examination and eligible to stay in Japan for unlimited periods, finally she decided to go back to Indonesia and tried to find a new job. While waiting for the job interview, she was running a small business from the saving money in Japan. She was shocked to find out that living in her city was challenging and difficult to find a job. She thought that she must rebuild her career from zero as a new nurse.

All attributes arise in this case describe the complexity of the concept. Sumiati demonstrated individual motivation in her decision to return home. Her return was influenced by the achievement of her personal goals, crisis, and her family. Financial capital was obviously observed from her situation to support her family and herself at home country. Lastly, return home positioned her on the difficulty finding a job and struggles to seek a new vacancy for her future.

Additional cases: related case: There is one case related to return migration concept of which have some attributes of return migration but actually different. Following is an example of related case.

Denias (Pseudonym) was left his job to migrate to Australia because of the war happened in his home country. After arriving in Australia, the immigration office found him without a legal document. Only two months ahead of his arrival date, the Australian government has decided to deport him back to his country of origin.

Denias case only has one attribute, his return itinerary was forced by the state to expel from the host country (involuntary return migration). This type of return repeatedly showed by refugees and asylum seekers that flow to developed countries.

Antecedents: The cause and effect model is the most prevalent framework for explaining return migration of nurses.¹⁰ The antecedents for return migration of nurses are social, economic, geographical, political, family or life cycle.⁶ Cause and effect factors drive nurses to return to the country of origin which affected by circumstances in the host and home country.⁶ Economic motives for example when the job arrangement reaches the end of the contract, it might be a cause factor to leave host country.⁸ On the other side, enough saving in country of origin might become an effect factor to return home. Non-economic consideration also having more influenced for return home than economic reason.⁶

Consequences: Mount evidence showed the positive and negative impact of return migration on various players on this movement.¹⁰ The players include migrant nurses, nursing profession, host and home country. For instance, developing countries who have a surplus of nursing workforce could gain benefit for the return of migrant nurses. The brain gain is much more expected than brain drain particularly from the middle and low-income countries.

Table 1: Concept on return migration of nurse: antecedent, attributes and consequences

Antecedents	Attributes	Consequences
Drivers influencing motivation to return (cause and effect)	Motivation and decisions of nurse migrant	Beneficial and detrimental depending on:
Social	Return as human right	Individual
Economic	Resource mobilization	Source country
Geographical	Reintegration	Receiving country
Political	Return itineraries	Nursing profession
Family/Life Cycle		National health system

Empirical referents: Measuring return migration can be challenging as there is still confusion on the definition and data availability as well.²⁸ How was country dealing with this issue by lack of system to track the returnee obviously appeared on the published literature.²⁹ Mostly country relies on the census, survey, population registries, labour force survey, country social survey, and data from employment services.²⁸ A study from most developed countries conveys a message that there is a need of established tools to measure the return migration.

The attributes, antecedents and consequences of return migration of nurses can be scrutinised using mixed methods, either quantitative or qualitative. The need to develop instrument or scale to measure return migration is necessary particularly for the standard measurement among countries to allow greater understanding of this issues.

DISCUSSION

In this concept analysis, the discourse of return migration on nurses has been elaborated in the systematic approach with implication on nursing research, education, and practice. According to this analysis, we need a specific scale to measure this phenomenon in standard ways. This study also highlights that return migration in nursing societies is occasionally approached in a holistic manner. International organisation in nursing has proposed a position statement on the important aspect addressing the global nurse migration.³⁰ In the global connectedness and interdependence between countries on the issues of migration, return issue will become more prevalent.

A concept analysis of return migration was challenging in the absence of available data, particularly on nursing perspective. By this, nursing profession needs to take action by implementing some measures to deal with the underlying problem.

CONCLUSION

This article provides an analysis of the concept of return migration of nurses found in published literature. The analysis proposed that return migration of nurses has been identified as having characters: individual's motivation and decision, universal human right, resource mobilisation, reintegration and return itineraries. Countries involved in this program should promote orderly and regulated return migration of nurses using a comprehensive approach.

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REFERENCES

1. Connell, J. & Buchan, J. The impossible dream? Codes of practice and the international migration of skilled health workers. *World Med. Heal. policy* **3**, 1–17 (2011).
2. Wismar, M., Maier, C. B., Glinos, I. A., Dussault, G. & Figueras, J. *Health professional mobility and health systems. Evidence from 17*, (World Health Organization, 2011).
3. Buchan, J. & Aiken, L. Solving nursing shortages: a common priority. *J. Clin. Nurs.* **17**, 3262–3268 (2008).
4. Efendi, F., Chen, C.-M., Nursalam, N., Indarwati, R. & Ulfiiana, E. Lived experience of Indonesian nurses in Japan: A phenomenological study. *Japan J. Nurs. Sci.* **13**, 284–293 (2016).
5. Efendi, F., Nursalam, N. N., Kurniati, A. & Gunawan, J. Nursing qualification and workforce for the Association of Southeast Asian Nations Economic Community. *Nurs. Forum* 1–6 (2018). doi:10.1111/nuf.12243
6. King, R. Generalizations from the history of return migration. *Return Migr. Journey hope or despair* 7–55 (2000).
7. Blouin, C. & Debnath, P. CARICOM return migration and brain circulation: case study of Caribbean-born nurses. *Can. Foreign Policy J.* **17**, 101–114 (2011).
8. Kurniati, A., Chen, C.-M. M., Efendi, F. & Ogawa, R. A deskilling and challenging journey: the lived experience of Indonesian nurse returnees. *Int. Nurs. Rev.* n/a-n/a (2017). doi:10.1111/inr.12352
9. Efendi, F. *et al.* IJEP: Gray Area for Health Policy and International Nurse Migration. *Nurs. Ethics* **24**, 313–328 (2015).
10. Haour-Knipe, M., Davies, A. & ICNM. *Return Migration of Nurses*. **2015**, (International Centre on Nurse Migration, 2008).

11. IOM. Return Migration: Challenges and Opportunities. **2015**, (2008).
12. Walker, L. O. & Avant, K. C. *Strategies for theory construction in nursing*. (Appleton & Lange Norwalk, CT, 2005).
13. Bovenkerk, F. *The sociology of return migration: a bibliographic essay*. (Martinus Nijhoff, 1974).
14. Dumont, J.-C. & Spielvogel, G. Return migration: A new perspective. *Organ. Econ. Coop. Dev. (OECD), Int. Migr. Outlook, Annu. Rep.* (2008).
15. Brown, Connel, J., Brown, R. P. C. & Connell, J. The migration of doctors and nurses from South Pacific Island Nations. *Soc. Sci. Med.* **58**, 2193–2210 (2004).
16. Thomas-Hope, E. Return Migration to Jamaica and its Development Potential. *Int. Migr.* **37**, 183–207 (1999).
17. Troy, P. H., Wyness, L. A. & McAuliffe, E. Nurses' experiences of recruitment and migration from developing countries: a phenomenological approach. *Hum. Resour. Health* **5**, 15 (2007).
18. Cassarino, J.-P. Theorising return migration: The conceptual approach to return migrants revisited. *Int. J. Multicult. Soc.* **6**, 253–279 (2004).
19. World Health Organization. User's guide to the WHO global code of practice on the international recruitment of health personnel. **2014**, (2010).
20. United Nations. Universal declaration of human rights. **2015**, (1948).
21. Brown, R. P. C., Connell, J., Brown & Connell, J. Occupation-specific analysis of migration and remittance behaviour: Pacific Island nurses in Australia and New Zealand. *Asia Pac. Viewp.* **47**, 135–150 (2006).
22. ICNM. International Nurse Migration and Remittances. **2015**, (2007).
23. Ammassari, S. & Black, R. *Harnessing the potential of migration and return to promote development: applying concepts to West Africa*. (International Organization of Migration, 2001).
24. Adzei, F. A. & Sakyi, E. K. Drivers of return migration of Ghanaian health professionals: Perspectives from doctors and nurses in urban Ghana. *Int. J. Migr. Heal. Soc. Care* **10**, 102–120 (2014).
25. Arowolo, O. O. Return migration and the problem of reintegration. *Int. Migr.* **38**, 59–82 (2000).
26. Efendi, F. *et al.* Return migration of Indonesian nurses from Japan: Where should they go? *J. Nurs. Educ. Pract.* **3**, p154 (2013).
27. Lorenzo, F. M. E., Galvez-Tan, J., Icamina, K. & Javier, L. Nurse migration from a source country perspective: Philippine country case study. *Health Serv. Res.* **42**, 1406–1418 (2007).
28. Smoliner, S., Förschner, M., Hochgerner, J. & Nová, J. Comparative Report on Re-Migration Trends in Central Europe. *Re-Turn, Cent. Soc. Innov. Vienna* 81 (2011).
29. Dustmann, C. & Weiss, Y. Return migration: theory and empirical evidence from the UK. *Br. J. Ind. Relations* **45**, 236–256 (2007).
30. ICN, FNIF & Burdett Trust for Nursing. The Global Nursing Shortage: Priority Areas for Intervention. **2014**, (2006).

Immunological Status of Mumps in Infertile Individuals in Comparison to Children

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ABSTRACT

Mumps is spread easily through the airborne spray from the upper respiratory tract. A Cross-sectional prospective study conducted in Tikrit Teaching Hospital and Primary Health Care Centers.

The study population included adults and children from both gender. The adults population group are to be recruited from university students, while the children are to be recruited from 6th primary, 1st, 2nd and 3rd secondary schools. The sample size is 100 subjects in each adults and children groups [50 subject male and 50 female]. Thus a minimum of 200 subjects to be included in the study. Data on vaccination was taken directly from the each individual or vaccination cards if available. ELISA was used for determination of IgG for mumps diseases in central research Laboratory and Tikrit Laboratory's. The tests were performed according to manufacturer instructions.

Optical density mean value was with predictive value for mumps antibodies concentration. The mumps mean serum value was lower in adult subjects as compared to child group. This finding indicated that immune response to mumps decreased with time and contribute to resurgence of mumps in community. The frequency of mumps non immune status was higher in adults as compared to child. Additionally, mumps immune response with high titer was significantly lower in adults than in children. The high titer rate was 2 times more in children than in adults. These figures indicated that IgG mumps antibody concentration confirmed the possibility of immune reduction with age and explain the outbreak of the disease in vaccinated subjects.

The mean serum mumps IgG concentration was higher in male as compared to female, but not significant. In children, the mean serum mumps IgG was significantly higher in child male as compared to child female. Thus, this study finding do confirm that immune response to mumps vaccination was affected by gender and more intensive in male. The mean mumps serum IgG values were significantly higher in child male as compared to adult male.

Keywords: Immunological, status, mumps, infertile, individuals, comparison children.

INTRODUCTION

Immunization is one of the most successful and cost-effective public health interventions to prevent deaths and disabilities from vaccine-preventable diseases. Smallpox was eradicated and the world was about to eradicate poliomyelitis. Significant reductions have been achieved in reducing disease, disability and death due to

diphtheria, tetanus, pertussis and measles. In 2003 alone, it is estimated that immunization has managed to avoid more than 2 million deaths.^[1]

Mumps was a common childhood disease before a vaccination became available for the virus. When people think of mumps, they often think of swollen cheeks due to the swelling of the salivary glands located next to the ears. However, because of the types of tissues that the mumps virus can infect, complications such as encephalitis, meningitis, swelling of the ovaries, and swelling of the testes can occur. Before the vaccination was introduced, mumps was the most common cause of acquired deafness in children^[2]

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MATERIALS AND METHOD

Settings: Tikrit General Hospital (KGH) and Primary Health Care Centers in Tikrit Governorate.

Study Design: Cross-sectional prospective study.

Study Population: The study population included adults and children from both gender. the adults population group are to be recruited from university students, while the children are to be recruited from 6th primary, 1st, 2nd and 3rd secondary schools. the sample size is 100 subjects in each adults and children groups [50 subject male and 50 female]. Thus a minimum of 200 subjects to be included in the study. A pre-designed questionnaire

is to be used for gathering data from each individual included in the study. The demographic information of these groups was shown in Table (1).

Group 1: Adults Male and Female with age of 19-45 years were subdivided into:

A1:- Adults 43 Male.

B1:- Adults 46 Female.

Group 2: Children Male and Female with age of 6-17 years were subdivided into:

A1:- Children 46 Male.

B1:- Children 41 Female

Table 1: Study population

Group		Number	Mean age ± SD in years
Adults Male and Female	Adults Male	43	23.5 ± 3.5
	Adults Female	46	24.8± 4.7
Children Male and Female	Child male	46	12.04 ± 2.8
	Child Female	41	12.6 ± 2.8
Grand total		176	18.3 ± 6.9
P value	ANOVA		NS

Collection of data: The designated investigators visited the outpatient department on alternate day, selected the study subjects, and screened them using a predesigned pretested schedule considering the inclusion and exclusion criteria till the study subject’s recruitment could be identified. clinical examination and laboratory investigations were to be carried out for the study subjects to exclude other causes of mumps infection such as Orchitis, Oophoritis, Hearing Loss, Encephalitis, Meningitis and Pancreatitis.

Samples:

- Blood samples (5-10 ml) were drawn aseptically from all enrolled cases and controls for routine investigations. An aliquot of sera was preserved at 70°C for study.
- All the serum samples collected from the study were tested for were tested for mumps IgG antibodies by

commercially- available (ELISA) kits. The results read by a Micro well reader and compared in a parallel manner with controls; optical density read at 450 nm on an ELISA reader

RESULTS AND DISCUSSION

mumps serum IgG and Optical density in Adult compared to Child: Optical density mean value was higher in child group [1.235±0.610] than in adult group [1.075±0.511], but the difference was not significant, Table2. Additionally, the mumps mean serum value was lower in adult subjects [540±257] as compared to child group [617±305], however, there was no significant difference, Table 2. This finding indicated that immune response to mumps decreased with time and contribute to resurgence of mumps in community. In Iraq, during the period from 2000 to 2016 period, mumps cases fluctuated and ended in 73,939 cases in 2016^[3].

Table 2: Mean optical density and mumps serum IgG in Adult compared to Child

	Group	N	Mean	SD	Frequency of Negativity	High Titer
OD	Adult	89	1.075	0.511	23/89 [25.8]	11/89[12.4]
	Child	86	1.235	0.610	18/86 [20.9]	26/86 [30.2]
	P		>0.05		>0.05	0.004

Conted...

IgG	Adult	89	540.831	257.921	23/89 [25.8]	11/89[12.4]
	Child	86	617.575	305.189	18/86 [20.9]	26/86 [30.2]
	P		>0.05		>0.05	0.004

The frequency of mumps non immune status was higher in adults [25.8%] as compared to child [20.9%], however the difference was not reach a significant level. Additionally, mumps immune response with high titer was significantly lower [P=0.004] in adults [12.4%] than in children [30.2%]. The high titer rate was 2 times more in children than in adults. These figures indicated that IgG mumps antibody concentration confirmed the possibility of immune reduction with age and explain the outbreak of the disease in vaccinated subjects. Thus the present study finding may gave an explanation for the high rate of reported cases in Iraq, in 2016 as compared to previous years. However, the war conflict may act as another factor that disturb the vaccination program performance.

In a recent study in Iraq, Kirkuk, the MMR vaccination coverage was 86%. A lower MMR coverage was in the age group of 46-49 (64.28%) and 26-30 (77.27%) years, while a higher coverage was in the age group 21-25 (91.52) and 13-15 (90%) years. These figures supported the present study findings in that vaccination coverage was with lower rate in adults as compared to children [4].

The study in Bulgaria^[5], reported that 69% of their cohort study were immunized with a mumps vaccine.

The negative cases were more in the age group of 19-29 years [42%] and over 31 years age [33%], and lower in the age group of 12-18 years [6%]. In contrast to our study^[5] found high rate of highly positive cases in those with age of 19 and above as compared to those of 18 years and below.

In Jiangu province, China, ^[6] study shows that mumps positive seroprevalence of 59% and there was a sharp increase in geometric mean concentration in those with age of 2-5 years, with a mean of 237.7 IU/ml. After 5 years age, the antibody concentration declined to 44.3 IU/ml by the age of 14 years and remain high after that age [205-324 IU/ml]. To be more sound in presenting the immune response and vaccination coverage it is recommended to perform a large scale research to evaluate the effectiveness of one and two MMR vaccination dose.

Mumps sero-nectivity and frequency of high titre according to gender: The present study shows that anti mumps IgG positivity was significantly more frequent in female adults [36.9%] as compared to male adults [14.4%]. However, high titer frequency was higher in female adults than in male adults but not reach a significant level, Table 3 ^[7], in Saudi Arabia reported higher frequency of seropositivity to mumps in female than in male children.

Table 3: Mumps sero-Nectivity and frequency of high titre according to gender

	Group	Gender	Mumps seropositivity	High titer
			Negative /total [%]	Number/total [%]
IgG	Adult	Male	6/43 [14.4]	4/43 [9.5]
		Female	17/46 [36.9]	7/46 [15.2]
		P	0.013	>0.05
	Child	Male	6/45 [13.3]	19/45 [42.2]
		Female	12/41 [29.3]	7/41 [17.1]
		P	>0.05	0.011

Age and IgG Mean in Adult male compared to adult female: The mean serum mumps IgG concentration was higher in male as compared to female, but not significant, Table 4. In contrast, Liu et al reported that mumps geometric mean concentration of antibody significantly affected by gender, while mumps seroprevalence not

significantly affected. Recent study ^[8]found that mumps IgG serum concentration was significantly lower in male as compared to female in those immunized at age of 11-13 months, but not that vaccinated at age of 17-19 months. Other studies not found differences in mumps immune response in relation to gender ^[9,10].

Table 4: Mean Age and IgG in Adult male compared to adult female

	Group	N	Mean	Std. Deviation	Std. Error Mean
Age	Adult male	43	23.56	3.5	0.5
	Adult female	46	24.87	4.7	0.6
	P			>0.05	
IgG	Adult male	43	568.86	231.9	35.3
	Adult female	46	514.63	280.06	41.2
	P			>0.05	

Age and IgG Mean in child male compared to child female: In children, the mean serum mumps IgG was significantly higher [P=0.031] in child male [683.84] as compared to child female [543.22], Table5. Thus, this study finding do confirm that immune response to mumps vaccination was affected by gender and more intensive in male. However, other study reported that protective mumps immunity is more in female than male following single and 2 vaccine doses .ANOVA test show a significant differences between the four groups [P=0.024], Table 5. an additional prediction for effect of gender and age on mumps immune response. The mean serum mumps IgG value was higher in adult male [568.86±231.92] as compared to adult female [514.63±280.06], Table6 The same pattern was demonstrated when child male compared to child female, Table6.

Table 5: Mean Age and IgG in child male compared to child female

	Group	N	Mean	Std. Deviation	Std. Error Mean
Age	Child male	46	12.04	2.87	0.42
	Child female	41	12.68	2.84	0.42
	P		>0.05		
IgG	Child male	46	683.84	308.21	45.44
	Child female	41	543.22	287.52	44.90
	P		0.031		

Table 6: Mean of mumps IgG comparison between groups

Variable	Group	Number	Mean	Std. Deviation
IgG	Adult male	43	568.86	231.92
	Adult female	46	514.63	280.06
	Child male	46	683.84	308.20
	Child female	41	543.22	287.52
	Total	176	578.77	284.08
	P			0.024

The mean mumps serum IgG values were significantly higher in child male [IgG= 683.84±308.20] as compared to adult male [IgG= 568.86±231.92], with a significant differences, Table6. The same trend was demonstrated in comparison of adult female with child female, but the differences not reach a significant level, Table 6. The above findings indicating that mumps immune response was affected by age and agreed to that reported by others^[11,12,13and15] However^[16]. not found significant association between anti-mumps antibodies and age.

Conflict of Interest: Hala .M. majeed declares that he has no conflict of interest.

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Ethical Approval: The ethical committee of the concerned institute approved the research protocol. The purpose and procedures of the study were to be explained to all the study subjects, and informed consent was to be obtained from them.

Referances

1. Nabeel A A, and Sundus JB. National Immunization Program for Iraq. Prepared jointly USAIDs/ Primary Health Care Project in Iraq. University Research Co., LLC.2015.
2. Deeks SL, and Simpson MA(2011). An assessment of mumps vaccine effectiveness by dose during an outbreak in Canada. CMAJ.2011; 183(9):1014-20.
3. DeLa-Rica R, and Stevens M M."Plasmonic ELISA for the ultrasensitive detection of disease biomarkers with the naked eye". Nature Nanotechnology2013.
4. Pergen S, Alsamarai AGM.(2017). Immunization program coverage in Kirkuk city. Intl J Med Sci. 2017;295)pp:70-77.
5. Karcheeva L, Gillian H. Lim *et al.*, (2010) An assessment of mumps vaccine effectiveness by dose during an outbreak in Bulgaria CMAJ .2010; 183(9)pp: 1014–1020.
6. Liu Y, Lu P, Ma F, et al. Cross-sectional surveys of measles antibodies in the Jiangsu Province of China from 2008 to 2010: the effect of high coverage with two doses of measles vaccine among children. PLoS One. 2013;8(6).pp:23-45.
7. Jaber SM. A serological survey of measles, mumps and rubella immunity among school aged children in Western Saudi Arabia. Saudi Med J.2006;27(1) pp:63-9.
8. Demicheli, V. Di Pietrantonj C. Vaccines for measles, mumps and rubella in children. Cochrane Database Syst Rev.2012; 15;(2), pp:1-5.
9. Al-kadassy A, and bsfrd *et al.*, Serological analysis of mumps virus antibodies among school children in Hodeidah city, Yemen Int.J.Curr. Microbiol.App.Sci 2014;(12)pp: 52-61.
10. Carley, A. The Monthly Infectious Diseases Surveillance Report is produced by Public Health Ontario (PHO) for the public health community of Ontario. Halton Region Health Department 2016.
11. AlQatawy H M. Efficacy of easles, mumps, Rubella and pertuss vaccination in children from, Palestine, A thesis submitted in partial fulfillment of the requirements for the Master degree of Science in Biological sciences 2014.
12. Sultana M, Hassan S .Prevalence of IgG Antibody Against Measles, Mumps and Rubella in Bangladeshi Children: A Pilot Study to Evaluate the Need for Integrated Vaccination Strategy Blackwell Publishing Ltd. Scandinavian Journal of Immunology.2006; 64, 684–689.
13. Greenland M K., *et al.* Mumps outbreak among vaccinated university students associated with a large party, the Netherlands,(2012); Vaccine 30(3);pp: 4676–4680 .
14. *Ladbury G, van Binnendijk, et al.*, Smoking and older age associated with *mumps* in an outbreak in a group of highly-vaccinated individuals attending a youth club party, the Netherlands, . Euro Surveill.2014;19(16)pp:23-78.
15. Tan PL, and Pankratz V S. Twin studies of immunogenicity--determining the genetic contribution to vaccine failure. Vaccine.2001;19(6) pp:2434–9.
16. *Cooney, M.;K.*; The Seattle Virus Watch Valassina M, *et al.* .Comparative study of the *immune response* in mice immunized with four live attenuated strains of *mumps* virus by intranasal or intramuscular route. Vaccine 2002;20(2)pp:1106–1112.

Patient Safety and Quality of Care in Indonesia: Challenges and Opportunities for Professional Health Resources from the ASEAN Economic Community

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ABSTRACT

This study identified current knowledge gaps and contextual considerations for collecting data on patient safety in the Association of Southeast Asian Nations (ASEAN). Additionally, this study has identified patient safety and quality of care improvement activities for health care services in Indonesia and described patient safety and quality of care in regards to challenges from mutual recognition arrangements (MRAs) and health professional mobility.

A systematic review was performed using online journal search engines (Google Scholar, PubMed, ScienceDirect) with the following keywords: patient safety, quality of care, and Indonesia. As a result, 1,828 papers were found. After checking for duplications, the papers were further screened with the following keywords: skill competency, awareness, and knowledge of quality of care. This resulted in a selection of 49 papers. For the last step, only papers published from 2005 to 2016 were selected, which resulted in just seven papers.

These results showed that most workers in health care centres did not understand the concept and definition of patient safety. There were no modules or guidelines available. Hospital patients were grouped into three segments, namely core service patients, complainers and salient patients. Medical errors were divided into four types, errors in administration (59%), transcription (15%), dispensing (14%) and prescribing (7%). Of these errors, 2.4% were classified as potentially serious and 10.3% as potentially significant. One paper stated that there were six types of service failures, including medical reliability errors, physical evidence errors, poor information, medical treatment errors, costly services and complaint handling failures.

Patient safety implementation procedures have been limited to medical personnel and health care providers. A primary health centre (PHC) needs five dimensions for the implementation of patient safety systems: dimensions of consciousness, commitment, identifying risk factors, compliance with incident reporting, and professional competence.

Keywords: ASEAN Economic Community, Free Flow Human Resources, Patient Safety, Quality of Care, Indonesian Public Health Centre

INTRODUCTION

Patient safety is considered as the prevention of errors and other adverse effects associated with health care in patients ⁽¹⁾ There are two factors directly related to patient safety: behaviour and skill ⁽²⁾ The relationship between the health care professional and the patient/consumer is the key for developing the role of the latter for patient safety. The first prerequisite is a shared awareness that a role for the patient/consumer

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is possible, accompanied by the motivation and skill needed to enable the activation of this role⁽¹⁾.

Data from transitional and developing countries suggest that substantial harm comes from medical care. However, there are considerable gaps in the knowledge regarding the structural and process factors that underlie such unsafe care that globally make solutions difficult to identify, especially in a resource poor setting⁽²⁾. This will be a challenge that needs to be faced in the Association of Southeast Asian Nations (ASEAN) community. Furthermore, with the establishment of the ASEAN Economic Community (AEC) in 2015⁽³⁾.

The first characteristic of the AEC is to create a single market and production base through the free flow of goods, services, investments, capital and skilled labour through mutual recognition arrangements (MRAs). MRAs aim to facilitate the mobility of professionals and skilled labour in the ASEAN. Through an exchange of information, MRAs can also work towards promoting the adoption of best practices on standards and qualifications (ASEAN). In other words, an MRA is a mechanism for countries to use to work together to harmonize competency standards and training in selected occupations, thereby facilitating labour mobility.

However, there are the questions as to whether the implementation of MRAs can be achieved, especially in regards to practices ensuring patient safety and quality of care from health professionals from several countries.

Through a systematic review of research literature, what is currently known about the knowledge gaps can be identified along with the contextual considerations for collecting data about patient safety and quality of care improvement activities for health care service providers in Indonesia.

METHOD

The study was designed using a systematic review. Systematic reviews and meta-analyses are essential for summarizing evidence relating to efficacy and the safety of health care interventions accurately and reliably⁽⁴⁾. A systematic literature review was conducted on the topic of safety and quality of care (public and private hospitals and private clinics) in Indonesia.

Study Identification: The systematic review was started with an online journal search engine (Google Scholar, PubMed, ScienceDirect) with the following keywords: patient safety, quality of care, and Indonesia, which

resulted in the discovery of 1,828 papers. After checking for duplications, the papers were further screened by the following keywords: skill competency, awareness, and knowledge of quality of care. This resulted in the selection papers of 49 papers. Lastly, only papers that were published from 2005 until 2016 were chosen, and this resulted in only seven papers.

RESULTS

Study in Bali identified 1,563 medication errors in her 20-week prospective study of such errors during the medication delivery process in a geriatric ward at a public teaching hospital in Bali, Indonesia⁽⁵⁾. The in-hospital clinical pharmacy identified these medication errors as being of six different types of errors, namely errors in administration, dispensing, transcription, prescribing, system, or monitoring.

The most frequently discovered medication error was in administration with 927 errors (59.3%). Monitoring errors were the least common with only two errors (0.1%). There were 10 types of administration errors committed the study⁽⁶⁾ which were errors in documentation, drug omission, dosage, timing, drug instructions, drug indications, drug types, near misses, duplications, and dosage forms. Out of the 927 errors, 593 of the administration errors were associated with documentation and 212 were associated with drug omission.

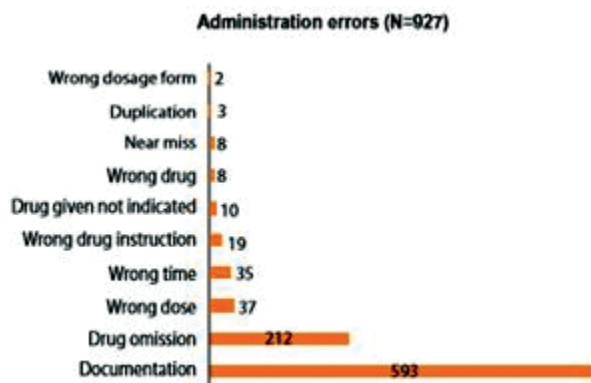


Figure 1: Types and number of administration errors identified

Alfansi et al. (2009) conducted a study examining the categories of service failures in the hospital industry in four cities in Bengkulu Province, Southwest Sumatera, Indonesia. There were six categories for service failures in the study by Alfansi et al. (2009): medical reliability failures, physical evidence failures, poor information, medical treatment errors, costly services, and complaint handling failures⁽⁷⁾.

Table 1: Categories of Service Failure

Categories	Description
Medical Reliability Failure	incompetence of doctors and paramedics in dealing with patients, inadequate skills of doctors, doctor’s mistake in medical treatment, doctor is in a rush in dealing with patients, and doctor is slow
Physical Evidence Failure	limited number of doctors and paramedic, lack of medical facilities, and untidiness of the hospital
Poor Information	reflect patient difficulties in finding information regarding medical treatment and in getting prescribed medication in the hospital drugstore
Medical Treatment Error	diagnosis errors conducted by doctors, slow serviced provided by the medical staff, and patient have no significant improvement after treatment and medication
Costly Services	extra cost associated with the services and the administrative process is time consuming
Complaint Handling Failure	hospitals are slow in handling patient complaints and cost of hospitals is too expensive relative to the services provided

The Alfansi et al. (2009) study also classified patients into three groups with the primary purpose of categorizing them on the basis of their responses to service failure-related variables⁽⁷⁾. These three groups were core service patients, complainers, and salient patients. Core service patients were 40.14% of the sample and had negative opinions about hospital service quality yet perceived that the physical evidence and medical treatment were relatively fine. Complainers were 34.35% of the sample and perceived that the quality of hospital services was below their expectations and only gave positive opinions on complaint handling. Salient patients were 34.35% of the sample and had negative perceptions of the quality of medical treatment provided by doctors or paramedics.

Table 2: Final Cluster Centers of Service Failure

Dimensions of service failure	Cluster 1	Cluster 2	Cluster 3
Medical reliability (F1)	-0.19	-0.10	0.29
Physical evidence (F2)	0.49	-0.78	-0.01
Information (F3)	-0.13	-0.28	0.36
Medical Treatment (F4)	0.73	-0.20	-0.70
Costly services (F5)	-0.14	-0.88	0.82
Complaint Handling (F6)	-0.39	0.53	0.06

The study of patient complaint behaviour by Alfansi’s et al. (2009) used a seven-point scale and revealed that most patients tended to voice their complaints through *direct action* by directly complaining to hospitals. The second pattern of patient complaint behaviour was *doing nothing* as patients tended to forget the hospital service failure and did nothing about it. The third pattern of complaint behaviour was *private action* where patients told friends about their bad experiences with the hospital’s services and persuading them not to use that hospital in the future. The fourth pattern was *public action* where patients would voice their complaints publicly through NGOs, the media, or by filing a lawsuit.

A qualitative study was conducted in Padang, Indonesia examining the dimensions of patient safety systems in Padang’s primary health care (PHC) facilities⁽⁸⁾. There were various surveys mentioned in the study that assessed patient safety, such as the Hospital Survey on Patient Safety Culture (HSPSC), which has 12 dimensions for a culture of patient safety, the Safety Attitude Questionnaire (SAQ), which has eight dimensions for patient safety, and the Instrument Stanford (IS), which has five dimensions for patient safety. The Indonesian Hospital Patient Safety Committee uses five dimensions for patient safety, which are dimensions of consciousness, commitment, identifying risk factors, compliance with incident reporting, and professional competence.

Machmud and Nursal’s study (2015) demonstrated that most workers in health centres did not understand the concept and definition of patient safety. The implementation of patient safety in the health centres had no modules or guidelines and, therefore, had been performed based on the existing SOP. The implementation of patient safety itself was still limited to medical personnel and other kinds of health service providers. There was no follow-up on most of patient safety incidents⁽⁸⁾.

DISCUSSION

Various methods have been used to examine patient safety in Indonesia, such as cross-sectional, qualitative, descriptive, and prospective studies with major research settings in public hospitals and PHC facilities providing significant and important findings related to patient safety conditions.

Most workers in health centres did not understand the concept and definition of patient safety, and there were no modules or guidelines.

Medication errors occurred at every stage of the medication delivery process, with administration errors being the most frequent. Pharmacist involvement in ensuring medication safety requires support from the health care system, health administrators, and a good practice environment. Pharmacists, through the provision of in-hospital clinical pharmacy services, could potentially play a significant role in detecting and preventing medication errors.

Largescale international prevalence studies have been the foundation for improving quality and safety in health care ⁽⁹⁾. The reviewed findings have implications for researchers, government, and health professionals in developing countries and especially in Indonesia, where quality and safety research is well established and there is a wealth of patient safety skills and knowledge to contribute.

These studies have been the driving force for governments in developed countries for investing in strategies that reduce patient harm and improve the quality of care. Accepting the evidence that patients are harmed by health care and adapting this knowledge according to the cultural and political systems of the country concerned might be a first strategy. Another strategy might to consider how low resource countries encounter distinct challenges and require their own prevalence studies to systematically identify and address unsafe or poor quality care⁽¹⁰⁾.

Larger scale collaborative projects that are based on a quality and safety framework are now needed. While a multitude of quality and safety interventions exist, researchers must account for the socio-political and cultural contexts when utilizing these in developing countries in Southeast Asia in addition to dealing with the challenges of implementation⁽²⁾. Rosenthal et al. (2010) highlighted the challenges for resource-limited countries that may compromise the success of quality and safety interventions. The challenges identified include the lack of mandated infection control programmes or hospital accreditation, limited funding, lower staff to patient ratios, and a greater proportion of inexperienced health care workers⁽¹¹⁾719 patients (190,905 central line)u2013days

Safety initiatives or interventions in developing countries must include local leadership, engagement, and agreed purpose. These things are essential because, while the intervention may be successful during the life of a research project, the real test of success is whether the gains can be sustained long after project completion⁽¹²⁾

Due to implementation of the AFTA and AEC systems, The Ministry of Health has been cooperating

with several other countries, such as Saudi Arabia, the United Kingdom, Kuwait, the Netherlands, Singapore, the United States, Norway, and Malaysia to deliver health care workers from Indonesia to those countries. According to analysis of the Indonesian health labour market in various countries, the kinds of Indonesian health care workers being sent overseas are general practitioners, dentists, medical specialists, and nurses. On the other hand, the number of foreign labourers working in Indonesia is increasing. It was reported in the media that 2,500 Philippine nurses applied for jobs in Indonesian hospitals. These foreign medical workers must have an educational level of a Bachelor Degree with registered nurse status (RNS) and speak Indonesian (Bahasa) fluently.

Currently, hospitals are facing big challenges from the globalization era. The challenge is to compete well with fellow health care providers both domestically and overseas. This means that competition provides or raises consumer or patient satisfaction where better quality is the main focus of service. On the other hand, globalization also affects patients by providing more information about health care services overseas.

Indonesia needs to increase the number of health care professionals and improve the type and quality of Indonesian health care professionals in curriculum creation, teaching and examination systems, and establish comprehensive health education programs. These actions will result in Indonesian health care workers meeting international standards and being ready to face an influx of foreign workers or to work abroad meeting international standards. Besides that, Indonesia needs to establish a policy requiring foreign health professionals to follow standardized professional examinations in order to work in Indonesia and enact reciprocal regulations, which means that foreign health workers who are authorized to work in Indonesia are from countries that also allow Indonesian health personnel to work in their country. Then, Indonesia needs an institution that can give accreditation to maintain the professionalism of health workers in Indonesia.

CONCLUSION

The safety and quality of patient care in developing countries such as Indonesia is understudied. This review indicates that patient safety implementation is still limited to medical personnel and health service providers. Unsafe and poor quality care is a problem, in particular medication errors or misuse and a lack of patient safety skills and knowledge in public hospitals. More studies on patient safety are needed in Indonesia to develop good standards to face MRAs.

Conflict of Interest: NIL

Ethical Clearance: The study was approved by the Ethical Committee of Faculty of Public Health, Universitas Indonesia, Indonesia, the approval number is 627/UN2.F10/PPM.00.02/2018

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REFERENCES

1. World Health Organization (WHO). Patient safety [Internet]. World Health Organization; 2018 May [cited 2018 May 23]. Available from: <http://www.euro.who.int/en/health-topics/Health-systems/patient-safety/patient-safety>
2. Braithwaite J, Marks D, Taylor N. Harnessing implementation science to improve care quality and patient safety: a systematic review of targeted literature. *Int J Qual Heal Care*. 2014;26(3):321–9.
3. Jha AK, Prasopa-Plaizier N, Larizgoitia I, Bates DW. Patient safety research: an overview of the global evidence. *Qual Saf Heal Care* [Internet]. 2010 Feb 1 [cited 2018 May 23];19(1):42–7. Available from: <http://qualitysafety.bmj.com/lookup/doi/10.1136/qshc.2008.029165>
4. Fachrudin U, Hastiadi FF. Impact Analysis of Normalized Revealed Comparative Advantage on ASEAN's Non-Oil and Gas Export Pattern Using Gravity-Model Approach. *Work Pap Econ Bus* [Internet]. Faculty of Economics and Business, University of Indonesia; 2016 [cited 2018 May 23]; Available from: <https://ideas.repec.org/p/lpe/wpecbs/201603.html>
5. Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gøtzsche PC, Ioannidis JPA, et al. The PRISMA Statement for Reporting Systematic Reviews and Meta-Analyses of Studies That Evaluate Health Care Interventions: Explanation and Elaboration. *PLoS Med* [Internet]. Public Library of Science; 2009 Jul 21 [cited 2018 May 23];6(7):e1000100. Available from: <http://dx.plos.org/10.1371/journal.pmed.1000100>
6. Ernawati DK, Lee YP, Hughes JD. Nature and frequency of medication errors in a geriatric ward: an Indonesian experience. *Ther Clin Risk Manag* [Internet]. Dove Press; 2014 [cited 2018 May 23];10:413–21. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/24940067>
7. Alfansi L, Atmaja FT. Service Failure and Complaint Behavior in the Public Hospital Industry: The Indonesian Experience. *J Nonprofit Public Sect Mark* [Internet]. Routledge ; 2009 Sep [cited 2018 May 23];21(3):309–25. Available from: <http://www.tandfonline.com/doi/abs/10.1080/10495140802644554>
8. Machmud R, Gusta Anggraini Nursal D. Patient Safety Dimension in Primary Health Care Padang City. In: *Proceedings of the 1st Public Health International Conference (PHICo 2016)* [Internet]. Paris, France: Atlantis Press; 2017 [cited 2018 May 23]. Available from: <http://www.atlantispress.com/php/paper-details.php?id=25875852>
9. Brennan TA, Leape LL, Laird NM, Hebert L, Localio AR, Lawthers AG, et al. Incidence of Adverse Events and Negligence in Hospitalized Patients. *N Engl J Med* [Internet]. Massachusetts Medical Society; 1991 Feb 7 [cited 2018 May 23];324(6):370–6. Available from: <http://www.nejm.org/doi/abs/10.1056/NEJM199102073240604>
10. WHO. Patient safety in developing and transitional countries New insights from Africa and the Eastern Mediterranean Better knowledge for safer care. *World Heal Organ* [Internet]. [cited 2018 May 23]; Available from: http://www.who.int/patientsafety/research/emro_afro_report.pdf
11. Rosenthal VD, Maki DG, Rodrigues C, Álvarez-Moreno C, Leblebicioglu H, Sobreyra-Oropeza M, et al. Impact of International Nosocomial Infection Control Consortium (INICC) Strategy on Central Line-Associated Bloodstream Infection Rates in the Intensive Care Units of 15 Developing Countries. *Infect Control Hosp Epidemiol* [Internet]. Cambridge University Press; 2010 Dec 2 [cited 2018 May 23];31(12):1264–72. Available from: https://www.cambridge.org/core/product/identifier/S0195941700039394/type/journal_article
12. Harrison R, COHEN AWS, Walton M. Patient safety and quality of care in developing countries in Southeast Asia: a systematic literature review. *Int J Qual Heal Care* [Internet]. Oxford University Press; 2015 Aug 1 [cited 2018 May 23];27(4):240–54. Available from: <https://academic.oup.com/intqhc/article-lookup/doi/10.1093/intqhc/mzv041>

Using Data Envelopment Analysis to Improve the Hospitals Efficiency in Indonesia: The Case of South Sulawesi Province

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ABSTRACT

Background: The increasing hospital growth in Indonesia provides favorable efforts in increasing public access to health care facilities. However, this condition will give adverse impacts if it is not compatible with efforts to generate hospitals as efficient organizations. The purposes of this research were to formulate appropriate strategies to improve hospital efficiency in South Sulawesi Province, Indonesia.

Method: This research used the Data Envelopment method to measure hospital efficiency. Samples of this research were all public hospitals in South Sulawesi province. The total samples of this research were 26 hospitals in South Sulawesi Province, Indonesia.

Results: Results of the research showed that of the total 26 hospitals assessed, most hospitals in South Sulawesi Province in the current time were still inefficient in which there were 14 hospitals or 53.8% in the inefficient category. The overall mean score of hospital efficiency in South Sulawesi province was 0.91.

Conclusions: The inefficiency estimation results in this study can help in formulating a policy to improve hospital efficiency in South Sulawesi Province by reducing certain inputs or maximizing outputs of hospital according to amount of projection inputs and outputs on DEA Analysis.

Keywords: *Data envelopment analysis (DEA), hospital efficiency, Indonesia.*

INTRODUCTION

The increasing hospital growth continually takes place every year in Indonesia. According to the Indonesian Health Profile, there are 1,268 hospitals in 2005 and increase up to 2,833 hospitals during December 2018⁽¹⁾. The increasing hospital growth will give benefits to the improvement of health services access to the community. However, this condition will be a burden if the increasing hospital growth is not compatible with appropriate efforts in generating hospitals as effective and efficient organizations.

Considering the importance of efficiency, the Indonesian government had formulated regulations that required all hospitals in Indonesia should be managed under the principles of the public service agency (PSA) model. The PSA aims to improve the quality of services to the public by providing flexibility of financial management based on the principles of efficiency, effectiveness and productivity. It is expected that the quality of hospital services and financial performance can be improved through the implementation of flexibility in financial management.

To date, the current method used to estimate hospital efficiency in Indonesia is the ratio method that includes ratio of patient and hospital staff, Bed Occupancy Rate (BOR), Average Length of Stay (ALOS) and Bed Turn Over (BTO) respectively⁽²⁾. Efficiency is a ratio of produced output over used input. Hence, the used inputs should be able to describe the entire resource of a particular hospital. However, the indicators formulated

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by the government only considers inputs in the form of human resources alone, without consideration of the capital inputs. In addition, correlations between input and output are measured based on only the ratio of one input to one output. Therefore, a more precise assessment method is needed to address those weaknesses. According to Hollingsworth (2008), the most common approach used to measure hospital efficiency is the frontier analysis approach, and one of the types of this approach is the Data Envelopment Analysis (DEA) method⁽³⁻⁴⁾.

In Indonesia, a study of hospital efficiency found out that only 35% of the total hospitals in Indonesia were technically efficient with an average technical efficiency rate of 80%⁽⁵⁾. Another study in East Java province indicated that of the total 39 hospitals assessed, only 8 hospitals were efficient⁽⁶⁾. South Sulawesi province is one of the provinces in Indonesia that shows the significant growth of hospitals in recent years. As recorded in 2010, there are only 10 public hospitals in the PSA status and increase up to 26 hospitals in 2017. The increase of amounts of hospitals is expected compatible with the improvement of quality and efficiency of services as stated in the objectives of implementation of the PSA policy.

The standard of bed occupancy rate in hospital is 60%-85% but only 8 regencies/municipalities of the total 24 regencies/municipalities in South Sulawesi fulfill that standard. This indicates that the efficiency of Bed Occupancy Rate remains a problem in South Sulawesi province⁽¹⁾. In addition to that, bed distribution is disproportionate in South Sulawesi province. Of the total 24 regencies/municipalities, 9 regencies/municipalities have the ratio of number of bed to number of population is less than 1 (the standard ratio of number of bed to number of population is 1). This leads the inefficiency of health services due to the excessive quantity of beds in some districts but lack of beds in other districts. Based on these reasons, this research aims to measure hospital efficiency using the DEA approach and formulate strategies to improve the level of hospital efficiency in South Sulawesi Province in Indonesia.

MATERIALS AND METHOD

Hospital Efficiency: Efficiency is a widely used term in economics, generally referring to the best utilization of resources in production. In another term, efficiency can also be interpreted as an optimum use of inputs provided by a particular hospital to produce outputs at a maximum level by utilizing its own resources. The efficiency assessments were divided into several sub-dimensions

that include service accuracy, relationship between input and output of health treatment, and the utilization of technology to gain the best care⁽⁷⁾.

Efficiency is divided into two types. Firstly, technical efficiency refers to the choice of production processes to produce certain outputs by minimizing resources. This technical efficiency is illustrated by points along the isoquant curve. Secondly, economic efficiency/cost efficiency refers to the choice of certain techniques used in production activities that should minimize costs. At economic efficiency, the company's activities are limited by the budget line owned by the company (isocost). The selected production efficiency should bear both technical efficiency and economic efficiency⁽⁸⁾.

The assessment of efficiency rate using the DEA method is widely used to measure the technical efficiency of hospitals and other health services, and it is not only applied in America but also worldwide. Several studies have found out the advantages of the DEA method to improve hospital efficiency⁽⁹⁻¹²⁾. A number of researchers apply this method because its simplicity in dealing with inputs and outputs. This method can accommodate a number of inputs and outputs in various dimensions. By using DEA, the assessment of efficiency will be more accurate because a particular hospital has many inputs and outputs and they are interconnected each other.

Data Envelopment Analysis: The DEA is a linear programming technique used to measure the efficiency of organizational units which called Decision Making Units (DMUs). DMUs are organizations or entities in which their efficiency rates are measured relative to a group of other homogeneous entities. Homogeneous entities signify that inputs and outputs of the evaluated DMUs should be similar. DMUs can be in the form of either commercial or public entities, such as commercial or government banks, private or public schools, hospitals, and so on⁽¹³⁾. DEA is used to compare a particular efficiency rate of a decision-making unit with similar DMUs by scoring various inputs and outputs. The calculation of efficiency using the DEA provides a value range from 0 to 1 (most efficient). DMUs with values less than 1 are classified as inefficient units. There are various types of DEA models that may be used depending on the conditions of the problem encountered⁽⁹⁾.

Data Source: This research used secondary data collected from the online hospital database reporting system of the Ministry of Health of the Republic of Indonesia in the year 2017. Samples of the research

were all public hospitals in the status of PSA in South Sulawesi Province, Indonesia. The total samples were 26 hospitals.

Input and Output Variables: In determining the input and output indicators, this research considered two things: results of the previous studies and the availability of data indicators in the hospital online database reporting system. Input indicators were hospital area (m²), numbers of doctors, nurses, other health workers and non-health workers⁽¹⁴⁻¹⁸⁾. Output indicators were numbers of outpatients, inpatient, emergency care, Bed Occupancy Rate (BOR) and Average Length of Stay of Patients (ALOS)⁽¹⁹⁻²³⁾.

FINDINGS

The results showed that the overall mean hospital area in South Sulawesi Province was 51,842m² with the overall mean number of 240 beds, 39 doctors, 207 nurses, 113 health workers and 90 non-health workers. The overall mean output produced by the hospitals were 46,071 outpatients, 19,843 inpatients, 8,771 emergency patients, BOR were 64% and ALOS were 3.9 days. The measurement of inputs and outputs of the hospitals that include the minimum, maximum, mean and standard deviation values are shown in Table 1.

Table 1: Descriptive Statistics of Inputs and Outputs

Inputs/outputs	Minimum	Maximum	Mean	Std. Deviation
Hospital Area (m ²)	5,500	400,000	51,842	75,973.860
Hospital Beds	107	919	240	150.580
Doctors	10	134	39	24.418
Nurses	65	951	207	173.002
Other Health Workers	27	557	113	118.319
Non-Health Workers	9	433	90	89.616
Inpatients	3,205	180,782	46,071	33,304.636
Outpatients	1,689	239,917	19,843	45,108.158
Emergency Patients	700	28,488	8771	6,256.949
BOR	16%	91%	64%	15.64052
Av-LOS	2.3	9	3.9	1.33523

Efficiency Scores: By using an output-oriented model with the Variable Returns to Scale, the technical efficiency rates of the hospitals were scored, as shown in Table 2. The overall mean score of hospital efficiency was 0.91 or 91%. The most hospitals (53.8%) are technically inefficient, but the overall efficiency rate of the hospitals in South Sulawesi province already achieved the good performance compared to other provinces. As indicated in a study conducted by Hafidz et.al (2018), the overall mean score of hospital efficiency in Java and Bali Provinces of Indonesia was only 61%⁽²⁴⁾ and another study found that the overall mean score of hospital efficiency in Indonesia was 80%⁽⁵⁾ or still lower compared to the overall mean score of hospital efficiency in South Sulawesi province that achieved up to 91%.

Table 2: Hospital Efficiency Scores in South Sulawesi Province

Efficiency	Frequency	Percent	Minimum	Maximum	Mean
Efficient	12	46.2	0.61	1.00	0.91
Inefficient	14	53.8			
Total	26	100.0			

Strategies to Improve Efficiency: Improving the hospital efficiency is crucial since hospitals represent a high share of overall health expenditure while providing key services to improve population health. Hospitals represent the largest share of health care spending. Indonesian hospitals account for 55 percent of the total public health expenditures⁽²⁵⁾. Between 2005 and 2014, the share of hospitals' expenditures increased by 22%⁽²⁵⁻²⁶⁾. However, the average hospital BOR in Indonesia is only above 60 percent, which is lower than the recommended occupancy levels of 85%-90%⁽²⁷⁻²⁸⁾.

Table 3: Initial and Estimated Mean Scores of the Hospitals

Inputs/Outputs	Mean		Differences
	Initial Scores	Estimated Scores	
Hospital Area (m ²)	51,842	31,759	-39%
Beds	240	219	-9%
Doctors	39	32	-18%
Nurses	207	153	-26%
Other Health Workers	113	89	-21%
Non-Health Workers	90	58	-36%
Inpatients	46,071	55,685	21%
Outpatients	19,843	23,766	20%
Emergency Patients	8771	11056	26%
BOR	63.7%	76.7%	20%
Av-LOS	3.9	3.4	-13%

The strategies to improve the efficiency rate of hospitals can be pursued by the policy makers by conducting two approaches: reducing inputs or maximizing outputs. In reducing inputs, the initial mean score of hospital building area in South Sulawesi Province is 51,842m² and the estimated mean score for hospital building area to achieve efficiency rate should be reduced by -39%. In addition, Table 3 shows that the initial mean scores of beds at hospitals are 240 beds and to achieve an optimum level of efficiency, the current amounts of beds at hospitals should be only 219 beds or it should be reduced by -9%. Other inputs that should be reduced by the hospitals to achieve the efficiency level are numbers of doctors by -18%, nurses by -26%, and other health workers by -21% and other non-health workers by -36% respectively.

Another strategy that should be conducted by the management to improve hospital efficiency is increasing the hospital productivity. By increasing the productivity, it is expected that a particular hospital can achieve an optimal output. Referring to the current number of inputs, the estimated mean outputs that should be achieved by the hospitals in South Sulawesi province in one-year health service are 55,685 outpatients, 23,766 inpatients and 11,056 emergency patients. Furthermore, the hospital's BOR needs to be increased by 20% from the initial score of 63.7% to 76.7%. The quality of services at hospitals also needs to be improved, especially the quality of patient care services. By improving the quality of patient treatment services, it is expected that the mean length of stay of patients can be reduced by 13% or will decrease from 3.9 days to 3.4 days to achieve the level of optimum hospital efficiency.

CONCLUSIONS

This research can provide some valuable inputs for the policy makers. By considering the needs of public health services in the hospital work area, the estimation of inefficiency can assist them to formulate appropriate policies to improve hospital efficiency level by maximizing the hospital input productivity. Productivity of hospital inputs should be improved to achieve optimal output levels. In addition, the policy makers need to pay more attentions to the efficiency of hospital inputs due to the numbers of inputs are not compatible with outputs, in which the policy makers need to formulate appropriate strategies such as reallocating hospital inputs, especially in hospitals in the category of inefficient. Strategies of resource relocation from hospitals with excessive inputs by reducing resource inputs can be implemented to achieve hospital efficiency in South Sulawesi Province.

Conflict of Interest: The authors declare that they have no competing interests

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Ethical Clearance: This research was approved by ethics committee of Public Health Faculty, Universitas Indonesia.

REFERENCES

1. Dirjen Yankes. Indonesia Hospital Online [Internet]. Ministry of Health, Indonesia. 2018. Available from: <http://sirs.yankes.kemkes.go.id/rsonline/login.php>

2. Kemenkeu. Guidelines for Assessment of Performance of the Public Service Agencies in Health Services Division. 2013.
3. Hollingsworth B, Peacock SJ, Hollingsworth B, Peacock SJ. Efficiency Measurement in Health and Health Care [Internet]. Taylor & Francis or Routledge's. 2008. 1-157 p.
4. Hussey PS, Vries H De, Romley J, Wang MC, Chen SS, Shekelle PG, et al. Health Care Efficiency A Systematic Review of Health Care Efficiency Measures. Heal Res Educ Trust. 2008;784–805.
5. Chalidyanto D. Factors relating to the efficiency of government hospitals in Indonesia. Universitas Indonesia; 2013.
6. Cahyani N, Akbar MS, Susilaningrum D. Review on Health Service Efficiency General Hospital In East Java. J Sains dan Seni ITS. 2012;1(August 2016).
7. Veillard J, Champagne F, Klazinga N, Kazandjian V, Arah OA, Guisset A. A performance assessment framework for hospitals: The WHO regional office for Europe PATH Project. *Int J Qual Heal Care*. 2005;17(6):487–96.
8. Haryadi A. Technical Efficiency Analysis of Education Sector (Application of Data Envelopment Analysis). Universitas Indonesia. Depok.; 2011.
9. Shahhoseini R, Tofighi S, Jaafari-pooyan E, Safiaryan R. Hospitals Efficiency measurement in developing countries: application of data envelopment analysis for Iranian. *Heal Serv Manag Res*. 2011;24(75).
10. Hatam N. The role of Data Envelopment Analysis (DEA) pattern in the efficiency of social security hospitals in Iran. *Iran Red Crescent Med J*. 2008;10(7):211.
11. Sheikhzadeh Y, Roudsari A, Vahidi R, Emrouznejad A, Dastgiri S. Public and Private Hospital Services Reform Using Data Envelopment Analysis to Measure Technical, Scale, Allocative, and Cost Efficiencies. *Heal Promot Perspect*. 2012;2:28–41.
12. Yasar A, Ozcan. Health Care Benchmarking and Performance Evaluation : An Assessment using Data Envelopment Analysis. Second Edi. Richmond, VA, USA: Springer Science & Business Media; 2014.
13. Ramanathan R. An Introduction to Data Envelopment Analysis; A Tool for Performance Measurement. India: Sage Publications Ltd.; 20013.
14. Karagiannis R. A system of equations two stage DEA approach for explaining capacity utilization and technical efficiency. *Ann Oper Res* [Internet]. 2015 Apr;227(1):25–43.
15. Nicola A De, Gitto S, Mancuso P, Tor R. A two-stage DEA model to evaluate the efficiency of the Italian health system [Internet]. Italia; 2012. Report No: 39126.
16. Varabyova Y, Schreyögg J. International comparisons of the technical efficiency of the hospital sector: Panel data analysis of OECD countries using parametric and non-parametric approaches. *Health Policy (New York)* [Internet]. 2013 Sep;112(1–2):70–9.
17. Chang H, Cheng M-A, Das S. Hospital ownership and operating efficiency : Evidence from Taiwan. *Eur J Oper Res*. 2004;159:513–27.
18. Cellini R, Pignataro G, Rizzo I. Competition and Efficiency in Health Care an Analysis of the Italian Case. 1999. p. 2–18.
19. Hsin-hui H, Qinghui Q, Chih-hai Y. China Economic Review Analysis of hospital technical efficiency in China : Effect of health insurance reform. *China Econ Rev* [Internet]. 2012;23(4):865–77.
20. Rezaee MJ, Karimdadi A. Do Geographical Locations Affect in Hospitals Performance? A Multi-group Data Envelopment Analysis. *J Med Syst* [Internet]. 2015 Sep;39(9):1–11.
21. Sulku SN. The health sector reforms and the efficiency of public hospitals in Turkey: Provincial markets. *Eur J Public Health*. 2012;22(5):634–8.
22. Hofmarcher MM, Paterson I, Riedel M. Measuring Hospital Efficiency in Austria – A DEA Approach. *Heal Care Manag Sci* 5., 2002;5:7–14.
23. Mahate A, Hamidi S. Frontier efficiency of hospitals in United Arab Emirates: An application of data envelopment analysis. *J Hosp Adm* [Internet]. 2015;5(1):7–17.
24. Hafidz F, Ensor T, Tubeuf S, Building W, Hospital SA. Assessing Hospital Performance in Indonesia:

- An Application of Frontier Analysis Techniques. Leeds; 2018. Report No.: WP18_1.
25. CHEPS, PPJK, AIPHSS. Indonesia National Health Accounts 2014. Jakarta, Indonesia; 2016.
26. Soewondo, P., Nadjib, M., Sari, K., Yunita & Afdhila N. Sha-based health accounts in the asia-pacific region: Indonesia 2005-2009. Seoul, Republic of Korea.; 2011.
27. Mahendradhata, Y., Trisnantoro, L., Listyadewi, S., Soewondo, P. M, T., Harimurti, P. & Prawira J. The Republic of Indonesia Health System Review. India; 2017.
28. Chisholm D, Evans DB. Improving health system efficiency as a means of moving towards universal coverage. 2010;

Walking as an Alternative Treatment of HbA1c Levels Control among Type 2 Diabetes Mellitus Patients

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ABSTRACT

Background: The examination of HbA1c (long-term glucose control) is usually performed to determine the condition of diabetes patients in early treatment. The various physical exercise was prescribed for patients to reduce the level of HbA1c. But the standard physical activity lasted for more than 150 minutes per week may cause tiresome and laziness for the patient. As such, the writers propose the walking exercise as an alternative. The objective of the study was to examine the effect of walking on HbA1c levels in type II DM patients treated in Kotabumi, North Lampung, Indonesia.

Method: Design of this study was quantitative research type. This study used quasi-experimental research with pre-post-test without a control group. Population in this research was patient of type II DM at community health clinic of Kotabumi II, North Lampung with 30 respondents obtained by purposive sampling technique. A t-test was used to analyze the relationship between variable.

Results: Results of the analysis showed a significant difference mean score of HbA1c between the measurement before and after the intervention of walking ($p= 0.002$; $\alpha=0.05$).

Conclusion: The walking exercise can be implemented in the treatment of Type 2 DM patient but must be adjusted to the current practice of a-150-minutes physical exercise to determine the proper portion of the training.

Keywords: *HbA1c, walking practice, exercise, type 2 DM, Tanjung Karang, Indonesia*

INTRODUCTION

Diabetes Mellitus is a progressive chronic disease characterized by the body's inability to metabolize carbohydrates, fats, and proteins, leading to hyperglycemia (elevated blood sugar levels⁽¹⁾). Many new treatment approaches have been developed, and recent clinical trials have provided relevant information regarding strategies to prevent and treat type 2 diabetes as well as some of the adverse effects of these interventions⁽²⁾. However, often neglected that when someone has type 2 diabetes, physical activity is an essential component of the treatment plan⁽³⁾.

Structured physical exercise consisting of aerobic exercise, resistance training or both are associated with a decrease in long-term glucose control (HbA1c) of type II DM patients. The formal physical activity of more than 150 minutes per-week decreases the HbA1c

level higher than if it is less than 150 minutes per week⁽²⁾. The purpose of the HbA1c examination is to determine the power of diabetes over a period of weeks or months⁽⁴⁾. Given the long-term problems and severe complications of diabetes, some of the issues that arise, such as eye disorders, kidney, blood vessels and nerves, leading to blindness, severe kidney disease, amputation, cerebrovascular disease (CVA) and Myocardial Infarction (MI) If not appropriate and prompt action on disease prevention, control and treatment^(5,6,7,9). DM disease has many chronic complications such as macro and microangiopathy. Some of the long-term problems that occur are a nuisance in the kidneys form nephropathy, disorders of the nervous system in the form of stroke heart disorders in the way of myocardial infarction and also problems due to macroangiopathy is diabetic foot ulcers that result in the occurrence of amputation. These problems will occur if handling is not done in the form of prevention, control and appropriate direct action. Physical exercise is an essential pillar in diabetes management, along with dietary and pharmacological interventions⁽¹⁰⁾.

The current guidelines suggest that patients with type II diabetes should do at least 150 minutes per-week

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with moderate aerobic exercise intensity and should exercise resistance training three times per week. The benefits of physical exercise for people with diabetes include increasing blood glucose levels, preventing obesity, contributing to the possibility of atherogenic complications, blood fat disorders, normalizing blood pressure, and improving the ability of work ⁽²⁾. Physical inactivity is estimated to be 21-25% as the principal cause of breast and colon cancer, 27% diabetes mellitus and 30% ischemic heart disease. Besides, the incidence of NCDs is currently approaching half the disease globally. This is estimated from every ten deaths, 6 of which contribute to the condition of NCDs ⁽¹¹⁾. Glycosylated hemoglobin (HbA1c) in diabetic patients reflects average blood glucose levels, and will not be affected by blood glucose variability in a short time ^(8,12).

Community health clinic has been implementing activities of DM patient management that are DM gymnastic activity, counseling, physical examination, blood glucose examination, home care and others. The purpose of the study to know the effect of walking on the levels of HbA1c in patients with type II DM in Kotabumi, North Lampung.

METHODOLOGY

This type of research is quantitative with quasi-experimental research design using a pre-post test design without a control group with intervention in the form of walking exercise. The analysis was carried out in community health clinic Kotabumi, North Lampung, namely Kotabumi II and Community Health Center Madukoro from August to November 2016. The population in this study were DM type II patients recorded in registration book at community health clinic Kotabumi II and community health clinic Madukoro ^(13,14). By using the formula, the number of respondents is 35 people. The inclusion criteria of the respondent were type II DM patients, taking oral hypoglycemic drugs (OHO), and signed informed consent. The requirements of the respondent's exclusion are the respondents experiencing complications such as heart problems, kidney disorders, liver disorders, severe anemia and diabetic foot ulcers (DFU), DM patients taking long-acetylsalicylic acid, clotting specimen, maternal-fetal transfusion, hemodialysis, bleeding, Hemolytic, phlebotomy, thalassemia, paralysis of the lower extremities, inflammation of the joints, osteomyelitis. Selection of the sample in this study

by using non-probability sampling that is consecutive sampling or sampling where all actual samples and meet the inclusion criteria taken to achieve the sample size determined by the researchers ⁽¹³⁾. HbA1c level obtained from laboratory examination of venous blood was done two times before intervention and after the intervention. Blood sampling was done by laboratory staff of North Lampung community health clinic then the examination of a HbA1c level was done by Diagnostic Partners laboratory of Bandar Lampung.

Before the bivariate analysis, the test of normality of data using Kolmogorov Smirnov analysis included initial HbA1c, final HbA1c, and respondent characteristic data. Bivariate analysis was conducted to examine the relationship or differences between the independent variables (walking exercise), with the dependent variable (HbA1c level). The bivariate analysis employs the dependent t-test and Pearson Correlation is used as the data is typically distributed. The significance level is set at 95%.

RESULTS

The average age of respondents is 56.30 years old. The mean for BMI in the intervention group was 25.01 (SD=10.82). The lowest BMI was 19.48, and the highest BMI was 33.27. The average duration of DM pain was 4.6 years. The minor DM pain is one year, and the most widespread DM pain is 13 years. The lowest initial HbA1c level was 4.9, and the highest HbA1c level was 14.10, and the mean final HbA1c level was 7.33 (SD=1.90). The lowest end HbA1c level is 4.70, and the highest HbA1c level is 10.90.

Table 1: Distribution of respondents by age, BMI, duration of DM disease

Variables	Mean	SD	Min. – Max.	95% CI
Age	56.30	57.80	36-67	53.46 59.14
BMI	25.01	10.82	19.48-33.27	23.78 26.23
DM periode	4.6	3.31	1-13	3.36 5.84
HbA1c 1	8.44	2.58	4.90 -14.10	7.47 9.40
HbA1c 2	7.33	1.90	4.70-10.90	6.67 8.09

The average HbA1c score in the first assessment was 8.44 (SD=2.59). There was an average decrease in HbA1c level in the second appraisal of 7.38 (SD=1.90). The result of statistical test obtained $p=0.002$ concluded that there is the difference of HbA1c level of the first appraisal which is significant with the second assessment or there is a significant difference between HbA1c level score between first and second measurement ($p=0.002$; $\alpha=0.05$). The variables tested for the strength of the relationship are HbA1c level variables and respondent characteristics. The result of Pearson correlation analysis shows there

is no relation of body mass index with final HbA1c ($r=0.131$) ($p=0.490$), no age relationship with end HbA1c ($r=0.152$) ($p=0.423$) long suffered DM with end HbA1c ($r=0.072$) ($p=.707$) and no relation between work with final HbA1c level ($p=0.657$). The multivariate analysis aims to determine the extent to which the characteristics of respondents influences the final HbA1c level. In this study, the results of multivariate analysis showed that none of the characteristics of respondents who can be used as the value of p on each characteristic of the respondent is > 0.25 exceeding the critical value of $p = 0.05$.

Table 2: Mean of HbA1c level analysis of type II DM patients before and after the walk exercises

Variable	Mean	SD	Different Means 95% CI	T	df	n	p-value
Initial HbA1c	8.44	2.59	0.42: 1.67	3.45	29	30	0.002*
Final HbA1c	7.38	1.90					

DISCUSSIONS

Walking exercise is a physical activity used to improve health and maintain fitness. The training is carried out depending on the tolerance that can be performed by the patient. Physical, emotional and developmental factors affect activity tolerance. An active lifestyle is vital in maintaining and improving health as well as in the handling of chronic diseases⁽¹⁵⁾. Regular physical activity and exercise improve the overall functioning of the body, including cardiopulmonary (endurance), musculoskeletal fitness (flexibility and integrity), nourishment and weight control (body image) as well as psychological well-being⁽¹⁵⁾. Walking is a form of activity that is easy, safe, can be done anywhere, good for the body (endurance, increase muscle strength and increase the flexibility of joints), prevent and fight some diseases (e.g., hypertension, heart disease, stroke, and obesity). Walking exercise is an aerobic exercise that plays an essential role in improving insulin signals by increasing the protein GLUT4. GLUT4 is responsible for expanding the use of glucose into cells, facilitating glucose to be used as energy during exercise⁽¹⁷⁾. This suggests that this exercise can be used as a proper stimulus in overcoming insulin resistance in type 2 diabetic patients⁽¹⁸⁾. Walking exercise can control blood sugar levels. Training followed by dietary intervention is the first line therapy in DM patients⁽¹⁶⁾. HbA1c formation occurs for 120 days, which is the lifespan of red blood cells. The amount of hemoglobin that is glycolized depends on the amount of glucose available. If blood glucose levels rise for a long time, red blood cells will

be saturated with glucose to produce glychemhemlobin⁽⁷⁾. Structured exercises include aerobic exercise, resistance training or a combination of both associated with a decrease in HbA1c in Type II DM patients⁽²⁾. Besides, it is stated that physical activity is related to a reduction in HbA1c levels when supported by a proper diet. However, if HbA1c is too low, it will cause the risk of hypoglycemia⁽¹⁹⁾. Based on the results of HbA1c measurement beginning and ending, it is known that blood sugar control in patients with type II DM in North Lampung, Kotabumi region is not suitable as seen from the average Hb A1c initial level of 8.4%. Nevertheless, after doing the exercises in a structured activity where the training is done three times a week, there is an average decrease to 7.38%. This condition indicates that walking exercise increases the use of glucose in the blood and is an appropriate stimulus in overcoming insulin resistance in type 2 DM patients⁽¹⁸⁾.

CONCLUSION

Type II DM patients in the Kotabumi area of North Lampung have an average length of DM for 4.6 years (SD=3.31). Type II DM patients in Kotabumi North Lampung have an average body mass index of 25.01 (SD=10.82). Patients with type II DM in Kotabumi North Lampung had an average HbA1c level at baseline measurement was 8.44% (SD=2.59). Type II DM patients in the Kotabumi area of North Lampung had an average HbA1c score in the final measure was 7.38 (SD=1.90). There is a significant difference of HbA1c levels in the first measurement and second ($p=0,002$; $\alpha=0,05$) in DM

type II patient in Kotabumi North Lampung Indonesia. This way, walking exercise can be given as an alternative to treatment in maintaining the blood sugar level.

Ethical Clearance: The Ministry of Health Polytechnic approved this research in Tanjung Karang, Indonesia. A research permit was requested from the local health authorities. We would like to thank the Community Public Health in Kotabumi and Madukoro Bandar Lampung for helping us during the research. We also wish to thank all the participants who contributed to this study.

Conflict of Interest: Nil.

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REFERENCES

- Inzucchi SE, Bergenstal RM, Buse JB, Diamant M, Ferrannini E, Nauck M, Peters AL, Tsapas A, Wender R, Matthews DR. Management of hyperglycemia in type 2 diabetes, 2015: a patient-centered approach: update to a position statement of the American Diabetes Association and the European Association for the Study of Diabetes. *Diabetes care*. 2015 Jan 1;38(1):140-9.
- Kahn SE, Cooper ME, Del Prato S. Pathophysiology and treatment of type 2 diabetes: perspectives on the past, present, and future. *The Lancet*. 2014 Mar 22;383(9922):1068-83.
- Tomas-Carus P, Ortega-Alonso A, Pietilainen KH, Santos V, Gonçalves H, Ramos J, Raimundo A. A randomized controlled trial on the effects of combined aerobic-resistance exercise on muscle strength and fatigue, glycemic control and health-related quality of life of type 2 diabetes patients. *The Journal of sports medicine and physical fitness*. 2016 May;56(5):572-8.
- Park J, Lim S, Yim E, Kim Y, Chung W. Factors associated with poor glycemic control among patients with type 2 diabetes mellitus: the fifth Korea National Health and Nutrition Examination Survey (2010-2012). *Health Policy and Management*. 2016 Jun 1;26(2):125-34.
- Mahdavi AR, Etemad K, Haider M, Alavinia SM. The effect of seeing a family physician on the level of glycosylated hemoglobin (HbA1c) in type 2 Diabetes Mellitus patients, 2013;12(1):1.
- Hirst JA, Stevens RJ, Farmer AJ. Changes in HbA1c level over a 12-week follow-up in patients with type 2 diabetes following a medication change. *PLoS One*. 2014;9(3):1-7.
- Marlaykey, Louise M., dan McMorro ME. Nurse's manual of laboratory test and diagnostic procedures. Second ed. Philadelphia: W.B Saunders Company, 2000.
- Paputungan SR, Sanusi H, Bagian S, Metabolik E, Bagian D, Penyakit I. Peranan Pemeriksaan Hemoglobin A 1c pada Pengelolaan Diabetes Melitus, 2014;41(9):650-5.
- WT C. Diabetes-related microvascular and macrovascular diseases in the physical therapy setting. *Phys Ther [Internet]*, 2008;88(11):1322-1335 14p. Available from: <http://0-search.ebscohost.com/brum.beds.ac.uk/login.aspx?direct=true&db=rzh&AN=105573542&site=ehost-live&scope=site>
- Johnson JY. Handbook for Brunner & Suddarth's textbook of medical-surgical nursing, 2010. 591-594 p.
- WHO. Global recommendations on physical activity for health. Switzerland: WHOPress, 2010.
- Fang L, Zhong S, Bing LU, Zhang L, Shen L, Shen X, Zhu W. Effect of blood glucose variability on urinary proteins in type 2 diabetes mellitus. *Clinical Medicine of China*. 2015 Jan 1;31(1):57-60.
- Sastroasmoro, S. I. Dasar-dasar metodologi penelitian klinis. Jakarta: Sagung Seto, 2010.
- Dahlan M. Statistik untuk kedokteran dan kesehatan. edisi 3. Jakarta: Salemba Medika, 2008.
- Potter PA. Fundamentals of nursing. 8th edition. St. Louis: Elsevier Mosby, 2013.
- Gulve EA. Exercise and Glycemic Control in Diabetes: Benefits, Challenges, and Adjustments to Pharmacotherapy. *Phys Ther*. 2008;88(11).
- RJ C, Crank H, Hall A, Millbourn A. Be Active: promoting physical activity in overweight people. *Pract Nurs [Internet]*, 2010;21(11):569-573 5p. Available from: <http://search.ebscohost.com/login.aspx?direct=true&db=c8h&AN=104946552&lang=ja&site=ehost-live>.
- Frøsig C, Richter EA. Improved Insulin Sensitivity After Exercise: Focus on Insulin Signaling. *Obesity [Internet]*, 2009;17(n3s):S15-20. Available from: <http://dx.doi.org/10.1038/oby.2009.383>.
- Lipska KJ, Warton EM, Huang ES, Moffet HH, Inzucchi SE, Krumholz HM, et al. HbA1c and risk of severe hypoglycemia in type 2 diabetes: the diabetes and aging study. *Diabetes Care*. 2013;36(11):3535-42.

Oolong Tea Drink as an Alternative to Oral Negative Contrast Media in Magnetic Resonance Cholangio Pancreatography (MRCP)

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ABSTRACT

Background: High signal intensity of the gastrointestinal system can disrupt the optimization of MRCP image quality. Research on the use of natural oral contrast media of MRCP has been widely used, but contrast media material is difficult to obtain in the developing country market such as Indonesia

Methods: Based on Atomic Absorption Spectrometry (AAS) test the manganese content of oolong tea brand packaged is 0.9 mg larger than other packaged tea products. Therefore this study aims to evaluate oolong tea packaged as an alternative to oral MRCP contrast medium and to determine the best start scanning time settings. The subjects of the study were 28 healthy respondents, consisting of one control group and three treatment groups. The treatment group was given a 400 ml oolong tea package then 3D MRCP thick slab axial HASTE scanning was performed after 5 minutes (treatment 1), 15 minutes (treatment 2) and 25 minutes (treatment 3). The MRCP image assessment uses grading based on contrast and image effects.

Results: The results showed that there was a difference of MRCP image on the enhancement of contrast and image effect. The stomach and duodenum can be compressed into hypointense as well as the visualization of the choledochal, and the hepatic ducts appear more clearly at the start of a 15-minute scanning and 25-minute post contrast. Visualization of the ampulla, pancreatic ducts, and intra-hepatic ducts showed no difference between pre and post contrast.

Conclusion: Oolong tea in a form of a ready-to-drink package is as effective as other negative contrast media when used in Magnetic Resonance Cholangio Pancreatography (MRCP).

Keywords: Resonance Cholangio Pancreatography (MRCP), contrast media, oolong tea,

INTRODUCTION

Magnetic Resonance Cholangio Pancreatography (MRCP) is an alternative to the examination of the biliary system to evaluate the pancreatobiliary system and to reveal images of the ampulla, biliary duct, hepatic ducts, and intrahepatic central ducts without the use of contrast media ^(1,2). MRCP examination in determining obstruction in the biliary ducts has a sensitivity of 96%, 86% specificity, and 90% accuracy. In detecting

choledocholithiasis, MRCP examination has a sensitivity of 86%, 90% specificity, and 89% accuracy⁽³⁾.

In general, MRCP examination is done without using contrast media, but when overlapping occurs between the gastrointestinal and pancreatobiliary system, it will produce a false structure picture. The overlapping state of the MRCP examination may result in an unexpected increase in signal intensity. Diagnostic errors of MRCP examination include the frequent occurrence of fluid in the stomach or duodenum estimated as pancreatobiliary system pseudolesion. The fluid located between the folds of the stomach although this is normal may be considered as fluid in the ecstatic pancreatic ducts. Likewise, fluid and air in the duodenal bulb can be regarded as gallstones^(1,4,5).

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Oral negative contrast media used for examination of the abdominal area is gadopentetate dimeglumine, ferric ammonium citrate, manganese chloride, kaolinite, antacid, barium sulfate and ferric particles. Ironically, oral negative contrast media is rarely used because it is not manufactured as it is perceived as uncomfortable, difficult to swallow and expensive⁽⁶⁾.

This study aims to find an alternative to using natural oral negative contrast media on MRCP examination. The use of natural oral negative contrast in the form of liquids or juices in both fruits and drinks shows a very various best start time for scanning after drinking. The oral contrast medium of blueberry and pineapple juice indicate the best scanning start time is 15 minutes after drinking contrast media ^(6,7). The use of lemon juice, favorite beverages, and black tea as a contrast medium is not explained when the best time to start scanning is ^(8, 9, 10). The start time of scanning is essential to obtain an optimal MRCP image. This study aims to provide an alternative natural oral negative contrast media that can be used for MRCP examination and to find out the best start time scanning when using negative oral contrast medium of Oolong tea. In the family tree of Chinese teas, Oolong tea which is semi-fermented lies between un-fermented green tea and fermented black tea (called black tea in the West but known as red tea in China). The range of fermentation varies from 8% to 70%. Oolong is sometimes written as Wulong, but the meaning is the same: Oo (Wu) means black and long means dragon. Oolong tea is also known in China as “Qing Cha.”

Ready-to-drink packaged oolong tea is selected as based on Atomic Absorption Spectrometry (AAS) test; it has the highest manganese content (0.90 mg) compared to other types of tea drinks. In this study, the variation of time is analyzed to find the best scanning start time after the respondents are given the oolong tea.

METHODOLOGY

This research is an experimental research with Randomized Pretest-Posttest Control Group Design ⁽¹¹⁾. The sample of this study was healthy respondents with inclusion criteria; aged 25-55 years, in good health, willing to follow the course of research and with exclusion criteria; pregnancy, claustrophobia, Body Mass Index (BMI) > 30. The number of samples is at least seven respondents per group; consisting of 1 control group and three treatment groups, resulting in a total of 28 respondents. Determination of sample applies simple random sampling ⁽¹²⁾. Before the MRCP

examination, the respondents underwent fasting for six hours. The control group was not given negative oral contrast medium of oolong tea. The treatment group was administered the negative oral contrast media of oolong tea with different scanning time commencing; 5 minutes, 15 minutes and 25 minutes post contrast. Assessment of MRCP image information was performed by three radiologists using grading 1-4 on the negative oral contrast media effect on signal intensity and grading 0-3 on the impact of pancreatobiliary tree image system ⁽⁷⁾. Data were analyzed with Paired T-Test, Wilcoxon Sign Test, One Way ANOVA Test, and Kruskal Wallis Test.

RESULTS

The oral negative contrast media effects of oolong tea drink on the intensity of gastric and duodenal signals can be observed in Table 1. There was no difference in gastric and duodenal signaling intensity before and after oolong tea drink administration in the control group shown with p-value = 0.317. There is a difference in the strength of gastric and duodenal signals after the administration of the drink under different interval times; 5 minutes post contrast (p = 0.015), 15 minutes post contrast (p <0.001) and 25 minutes post contrast (p <0.001).

Table 1: Oral negative contrast media effect

Variable	Pre	Post	p
0 minute	2 ± 0.00	2.14 ± 0.378	0.317
5 minutes	2 ± 0.00	5.57 ± 5.35	0.015
15 minutes	2 ± 0.00	6.14 ± 0.690	< 0.001
25 minutes	2 ± 0.00	5.57 ± 1.134	< 0.001

The effects of negative oral contrast media of oolong tea packaging on the image of the pancreaticobiliary tree system on gallbladder (GB), cystic duct (CD), common hepatic duct (CHD), intrahepatic duct (IHD), common bile duct (CBD), pancreatic duct PD), ampulla (A), can be seen in Table 2.

Table 2: Negative contrast media effect on pancreatobiliary

Variable	Pre	Post	p
0 minute	12.29 ± 2.289	12.57 ± 2.370	0.172
5 minutes	10.86 ± 2.610	10.14 ± 2.478	0.047
15 minutes	11.43 ± 1.718	13.43 ± 1.618	0.010
25 minutes	11.29 ± 1.890	12.57 ± 1.397	0.063

There was no difference of conspicuity level of pancreatobiliary tree system after administering of oolong tea beverage in control group as showed by $p = 0.172$. The same was true in the treatment group with 25 minutes post contrast time where $p = 0.063$. But the treatment group of 5 minutes and 15 minutes post contrast showed there were differences respectively with $p = 0.047$, and $p = 0.010$.

The negative oral contrast media effects of oolong tea drinks on inter-group gastric and duodenal signaling intensities are shown in Table 3.

Table 3: The intensity of gastric signals and duodenum

Variable	Mean ± SD	Mean Rank	p
0 minute	2.14 ± 0.378	4.50	0.001
5 minutes	5.57 ± 5.35	16.57	0.001
15 minutes	6.14 ± 0.690	20.71	0.001
25 minutes	5.57 ± 1.134	16.71	0.001

There was a difference in the intensity of gastric and duodenal signals after administration of negative oral contrast medium of oolong tea drink with p -value 0.001 ($p < 0.05$). The highest strength of gastric and duodenal signals is at 15 minutes post contrasted with mean rank of 20.71 and the mean intensity of gastric and duodenal signals is of 6.14 ± 0.690 .

Table 4: The intensity of gastric and duodenal signals

Variable	5 minutes	15 minutes	25 minutes
0 minute	$p = 0.001$	$p = 0.001$	$p = 0.001$
5 minutes	–	$p = 0.114$	$p = 0.891$
15 minutes		–	$p = 0.284$

There was a difference between the control with post contrast groups in all scanning starting time either 5 minutes ($p = 0.001$), 15 minutes ($p = 0.001$) or 25 minutes ($p = 0.001$). There was no difference in the intensity of gastric and duodenal signals between the 5-minute and 15-minute post contrast groups ($p = 0.114$); 5 minutes with 25 minutes post contrast ($p = 0.891$); 15 minutes with 25 minutes post contrast ($p = 0.284$).

Further observation result indicated that there was a difference of clarity level (conspicuity) of pancreatobiliary tree system at each scanning time with

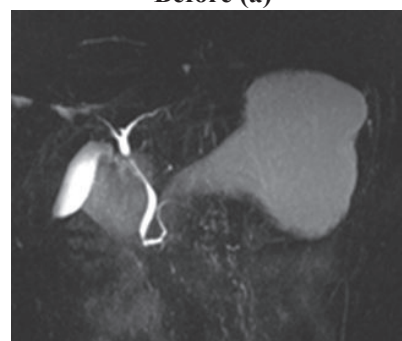
$p = 0.033$. The difference of conspicuity level between groups of 5 minutes and 15 minutes with p value = 0.027 ($p < 0.05$). There was no difference of conspicuity level between control group and 5 minutes post contrast ($p = 0.139$); 15 minutes post contrast ($p = 0.857$); 25 minutes post contrast ($p = 1.000$); between 5 minutes and 25 minutes post contrast ($p = 0.139$) and between 15 minutes and 25 minutes post contrast ($p = 0.857$).

DISCUSSION

There is a difference in the intensity of gastric and duodenal signals between before and after treatment. Most of the magnitude of gastric and duodenal signals is suppressed, although not yet optimal. Since Oolong tea manganese levels can shorten relaxation time, the post-contrast posture and duodenal picture appear more hypointense (Figure 1).



Before (a)



After 5 minutes drink (b)

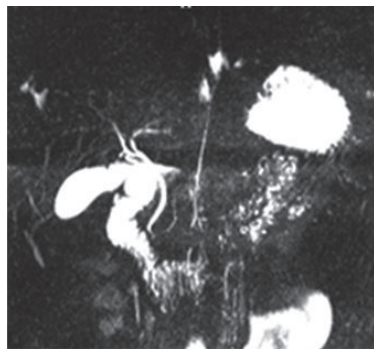
Figure 1: Pre MRCP image and 5 minutes post contrast

Figure 1 shows the stomach and duodenum of post-contrast MRCP image results not suppressed by oral negative contrast media of oolong tea drink maximally, but the post-contrast posture and duodenal picture look more hypointense compared with the contrast hull image. For negative oral contrast media to suppress the maximum gastric view can be done by setting a longer Time Echo (TE).

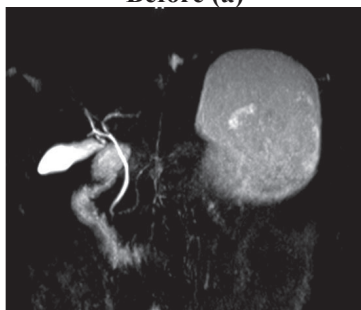
This research applied TE of 700 ms needed to extend to be more than 800 ms. The longer the TE will be the more spin relaxation in the stomach and duodenum that the relaxation time of the stomach and duodenum can be further shortened making the depressing and duodenal stomach becomes more depressed in the MRCP image. However, the precision of this TE setting needs to be considered, because a lengthy TE will cause an artifact (noise).

The intensity of gastric and duodenal signals in the control group and the treatment group experienced a lot of emphases, but in the treatment group did not undergo much change of focus. The intensity of the gastric and duodenal signals in the contrast post, 5 minutes, 15 minutes and 25 minutes after oolong tea showed the same signal intensity (hypointense), but could not be maximally depressed. The longer time to start scanning does not change the magnitude of the stomach and duodenal signals are getting depressed. Besides, the less content of manganese makes the time Echo (TE) is getting longer⁽⁶⁾.

The 0.9 mg Manganese concentration in oolong tea drink can shorten the relaxation time of T2 by suppressing the intensity of gastric and duodenal signals as well as to reduce the relaxation time of T1 with the opposite effect on the stomach and duodenum. The availability of manganese intake from the drink will make the relaxation time of T1 accelerated that recovery is quicker and the picture is brighter (hyperintense).



Before (a)



After 5 minutes drink (b)

Figure 2: Pre MRCP image and 15 minutes post contrast

Oolong tea drink is able to provide a good image effect on the pancreatobiliary tree system that is in the common bile duct and common hepatic duct (Figure 2). The intensity of the two sections signals the difference in image effect both in 5 minutes and 15 minutes post contrast when compared to the pre-contrast picture, but with 25 minutes post contrast, there is no difference in the effect of the image. This is due to the concentration of manganese on the pancreatobiliary tree system at 25 minutes post contrast has begun to decrease.

The gallbladder and intrahepatic duct display are seen during pre or post contrast, but there is no difference in image effect. Presentation of oolong tea contrast media was considered less able to distinguish the gallbladder and intra-hepatic duct enhancement on pre-contrast at 5 minutes, 15 minutes and 25 minutes post contrast. Intrahepatic duct can only be seen on the right and left hepatic duct branches whereas intra-hepatic duct peripheral is hardly seen because of the size is smaller where this result is consistent with the previous finding⁽⁴⁾.

Pancreatic duct and ampulla are hardly seen in all MRCP images. Pancreatic duct is slightly oblique making difficult to show the entire pancreatic duct. The use of single Shot Fast Spin Echo (SSFSE) sequences will show pancreatic duct in the head (97%), body (97%), and tail (83%)⁽⁴⁾.

Preparation of fasting aims to reduce the fluid in the stomach and is expected to have a little remaining liquid in the second part of duodenum useful as a landmark for the distal common bile duct and ampulla⁴. Giving negative oral contrast media is helpful in suppressing signal intensity in the intestine, but ampulla is often invisible due to regurgitation from contrast media to ampulla⁽⁶⁾.

Contrast media such as mangafodipir trisodium, used as an intra-venous negative contrast medium showed biodistribution in mice at 30 minutes after injection that 13% were in the liver, 9% in the small intestine, 3% in the blood and 1.3% in the kidneys⁽¹³⁾.

Overall differences in MRCP image information both on oral negative contrast media effects on gastric and duodenal signal intensity as well as on the image effects of the pancreatobiliary tree system show that oolong tea drink can be used as an alternative to negative

oral contrast media that significantly improves MRCP imaging quality. However, further study is needed in clinical situations including modification of the accuracy of TE settings.

CONCLUSION

To sum up, giving negative oral contrast media in the form of ready-to-drink-oolong tea package can provide contrast media effect and significant image effect compared to the one without contrast media. The best time to start scanning after giving negative oral contrast medium of oolong tea packing is 15 minutes. Liquid oolong tea in the form of 300 ml bottles can be used as an alternative to negative oral contrast media in MRCP examination because it is safe, tasty, cheap and practical.

Ethical Clearance: The research received permission of ethical clearance from the Health Research Ethics Committee of Poltekkes Kemenkes Semarang. The authors would like to thank Health Ministry Polytechnic Semarang, Central Java, Indonesia for funding.

Conflict of Interest: Nil.

REFERENCES

- O'Connor OJ, O'Neill S, Maher MM. Imaging of biliary tract disease. *American Journal of Roentgenology*. 2011 Oct;197(4):W551-8. DOI: 10.2214/AJR.10.4341
- Pressacco J, Reinhold C, Barkun AN, Barkun JS, Valois E, Joseph L. Accuracy of MRCP vs. ERCP in the Evaluation of Patients with Bile Duct Obstruction in the Setting of a Randomized Clinical Trial. In *Proceeding of International Society for Magnetic Resonance in Medicine*. 2013 (Vol. 11, pp. 412-417).
- Griffin, Nyree, Geoff Charles-Edwards, and Lee Alexander Grant. Magnetic resonance cholangio pancreatography: the ABC of MRCP. *Insights into Imaging* 3(1). 2012; 11-21.
- Vitellas, Kenneth M., Mary T. Keogan, Charles E. Spritzer, and Rendon C. Nelson. Magnetic resonance cholangio pancreatography of bile and pancreatic duct abnormalities with emphasis on the single-shot fast spin-echo technique. *Radiographics*. 2000; 20(4) :939-957.
- Mandarano G, Sim J. The diagnostic MRCP examination: overcoming technical challenges to ensure clinical success. *Biomedical imaging and intervention journal*. 2008;4(4): 28-40.
- Riordan RD, Khonsari M, Jeffries J, Maskell GF, Cook PG. Pineapple juice as a negative oral contrast agent in magnetic resonance cholangiopancreatography: a preliminary evaluation. *The British journal of radiology*. 2004 Dec;77(924):991-9. DOI: 10.1259/bjr/36674326
- Hiraishi K, Narabayashi I, Fujita O, Yamamoto K, Sagami A, Hisada Y, Saika Y, Adachi I, Hasegawa H. Blueberry juice: preliminary evaluation as an oral contrast agent in gastrointestinal MR imaging. *Radiology*. 1995 Jan;194(1):119-23.
- Chu ZQ, Ji Q, Zhang JL. Orally administered lemon/orange juice improved MRCP imaging of pancreatic ducts. *Abdominal imaging*. 2010 Jun 1;35(3):367-71.
- Tang HH, Song B, Huang ZR, Yao H. Application of black tea as a negative oral contrast in magnetic resonance cholangiopancreatography (MRCP). *Sichuan da xue xue bao. Yi xue ban= Journal of Sichuan University. Medical science edition*. 2013 May;44(3):476-80.
- Ghanaati H, Rokni-Yazdi H, Jalali AH, Abahashemi F, Shakiba M, Firouznia K. Improvement of MR cholangiopancreatography (MRCP) images after black tea consumption. *European radiology*. 2011 Dec 1;21(12):2551-7. DOI 10.1007/s00330-011-2217-0
- Campbell DT. *Methodology and epistemology for social sciences: Selected papers*. University of Chicago Press; 1988 Oct 27.
- Lemeshow S, Hosmer DW, Klar J, Lwanga SK. *Besar sampel dalam penelitian kesehatan*. Yogyakarta: Gajah Mada University. 1997.
- Regge D, Cirillo S, Macera A, Galatola G. Mangafodipir trisodium: review of its use as an injectable contrast medium for magnetic resonance imaging. *Reports in Medical Imaging*. 2009 Jul 10;2:55-68.

Profiling The Elderly's Quality of Life Living in Central Java Nursing Homes

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ABSTRACT

Background: Various health problems can occur in older people having an impact on various aspects of life.

Method: This study aimed to profile the quality of life of elderly who stay at home care in Central Java, Indonesia based on demographics status, physical health, mental health, social health, functional capabilities, and environment. This research used descriptive correlation studies conducted on the elderly in Home Care with 190 elderly as the samples. The Mini-Mental State Examination (MMSE) and the World Health Organization Quality of Life (WHOQOL) were employed, and Pearson product-moment was used to examine the relationship between factors that influence the quality of life of the elderly.

Results: Results of the correlation between quality of life with physical health and functional abilities revealed the significance of 0.003 and 0.00 respectively indicating a meaningful statistical relationship.

Conclusion: Physical health determines the elderly quality of life living in nursing homes. This brings implication on the necessity to increase awareness of health personnel to the quality of life of the elderly especially living in the nursing home to provide competent medical personnel and upbringing geriatrics.

Keywords: elderly, quality of life, physical, geriatrics,

INTRODUCTION

The elderly population is increasing very fast. The number of older adults is growing faster than in other age groups between the years 2000 and 2050, the proportion of the elderly population aged over 60 years the world will double from 11% to 22%. The absolute number of older adults is predicted to increase from 605 million to 2 billion in the same time⁽¹⁾.

Quality of life is one part of the functional status of the elderly. According to the World Health Organization Quality of Life (WHOQOL), quality of life is the operational condition of the elderly includes physical health, psychological health, social relationships, environment, health and social care. Quality of life is

affected by the level of independence, physical and mental condition, social activity, social interaction and family functioning. The impact of social isolation where the elderly do not want to interact with others is a key to determine the environmental impact on the quality of life⁽²⁾. In general, the elderly have limitations, so that the quality of life for the elderly is decreased. The family is the smallest unit of society, so it has a significant role in the care of the elderly to improve the quality of life of the elderly⁽³⁾. Various health problems can occur in the elderly group; the aging process will have an impact on numerous aspects of life, be it social, economic, and health. Judging from the health aspect, the increasing age of the elderly are more susceptible to a variety of physical complaints, either due to natural factors or because of disease⁽⁴⁾. The ability of the elderly will experience a decline in activities independently because of a reduction in physical health, mental, social, and functional skills. Elderly patients also experience cognitive decline, dementia, and depression⁽⁵⁾. The problems of the elderly will affect the quality of life of the elderly. This study will profile the quality of life of the

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elderly in the nursing home in Central Java by particular references to demographics status, physical health, mental health, social health, functional capabilities, and environment.

METHODOLOGY

This research is descriptive analysis study on 190 elderly in Nursing home in Central Java. The study was conducted in four nursing homes, or in Indonesia it is known as *Panti Wredha* namely, Panti Wredha Pucang Gading Semarang, Panti Wredha Wening Wardaya Ungaran, Semarang, Panti Wredha Darma Kasih Purbalingga and Panti Wredha Dharma Bakti Solo conducted during August to November 2016. Data was collected using demographic questionnaire, physical health, Geriatrics Depression Scale⁽⁶⁾, the Mini-Mental State Examination (MMSE)⁽⁷⁾, social health questionnaire, functional ability scale and WHOQOL-BRIEF⁽⁸⁾. The data obtained were analyzed using the Pearson product moment correlation test and spatial analysis.

RESULTS AND DISCUSSIONS

Most of the respondents are female (65.8%), aged in the range of 60-74 years old (48.7%), no schooling both formal and non-formal (50, 8%), having the status of widows or widowers or have been left to die by spouses.

The mean value of all respondents' Geriatrics Depression Scale was 8.9 with a standard deviation of 5.8 while mental health assessment using the Mini-Mental State Examination obtained an average of 17.7 with a standard deviation of 9.1 to 199 respondents. Social health of the majority of respondents in Panti Wredha Wening Wardaya Ungaran was categorized as good by 31.5% of the 73 respondents, 28% of 60 respondents Panti Wredha Dharma Bakti Solo were in the category of good social health, while at the Panti Wredha Budhi Dharma Kasih and Pucang Gading partly of respondents were categorized as poor social health.

Quality of life was revealed in four respondents domain: the physical, social, environmental and psychosocial. The highest mean quality of life was in Panti Wredha Pucang Gading, and Dharma Bakti Solo and the highest mean in the psychological domain was detected in Panti Wredha Wening Wardaya Ungaran while in Panti Wredha Budhi Dharma Kasih, the highest was at an average physical realm.

Assessment of functional ability in this study using the Barthel Index Activity⁽⁹⁾. The higher the index, the better the strength of the elderly in doing everyday activities to meet their basic needs and the lower the level of dependence.

Table 1: Barthel Index Activity in Location

Location	Mean	Std Deviation
Wening Wardaya Ungaran	15.63	4.94
Dharma Kasih Purbalingga	18.20	2.29
Pucang Gading Semarang	9.66	5.85
Dharma Bakti Solo	17.03	4.12

Tables 1 indicates that the average value of the highest functional capability of 18.20 with a standard deviation of 2.29 while the average value average (mean) as low as 9.66 with a standard deviation of 5.85. Analysis regarding the functional ability or elderly respondents presented their level of dependence on or guardians to meet the needs of their daily activities include, needs toileting, bathing, dressing, eating, drinking, up and down stairs, and urinating.

In the elderly themselves, the reduced functional ability can be affected by things like aging, physical health when the period of growth and decline in activity due to the aging process. The aging process would affect the ability of a person's body that is known by the term of degeneration. The aging process cell level also will affect the health of the elderly and make the elderly susceptible to diseases such as heart failure, stroke, and others degenerative disease. In general, the older the elderly, the higher the degree of dependence in performing everyday activities⁽¹⁰⁾.

Table 2: Quality of life mean based on WHOQOL-BRIEF

	Physical mean/std	Psychological mean/std	Social mean/std	Environmental mean/std
Wening Wardaya	53.3/12.9	53.7/15.3	43.3/19.3	46.1/16.7
Dharma Kasih	65.8/7.4	63.9/12.3	54.4/11.3	61.9/12.3
Pucang Gading	37.7/16	46.9/13.2	44.8/14.9	38.2/10.7
Dharma Bakti	52.8/11.6	55.3/11.3	47.1/18.8	47.4/15.2

On average the highest domain in the Wening Wardaya Ungaran is the psychological domain, i.e., 53.7 with a standard deviation of 15.3. In Dharma Kasih Purbalingga, the physical area has the highest mean value of 65.8 with a standard deviation of 7.4. Psychological domain has the highest mean value in Pucang Gading Semarang (46.9) as well as Dharma Bakti Solo (55.3).

The relationship between quality of life with physical and mental health measured with Geriatrics Depression Scale and the Mini-Mental State Examination and functional capabilities can be seen in Table 3 below.

Table 3: Relationship between the quality of life with physical health, social health, mental, and functional capabilities

	Physical	GDS	MMSE	Social	Functional
p-value	0.003	0.450	0.432	0.225	0.00

Results of correlation *Pearson product-moment* coefficient values obtained the relationship between physical health and quality of life with significance = 0.003 less than 0.05 indicating there is a significant relationship between physical fitness and quality of life of the elderly. Positive coefficient values indicate that the better the physical health of the elderly, the higher the quality of life.

Results of *Pearson product moment correlation* coefficient values obtained the mental relationship between depression with the quality of life with the significance of 0.450 greater than 0.05 indicating there is no relationship between depression with the quality of life of the elderly.

Results of *Pearson product moment correlation* coefficient values obtained the relationship between health mental (MMSE) and the quality of life with the significance amounted to 0.432 more significant than 0.05 denoting there is no relationship between health mental (MMSE) with the quality of life of the elderly.

Results of *Pearson product-moment* coefficient values obtained the relationship between social health and quality of life with the significance amounted to 0.225 higher than 0.05 revealing there is no relationship between social health and quality of life of the elderly.

Results of *Pearson product-moment* coefficient values obtained the relationship between functional ability and quality of life with the significance of 0.000

less than 0.05, proving there is a significant relationship between technical capacity and quality of life of the elderly. Positive coefficient values indicate that the higher functional ability, the higher the quality of life.

Good physical health and functional abilities have a relationship with life quality, especially in the physical domain. Elderly who seek respondents thought that quality of life is said to be good if able to do activities without hindrance and not too concerned about the presence or absence of social interaction and mental health⁽¹¹⁾. High-value functional capabilities indicate the level of dependence of elderly to get assistance in meeting daily needs is low. That means the health of the elderly, especially physical health is in excellent condition, because of physical health dramatically affects the presence or absence of obstacles in performing daily activities such as bathing, toileting, eating, and others. According to the theory of operation, the higher the ability of the elderly to move, the higher the satisfaction⁽¹²⁾.

CONCLUSION

Physical health and functional abilities affect the quality of a person’s social health. Practical skills of a person will determine how likely the elderly to adapt to their community independently and participate in any activity that is in it. Their participation individually, allowing the elderly to continue to have a high level of physical activity, in which physical activity can prevent the appearance of signs of aging. Physical activity is also believed to be the best way to avoid the adverse development of the disease, and foster a positive effect on the health of the elderly.

Ethical Clearance: The research received permission for ethical clearance from the Health Research Ethics Committee of Poltekkes Kemenkes Semarang. The authors would like to thank Health Ministry Polytechnic Semarang, Central Java, Indonesia for funding.

Conflict of Interest: Nil.

REFERENCES

- Hagberg JE. Old people, new and old artefacts- Technology for later life. In Changing worlds and the ageing subject 2018 Jan 18 (pp. 183-206). Routledge.

2. Hawton A, Green C, Dickens AP, Richards SH, Taylor RS, Edwards R, Greaves CJ, Campbell JL. The impact of social isolation on the health status and health-related quality of life of older people. *Quality of Life Research*. 2011 Feb 1;20(1):57-67.
3. Sincihu Y, Maramis WF, Rezki MN. Improve the Quality of Life of Elderly Through Family Role. *Jurnal Kesehatan Masyarakat*. 2018 Apr 2;13(3):374-81.
4. Lackner JM, Gudleski GD, Thakur ER, Stewart TJ, Iacobucci GJ, Spiegel BM. The impact of physical complaints, social environment, and psychological functioning on IBS patients' health perceptions: looking beyond GI symptom severity. *The American journal of gastroenterology*. 2014 Feb;109(2):224.
5. Jessen F, Wolfsgruber S, Wiese B, Bickel H, Mösch E, Kaduszkiewicz H, Pentzek M, Riedel-Heller SG, Luck T, Fuchs A, Weyerer S. AD dementia risk in late MCI, in early MCI, and in subjective memory impairment. *Alzheimer's & Dementia*. 2014 Jan 1;10(1):76-83.
6. Pocklington C, Gilbody S, Manea L, McMillan D. The diagnostic accuracy of brief versions of the Geriatric Depression Scale: a systematic review and meta-analysis. *International journal of geriatric psychiatry*. 2016 Aug;31(8):837-57.
7. Creavin ST, Wisniewski S, Noel-Storr AH, Trevelyan CM, Hampton T, Rayment D, Thom VM, Nash KJ, Elhamoui H, Milligan R, Patel AS. Mini-Mental State Examination (MMSE) for the detection of dementia in clinically unevaluated people aged 65 and over in community and primary care populations. *Cochrane Database Syst Rev*. 2016 Jan 13;1.
8. Snell DL, Siegert RJ, Surgenor LJ, Dunn JA, Hooper GJ. Evaluating quality of life outcomes following joint replacement: psychometric evaluation of a short form of the WHOQOL-Bref. *Quality of Life Research*. 2016 Jan 1;25(1):51-61.
9. Vitacca M, Paneroni M, Baiardi P, De Carolis V, Zampogna E, Belli S, Carone M, Spanevello A, Balbi B, Bertolotti G. Development of a Barthel Index based on dyspnea for patients with respiratory diseases. *International journal of chronic obstructive pulmonary disease*. 2016;11:1199.
10. Gil-Montoya JA, de Mello AL, Barrios R, Gonzalez-Moles MA, Bravo M. Oral health in the elderly patient and its impact on general well-being: a nonsystematic review. *Clinical interventions in aging*. 2015;10:461.
11. Forte R, Boreham CA, De Vito G, Pesce C. Health and quality of life perception in older adults: the joint role of cognitive efficiency and functional mobility. *International journal of environmental research and public health*. 2015 Sep 10;12(9):11328-44.
12. Rose DJ. Physical Activity Instruction of Older Adults, 2E. *Human Kinetics*; 2018 Aug 16.

An Empirical Analysis of Employees Job Satisfaction and Intention to Quit

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ABSTRACT

The main aim of this study is to find out the factors determining job satisfaction and intention to quit of the employees working in private colleges. The researcher used regression analysis to find the result. The lecturers' demographic data, their job-related satisfaction and turnover intentions were recorded through a self-administered questionnaire. The impact of demographic characteristics on job satisfaction and intention to quit was also examined. The Job satisfaction and intention to quit are negatively correlated. The results show that the employees are highly satisfied with the factor of status and working time and they are less satisfied with the factor of salary and load of work. Finally, It concludes that the least satisfaction factors and intention to quit directly correlated.

Keywords: Job Satisfaction, Demographic variables, Salary, Working environment.

INTRODUCTION

Spector (1997, p. 2) defines job satisfaction simply as “the degree to which people like their jobs and the different aspects of their jobs.” Job satisfaction is also defined as a response towards various facets of one's job, that is a person can be relatively satisfied with one aspect of his or her job and dissatisfied with other aspects (French, 1998; George & Jones, 2002; Kreitner & Kinicki, 2001). Robbins (1998) defines job satisfaction as a general attitude towards one's job; the difference between the amount workers receive and the amount they believe they should receive.

Motivational factors play an important role in increasing employee job satisfaction. Satisfied employees in return can help in improving organizational performance. The concept and assessment of job satisfaction began in 1911 with the research of Taylor. Taylor (1911) stated that rewards like the earnings of the job, incentive payments, promotion, appreciation, and opportunities for progress could lead to increased job satisfaction (as cited by Aslan, 2001).

Job satisfaction is an important element from organizational perspective, as it leads to higher organizational commitment of employees and high commitment leads to overall organizational success

and development (Feinstein, 2000) additionally growth, effectiveness and efficiency of the organization and low employees' intentions to leave the organization (Mosadeghard 2000). Obstinate, dissatisfied lecturers leave the organization and deflate the motivation of those staying there (Feinstein, 2000) and as a result workers loose performance and efficiency and might sabotage the work and leave the job (Sonmezer and Eryaman 2008).

Hagedorn (1994) tested a causal model among faculty at different stages of career development and found that satisfaction with salary, total work hours, and co-workers support affected the level of stress and ultimately satisfaction. Increased freedom and flexibility of academicians would have resulted in significantly greater job satisfaction (Bender and Heywood, 2006). Job satisfaction refers to the feelings of positive emotional as a result of the job experiences that the employees encountered. It is generally believed that higher pay leads to higher job satisfaction. Many people gets the jobs in colleges in the hopes of obtaining a high paying job. After getting the job, many college lecturers find themselves disliking it for a variety of reasons.

Job satisfaction is defined as the emotional feelings as well as the behavioral expression for a job. The feeling is influenced by some job related factors such as pay, different types of benefits, recognition, working

condition, relation with coworker and supervisors, and others(Cowinetal.,2008;Yilmazel,2013).

Job satisfaction is the level of serenity that someone feels for work, and this feeling influences performance. Hence, proper understanding of factors of lecturers job satisfaction is essential for management to take necessary actions. The following are the main factors which is affecting a lecturer who are all working in private colleges

Factors Influencing Job Satisfaction of Lecturers

- Salary
- Working environment
- Administration style
- Working time
- Co workers support
- Personal characteristics
- Distance of the Working place
- Transport facilities
- No. of casual leave
- No. of medical leave
- Training and Development
- Career Opportunities
- Recognition of work

Motivated and committed staff can be a determining factor in the success of an organization. Organizations cannot reach competitive levels of quality if the employees do not feel satisfied. Job satisfaction has been one of the most frequently studied work attitudes.

In this research the researcher find out the elements of job satisfaction and the factors which is motivated the lecturers do not quit from their existing job.

REVIEW OF LITERATURE

Alf Crossman (2002) Job satisfaction and employee performance of Lebanese banking staff. *Journal of Managerial Psychology* Vol. 18 No. 4, 2003 pp. 368-376 q MCB UP Limited 0268-3946. Female employees were found to be significantly more satisfied with pay than their male counterparts, this seems to confirm the argument by Spector (1997) that women expect less

from work and so they are satisfied with less. On the other hand, male employees are significantly more satisfied with supervision than their female counterparts, possibly because they value more the opportunities for self-expression and to influence important decisions².

Lise M. Saari and Timothy A. Judge(2004), EMPLOYEE ATTITUDES AND JOB SATISFACTION. *HUMAN RESOURCE MANAGEMENT*, Winter 2004. This article identifies three major gaps between HR practice and the scientific research in the area of employee attitudes in general and the most focal employee attitude in particular—job satisfaction: (1) the causes of employee attitudes, (2) the results of positive or negative job satisfaction, and (3) how to measure and influence employee attitudes. Suggestions for practitioners are provided on how to close the gaps in knowledge and for evaluating implemented practices⁵.

Marek Franěk, Jakub Večeřa(2008), Personal Characteristics And Job Satisfaction. The research identified the level of job satisfaction with a particular aspect of a job. Data showed higher average levels of satisfaction for the following aspect of the job: coworkers, nature of work, supervision, and communication⁶.

Ishfaq Ahmed, Muhammad Musarrat Nawaz(Mar 2010) ,Effects of Motivational Factors on Employees Job Satisfaction , *International Journal of Business and Management*, The objective of following research is to analyze the effects of motivational factors on job satisfaction of employees. This theory tests hygiene and motivator factors and impact of personal and job characteristics on work perceptions and job satisfaction. Structural equation modeling technique has been applied to test hypothesis, SPSS 16.0 has also been adopted for basic analysis purposes. The study concludes that intrinsic motivational factors are having significant relationship with employee job satisfaction, whereas hygiene (extrinsic) factors are not having any significant relationship with employee job satisfaction³.

May-Chiun Lo1,T. Ramayah Sains, Lim Chin Kui, (May 2013),Mentoring And Job Satisfaction In Malaysia: A Test On Small Medium Enterprises In Malaysia, Mentoring plays a significant role in bridging the relationship between supervisors and subordinates. *International Journal of Psychology: A Biopsychosocial Approach*. This study endeavours to investigate mentoring and satisfaction of employees in Malaysian

organizations. This study revealed the positive connection between mentoring and job satisfaction was partially supported. Gender was found to have direct impact on employees' job satisfaction⁷.

Kamala Saranya(Mar 2014) Influence of Job Satisfaction on Employees' Performance–A general Perspective, Volume 2 ;Issue 2; March 2014 ; ISSN 2278 8425, This study takes a dynamic multilevel approach to examine how the relationship between an employee's job satisfaction trajectory and subsequent turnover may change depending on the employee's unit's job satisfaction trajectory and its dispersion. The results indicate unit-level and individual-level job satisfaction trajectories have unique multilevel influences on turnover above and beyond static levels of job satisfaction. Unfortunately, in our region, job satisfaction has not still received the proper attention from neither scholars nor managers of various business organizations⁴.

Abdul Kadar Muhammad Masum¹, Md. Abul Kalam Azad², Kazi Enamul Hoque³, Loo-SeeBeh⁴, PeterWanke⁵ and ÖzgünArslan⁶,(Apr 2016) Job satisfaction and intention to quit: an empirical analysis of nurses in Turkey. The aim of this study was to identify the facets influencing job satisfaction and intention to quit of nurses employed in Turkey. The study revealed a negative relationship between job satisfaction and intention to quit the existing employment. Moreover, satisfaction with supervisor support was the only facet that significantly explained turnover intent when controlling for gender, age, marital status, education, and experience¹.

OBJECTIVES OF THE STUDY

- To identify the elements of job satisfaction among lecturers in private colleges.

- To measure the level of intention to quit among the lecturers in private colleges.
- To investigate the association between the lecturers' job satisfaction and their intention to quit the existing workplace.
- To examine the effects of socio-demographic variables (e.g., as gender, age, marital status, education level, and teaching experience on job satisfaction and intention to quit.

HYPOTHESES OF THE STUDY

- There is no significant difference among different elements of Job Satisfaction.
- There is no significant relationship between job satisfaction and intention to quit.
- There is no significant relationship between and socio-demographic variables of employees.

INFLUENCE OF FACTORS OF JOB SATISFACTION

After reviewing National and International literature the researcher identified Salary, Working environment, Working time, Co workers support, Distance of the Working place, Training and Development, Career Opportunities, Recognition of work are the main factors of job satisfaction of lecturers who are all working in private colleges. The subsequent verification of reliability of job satisfaction of eight factors of clearly revealed its nature of relationship as well as creative influence over lecturers satisfaction. Therefore, In this section the researcher intended to measure the influence of independent variables of job satisfaction on the lecturers satisfaction on their work.

Influence on Demographic-Socio Factors on Job Satisfaction

QUALIFICATION:

Table 1: Qualification

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	PG	20	20.0	20.0	20.0
	PG with M.Phil	17	17.0	17.0	37.0
	PG with ph.D	17	17.0	63.0	100.0
	Total	100	100.0	100.0	

It can be found that from the above table that the sample unit is represented by 20% of PG, 17% of M.Phil., 63% of Ph.D holders.

It concluded that the sample unit is dominated by Ph,D holders.

DESIGNATION

Table 2: Designation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lecturer	35	35.0	35.0	35.0
	Asst.Professor	38	38.0	38.0	73.0
	Ass.Prof	3	3.0	3.0	76.0
	Prof	24	24.0	24.0	100.0
	Total	100	100.0	100.0	

In the above table shows that 35% of lecturers grade, 38% of Asst.Prof. grade followed by 3% of Associate Professor and 24% of Professor grade.

EXPERIENCE:

Table 3: Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-5	12	12.0	12.0	12.0
	5-10	29	29.0	29.0	41.0
	more than 10	53	53.0	59.0	100.0
	Total	100	100.0	100.0	

It can be presented in the above table 12% of 5 years experience, 29% of 10 years experience followed by 59% of more than 10 years experience.

The reliability consist of eight variables and it subsequent influence over Job satisfaction is measured through linear multiple regression analysis. The results are presented below

INFLUENCE OF FACTORS OF JOB SATISFACTION

After reviewing National and International literature the researcher identified Salary, Working environment , Working time, Co workers support, Distance of the Working place, Training and Development, Career Opportunities, Recognition of work are the main factors of job satisfaction of lecturers who are all working in private colleges. The subsequent verification of reliability of job satisfaction of eight factors of clearly revealed its nature of relationship as well as creative influence over lecturers satisfaction. Therefore, In this section the researcher intended to measure the influence of independent variables of job satisfaction on the lecturers satisfaction on their work.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.987 ^a	.974	.972	.244
a. Predictors: (Constant), Factor8, Factor4, Factor7, Factor6, Factor1, Factor5, Factor2, Factor3				

From the above table it is found that R=.987 R square =.974 and adjusted R square .972. This implies the age variable create 97% variance over the job satisfaction. The cumulative influence of these variables over job satisfaction is ascertained through the following one way analysis of variance.

Table 5: ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	205.628	8	25.704	432.221	.000 ^b
	Residual	5.412	91	.059		
	Total	211.040	99			
a. Dependent Variable: Job satisfaction						
b. Predictors: (Constant), Factor8, Factor4, Factor7, Factor6, Factor1, Factor5, Factor2, Factor3						

Table -5 presents that F=432.221 p=.000 are statistically significant at 5% level. This indicates all these variables cumulatively responsible for job satisfaction. The individual influence of all these variable is clearly presented in the following co-efficient table.

Table 6: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.186	.086		-2.166	.033
	Working time	.393	.093	.344	4.230	.000
	Relation with Co-workers	.135	.094	.135	1.442	.153
		.011	.135	.010	.084	.934
	Working conditions	.018	.029	.020	.610	.544
	Other facilities	.126	.097	.115	1.301	.197
	Status	.467	.092	.467	5.071	.000
	Pay	-.014	.085	-.012	-.163	.871
	Work Load	-.076	.140	-.068	-.544	.588
a. Dependent Variable: Job satisfaction						

From the above table it shows that Working time (Beta=.344 ,t=4.230, p=.000), (Beta=-.075 ,t=-.771, p=.443), Relation with co-workers (Beta=.135 ,t=1.442, p=.153), Working conditions (Beta=-.020 ,t=-.610, p=.544), Other facilities (Beta=-.115 ,t=-1.301, p=.197), Status (Beta= 5.071 ,t=4.711, p=.000) Pay (Beta=-.012 ,t=-.163, p=.871) Work load (Beta=-.068 ,t=-.544, p=.588),,are statistically significant at 5% level. This indicates that the employees are highly satisfied with status and working time and they are less satisfied with pay and work load.

TESTING OF HYPOTHESES

- There is no significant difference among different elements of Job Satisfaction - rejected
- There is no significant relationship between job satisfaction and intention to quit- rejected
- There is no significant relationship between and socio-demographic variables of employees- rejected

FINDINGS AND CONCLUSIONS

In this article finds that the college lecturers’ job satisfaction depends on many factors such as Pay, Working environment, Working time, Co workers support, Distance of the Working place, Training and Development, Career Opportunities, Recognition of work, work load. The main factor which is affected the faculty is salary and working time in private colleges. The lecturers’ are highly satisfied with Status and work load and least satisfied with pay and work load. There is a close relationship between the socio-demographic factors and job satisfaction. Job satisfaction and intention to quit ate negatively correlated. Finally, it concludes that the least satisfied factors such as pay and work load affects the lecturers more and their intention to quit because of these factors.

Conflict of Interest: Nil

Ethical Clearance: Taken from UGC Committee

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REFERENCES

1. A b d u l K a d a r M u h a m m a d M a s u m i , Md.AbulKalamAzad², KaziEnamulHoque³, Loo-SeeBeh⁴, PeterWanke⁵ and ÖzgünArslan⁶,(Apr 2016).
2. Alf Crossman (2002) Job satisfaction and employee performance of Lebanese banking staff. *Journal of Managerial Psychology* Vol. 18 No. 4, 2003 pp. 368-376 q MCB UP Limited 0268-3946.
3. Ishfaq Ahmed, Muhammad Musarrat Nawaz(Mar 2010) ,Effects of Motivational Factors on Employees Job Satisfaction , *International Journal of Business and Management*,
4. Kamala Saranya(Mar 2014) Influence of Job Satisfaction on Employees' Performance – A general Perspective , Volume 2 ;Issue 2; March 2014 ; ISSN 2278 8425,
5. Lise M. Saari and Timothy A. Judge(2004), EMPLOYEE ATTITUDES AND JOB SATISFACTION. *HUMAN RESOURCE MANAGEMENT*, Winter 2004.
6. Marek Franěk, Jakub Večeřa(2008), Personal Characteristics And Job Satisfaction.
7. May-Chiun Lo¹,T. Ramayah Sains, Lim Chin Kui, (May 2013),Mentoring And Job Satisfaction In Malaysia: A Test On Small Medium Enterprises In Malaysia, *International Journal of Psychology: A Biopsychosocial Approach*.

Impact of Performance Appraisal System on the Individual Efficiency of the Employees in Manufacturing Companies Greater Chennai

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ABSTRACT

The main aim of this paper is to measure the components of performance appraisal system in manufacturing companies and to find the influence of performance appraisal components on individual efficiency of the employees. It also tested the hypothesis that there is no significant influence of performance appraisal system on individual efficiency of the employees. This study is empirical in a nature and leans upon the primary data. The primary data emerged out of collecting the information from the employees of manufacturing company. The researcher circulated 250 questionnaire, 50 each from all the five companies and able to obtain only 231 responses. Hence the sample size of the research is 231. The researcher used cron bach alpha coefficient method for reliability, KMO and Bartlett's test of sampling adequacy. The subsequent application of factor analysis and linear multiple regression analysis derived the predominant factors of performance appraisal and its impact on individual efficiency of the employees. The results proved that there is a significant influence of performance appraisal system on individual efficiency of the employees.

Keywords: Performance Appraisal, Non-Monetary Motivation, Self evaluation.

INTRODUCTION

Performance appraisal is considered as one of the non-monetary motivation of employee in any industrial sector. The employees are very meticulous in the recognition of their services in every work environment in the organisation. Both public sector and private sector employees need the pat and appreciation from their employees in the form of monetary and non-monetary benefits. In this content the need for 360 degree performance appraisal system, its method and determination and its total output through employees and organisation are very important to run the organisations effectively. In manufacturing companies they measure the performance of the employees through the feed backs of superior employees, subordinates and sometimes customers with direct accessibility. Measurement of performance appraisal is also a time bond phenomenon in manufacturing companies. They measure the performance in the back drop of productivity and discipline of the employees in the premises of the organisations.

In this paper, the researcher intended to correlate the components of performance appraisal with the

changes in the individual efficiency of the employees. The measurement of this relationship would throw a light on the domain how the employees are satisfied and motivated by the present performance appraisal system in the manufacturing companies.

LITERATURE REVIEWS

Kun Chang Lee, Sangjae Lee and In Won Kang (2015) - This paper provides for a new metric, knowledge management performance index (KMPI) for measuring the performance of a firm in its knowledge management at a point of time. The logistic function (KPMI) had five components to determine the knowledge circulation process (KCP). Knowledge creation, knowledge accumulation, knowledge sharing, knowledge utilisation and knowledge internalisation were those components. With the increase in KCP efficiency KMPI was also supposed to increase enabling firms to be knowledge intensive. The findings represented proposed KPMI could depict KCP efficiency, and the three financial performance measures were also useful⁴.

Guido M J de Koning(2015) - This article tries to identify the flaws inherent in two of the most common

performance evaluation approaches and to discuss two evaluation methods to give positive results. The components of any PMS included the way by which the company captures, quantifies, measures or evaluates employee performance, to find the link between performance and rewards, the range of rewards offered, (financial recognition, growth opportunities), company's plan for developing employee competence. The study suggested establishing a performance driven culture in the organisation¹.

Lisa Bryant, Denise A. Jones and Sally K. Widener (2014) - This paper investigates the relationship that existed among multiple performance measures to determine how they understand the creation of firm value. The designing of performance measurement system was supposed to consider all aspects of the business, not just the financial results. The data from 125 firms over a five year period were used to measure the outcome. The findings showed that the value creation process was better in all higher level BSC perspectives⁵.

Jay M. Jackman and Myra H. Strober (2013) - This article highlighted the importance of feedback reviews both positive and negative and its impact on the relationship between the superior and subordinate. Organisations should provide employees the opportunities to adapt to changes and change accordingly. The study also emphasised on Self assessment and feedback from superiors which guides the employees to develop faster. The organisations tried to follow adaptive techniques having a positive impact on the executives' development and leverage feedback².

Nelda Spinks, Barron Wells, Melanie Meche (2009) - This research paper examined the role of appraisal and its impact on productivity and effectiveness. The appraisals were identified to be beneficial to both employers and employees. The study found that there were always ways of improving the available performance appraisal system. The evaluation of the leading software programs and comparison of the features were done. It was concluded that the products gave structure to the process and make appraisal easier⁶.

John M. Ivancevich, H. Albert Napier, James C. Wetherbe (2015) - This paper has investigated the concepts of occupational stress, Type A behaviour pattern, work attitudes, health symptoms and health behaviour among information systems personnel. Type A behaviour pattern was identified to be significant

moderator for some stressor criterion associations. It has been concluded that more managerial understanding of the person's environment fit in general and individual employee predisposition toward Type A behaviour in particular to nurture and maintain healthy work environment³.

Gaps in the literature: The previous research works on performance appraisal system, HRM practices and outcome of performance appraisal system both empirically and descriptively identified the two conspicuous gaps still unraveled namely,

1. What are the components of performance appraisal system and what is its validation?
2. How the performance measurement system in the organisation motivate the employees?

Hence the present research attempts in this direction to identify the components of performance appraisal system and its subsequent impact on individual efficiency of the employees.

Objectives of the study:

1. To measure the components of performance appraisal system in manufacturing companies.
2. To find the influence of performance appraisal components on individual efficiency of the employees.

Hypothesis:

There is no significant influence of performance appraisal system on individual efficiency of the employees.

METHODOLOGY

The present research is empirical in a nature and leans upon the primary data. The primary data emerged out of collecting the information from the employees of manufacturing company. The questionnaire consists of only two parts namely performance appraisal system and individual performance score of the employees obtained from the organisations. The performance appraisal system section consists of 15 variables in Likert's five point scale which varied from strongly agree to strongly disagree.

Sample selection: The researcher applied convenient sampling method to collect the responses from top level,

middle level and operational level executives working in the top five manufacturing companies in the greater Chennai. The researcher circulated 250 questionnaire, 50 each from all the five companies and able to obtain only 231 responses. Hence the sample size of the research is 231.

Data analysis: The researcher used cron bach alpha coefficient method for reliability, KMO and Bartlett's test of sampling adequacy. The subsequent application of factor analysis and linear multiple regression analysis derived the predominant factors of performance appraisal and its impact on individual efficiency of the employees.

ANALYSIS AND DISCUSSION

In this section the researcher exploits factor analysis by principal component method to reduce the 15 variables into four predominant factors and the results are presented below:

Table 1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.854
Bartlett's Test of Sphericity	Approx. Chi-Square	3496.523
	df	105
	Sig.	.000

From the above table, it is found that KMO measure of sampling adequacy is 0.854, and Bartlett's test of sphericity with approximate chi square value is 3496.523. Both of them are statistically significant at 5 present

levels. This implies all the 15 variables of performance appraisal system are normally distributed and more suitable for data reduction process. But the individual variance of all the 15 variables is also important as status in the communalities table.

Table 2: Communalities

	Initial	Extraction
TT1	1.000	.520
TT2	1.000	.608
TT3	1.000	.508
TT4	1.000	.547
TT5	1.000	.556
TT6	1.000	.528
TT7	1.000	.804
TT8	1.000	.550
TT9	1.000	.451
TT10	1.000	.490
TT11	1.000	.672
TT12	1.000	.700
TT13	1.000	.615
TT14	1.000	.662
TT15	1.000	.599

Extraction Method: Principal Component Analysis.

The individual variance range between 0.451 to 0.700. It implies the variance varies from 45.1 percent to 70 percent which is highly conducive for the usage of factor analysis to find the predominant factors. The number of factors and their names are discussed below:

Table 3: Total number of factors

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1.	4.970	33.136	33.136	3.467	23.116	23.116
2.	1.577	10.512	43.648	2.237	14.916	38.032
3.	1.259	8.396	52.044	1.951	13.009	51.041
4.	1.005	6.701	58.745	1.156	7.704	58.745
5.	.915	6.101	64.846			
6.	.797	5.313	70.160			
7.	.758	5.054	75.214			
8.	.642	4.279	79.492			
9.	.565	3.768	83.260			
10.	.551	3.672	86.932			
11.	.481	3.209	90.141			

Conted...

12.	.445	2.970	93.111		
13.	.426	2.837	95.948		
14.	.364	2.424	98.372		
15.	.244	1.628	100.000		

From the above table of total variance, it can be ascertained that the 15 variables are reduced into four pre dominant factors with the total variance of 58.745%. The four factors have their individual variance 23.116%, 14.916%, 13.009% and 7.704% respectively. The four factors generated are self-evaluation, colleague-evaluation, employees evaluation and extrinsic evaluation. These factors are perceived by the employees in the manufacturing companies. They are considered as independent variables and total performance scores of the individual employees is considered as dependent factor. In this scenario a linear multiple regression analysis is applied and the following results are obtained.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.462 ^a	.214	.210	.66209

From the above table, it is found that R-square = .214 and adjusted R-square value = .210. This implies that the component of performance appraisal system create 21.4% variance over the dependent factors performance appraisal scores. The regression fit is presented in the following table.

Table 5: ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1.	Regression	88.445	4	22.111	50.440	.000 ^b
	Residual	325.268	742	.438		
	Total	413.713	746			

From the above analysis of variance table, it is ascertained that F=50.440, p=0.000 are statistically significant at 5 percent level. It is ascertained that the components of performance appraisal system and performance scores of employees are well related and it also validates the relationship between performance appraisal system and individual efficiency of the employees. The following table confirms the relationship by exhibiting the individual influences on individual efficiency of the employees.

Table 6: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1.	(Constant)	3.272	.154		21.224	.000
	Self evaluation	.121	.028	.140	4.274	.000
	Colleague evaluation	.193	.027	.279	7.280	.000
	Employer evaluation	.076	.024	.122	3.124	.002
	Extrinsic evaluation	-.156	.038	-.158	-4.090	.000

a. Dependent Variable: Performance

From the above table, it can be ascertained that self-evaluation (B=0.140, t=4.271, p=0.000), college evaluation (B=0.279, t=7.280, p=0.000), employee evaluation (B=0.122, t=3.124, p=0.000) and extrinsic

evaluation (B=0.159, t=-4.090, p=0.000) are statistically significant at 5 percent level. This shows that self-evaluation of the employees and college evaluation motivates the employees to perform well in the

organisation. Employee's evaluation and extrinsic evaluation equip their evaluation and extrinsic evaluation equips them to evaluate their performance and productivity within the organisation.

FINDINGS AND CONCLUSIONS

It is found that the four factors self-evaluation, college evaluation, employee evaluation and extrinsic evaluations are considered as the major components of performance appraisal system in manufacturing companies. The rationalized self-evaluation of the employee make them to understand their strength and weakness in their personality as well as in the job performance and job knowledge by colleagues around, employers observations and extrinsic focus like customers and outside interactive executives, create a fascinating avenues for the employees in the manufacturing companies to improve their individual and organisational performance. The justified, transparent, and rationalized evaluation of performance continuously motivates the employees to increase their individual efficiency in the near future. The linear multiple regression analysis revealed that the four performance appraisal components found to influence the individual efficiency of the employees significantly. Further it is concluded that the employees in the manufacturing companies need their satisfaction in performance scores evaluated by the people around. Job turnover intension is also considered as a major outcome of negative performance appraisal system.

Conflict of Interest: Nil

Ethical Clearance: Taken from UGC Committee

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REFERENCES

1. Guido M J de Koning, How not to evaluate employees, *Indian Management*, May 2015, Vol.44, Iss. 5, pp.34-41.
2. Jay M. Jackman and Myra H.Strober, Fear of Feedback, *Harvard Business Review*, Apr. 2013, pp.101-107
3. John E. Dittrich, J. Daniel Couger and Robert A. Zawacki, 'Perceptions of equity, job satisfaction, and intention to quit among data processing personnel', **Information & Management**, Vol. 9, Iss. 2 , Sep 2015, pp.67-75, 77-85
4. Kun Chang Lee, Sangjae Lee and In Won Kang, KMPI: measuring knowledge management performance, *Information & Management*, Volume 42, Issue 3 , March 2015, pp.469-482
5. Lisa Bryant, Denise A. Jones and Sally K. Widener, Managing Value Creation within the Firm: An Examination of Multiple Performance Measures, *Journal of Management Accounting Research*, Vol. Sixteen, 2014, pp.107-131
6. Nelda Spinks, Barron Wells, Melanie Meche, Appraising the appraisals: computerised performance appraisal systems, *Career Development International*, Vol. 4, Iss.2, Apr 2009 pp.94-100

Liver Enzymes, Lipid Profile Alteration and Growth Induced by Nickel Toxicity Under Heat Stress Conditions on Adult Male Rabbits

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ABSTRACT

The southeastern of Iraq especially Basrah city is characterized as humid subtropical and is subject to extended periods of high ambient temperature and relative humidity. The aim of this study was to investigate the effect of providing supplementary nickel chloride orally to adult rabbits under heat stress for two weeks .The results revealed significant decrease in B.W and total protein while blood glucose increased ,liver enzymes (ALT,AST and ALP) showed significant increase .lipid profile also showed increase in cholesterol , TG, LDL and decrease in HDL).

The study concluded that the stresses after exposure to high environmental heat had a negative effects on growth and Liver tissue functions as well as lipid profile.

Keywords: nickel ,heat. Stress, liver enzymes

INTRODUCTION

Increasing utilization of heavy metals in modern industries leads to an increase environmental pollution. Nickel a metal whose use is widening in modern technologies.so Nickel (Ni) is an important environmental toxicant that can cause cancer and cardiovascular disease^{1,2}. Its toxicological, physiological and histopathological alterations in rabbits, mice and minnows have been established ³.

Nickel and its compounds produce acute and chronic toxicity to aquatic life due to its persistence and bioaccumulation⁴.

The accelerated consumption of nickel-containing products nickel compounds are released to the environment at all stages of production and utilization and stated that human exposure to highly nickel-polluted environments, such as those associated with nickel refining, electroplating, and welding, has the potential to produce a variety of pathologic effects ⁵ . Nickel caused liver injury was measured by the increased activities of serumhepatic enzymes and spleen injury, lung inflammation, and caused cardiac toxicity ⁶ . In addition, many metal particles, such as Ni, have very poor solubility in water, which may contribute to their

toxicity effects ⁷. As for most metals, the toxicity of nickel is dependent on the route of exposure and the solubility of the nickel compound. The exposure to nickel chloride (NiCl₂) can cause hepatotoxicity and hepatotoxicity and can affect development^{8,9}

MATERIAL AND METHOD

The presented study was conducted at the College of nursing- University of Basrah. Twenty healthy male rabbits, brought from Basrah market of 10-12 months old , weighted 1.500-2.100 kg caged in metallic cages on July (normal daily temperature 30-50C°) a balanced diet and water were initially provided. ten male rabbits was served as control group and received 1 ml normal saline orally, the other ten male rabbits received 20 mg / kg B.W NiCl₂ orally for two weeks.

Ten ml of blood samples took by heart puncture then centrifuged (3500 r pm for 15 minute) and the serum that was obtained, transferred to Eppendorf analysis for liver enzymes and biochemical tests.

The experimental animals scarified after anaesthetized by intramuscular injection of xylazine 2% (Alfasan- Holland) and ketamine10% (Kepro -Holland) . Liver, kidney, spleen ,heart isolated served in containers

filled with 10% formalin , the specimens were processed to paraffin as per standard procedure. The results of the present study were analyzed by using one way analysis of variance(ANOVA) test using the program(spss).and the data were expressed as a means +SE. (P<0.05) were considered to be significant for all data of this study.

RESULTS AND DISCUSSION

Heat is a stressor that evokes several physiological reactions in humans and animals .Heat is an environmental and occupational hazard .the prevention of death in the community caused by extreme high temperatures and the risk of heat-related mortality increase with aging (Sari and Shakoor 2008)

Table 1: The effect of Nickle on body weight ,total protein and glucose of rabbits after 2weeks under heat stress

Groups parameters	Control Normal saline N = 8	Nickle Chloride 10mg /kg B.W N=6
Body weight kg	1.525 ± 20.500	1.150 ± 12.301
Total protein g/L	11.500 ± 0.466	5.500 ± 0.395
Glucose mg/L	114.040 ± 0505	170.555 ± 5.450

(P≤0.05) v.s control

Table 2: The effect of Nickle on Cholesterol, Triglyceride, HDL and LDL of rabbits after 2 weeks under heat stress

Groups parameter	Control Normal saline N = 8	Nickle Chloride 10 mg /kg B.W N = 6
Cholesterol mg/dl	80.710 ± 0.677	160.020 ± 7.420
Triglyceride mg/dl	60.180 ± 0.311	148.. 666 ± 9.560
HDL mg/dl	47.299 ± 0.50	41.752 ± 0.660
LDL mg/dl	2..119 ± 0.225	18.227 ± 0.640

(P≤0.05) v.s control

Table 3: The effect of Nickle on Cholesterol , Triglyceride , HDL and LDL of rabbits after 2 weeks under heat stress

Groups parameters	Control Normal saline N = 8	Nickle Chloride 10mg /kg B.W N = 6
AST U/L	9.150 ± 0.3522	44.670 ± 0.900
ALT U/L	13.770 ± 0.665	58.504 ± 0.998
ALP U/L	24.990 ± 0.828	68.783 ± 0.850

(P≤0.05) v.s control

The exposure of the experimental animals of the recent study to nickel under environmental heat stress lead to death of 4 animals from nickel group within the second third of the experimental period week and tow animal from the control group. at the end of the second week the laboratory analysis of the studied parameters to the remain animals showed significant decrease in body weight and total protein and elevation in cholesterol, TG and LDL as well as increase in ALT,AST and ALP , glucose significantly increase as compared with control group.

Nickel Chloride drenching caused statically significant (P≤0.05) increase in cholesterol, TG, LDL, and VLDL except fall in HDL in serum concentration of male rabbits in the group that treated with oral dosing NiCl₂¹⁰.

Many biochemical and physiological systems of the body are affected by exposure to heat, such as enzymatic, metabolic, cardiovascular, respiratory, hematopoietic, endocrinal and immuno-logical systems,

as well as blood and body fluid composition. Heat stress resulted in significant increase in serum ALT and LDH levels. On the other hand, serum ALP activity decreased significantly. However serum total protein, lead, AST and GGT levels were not affected¹¹.

The decrease total protein levels related to a number of pathological processes like protein elimination in the urine, lowered production of liver proteins and liver damage due to heavy metal intoxication¹².

Renal damage from Ni toxicity was evident from the changed in rabbits also resulting in a reversal of Ni-induced biochemical changes, a significant decrease in lipid peroxidation².

Nickel-treated rats showed a significant increase in serum low-density lipoprotein-cholesterol, total cholesterol, triglycerides¹³.

Nickel sulfate and potassium dichromate treated rats showed a significant increase in serum low density lipoprotein-cholesterol (LDL-C), very low density lipoprotein-cholesterol (VLDL-C) and triglyceride (TG) level as well as decrease in serum high density lipoprotein-cholesterol (HDL-C) level¹⁴. High enzymes in liver indicate damage to the cells or inflammation in your liver. Total proteins, AST, ALT, and ALP). AST, ALT and ALP levels increased remarkably in experimental animal as compared to the control one. Nickel also causes changes in growth parameters of animal by affecting their body weight with increased dosage of metal¹⁵.

CONCLUSION

The recent study concluded that nickel chloride toxicity under environmental heat stress elevated liver enzymes level in blood as well as lipid profile while it negatively effected total protein and growth.

Ethical Clearance: taken from college scientific committee

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. El-Shafei ,H.: Assessment of liver function among nickel-plating workers in Egypt .*Eastern Mediterranean Health Journal Volume 17, 2011 | Volume 17, issue 6.*

2. Elangovan P.; Ramakrishnan R.; Amudha K.; Jalaludeen AM.; Sagarank G.; Babu FR. and Pari L...: Beneficial Protective Effect of Troxerutin on Nickel-Induced Renal Dysfunction in Wistar Rats. *J Environ Pathol Toxicol Oncol. 2018;37(1):1-14.*
3. Pane, E. ; Smith, C.; McGeer, J. ; and Wood, C. M. Mechanisms of acute and chronic water borne nickel toxicity in the freshwater cladoceran, *Daphnia magna*. *Environmental Science and Technology,2003; 37:4382-4389.*
4. Vieira, R. ; Gravato, C.; Soares, A. ; Morgado, F. and Guilhermino, L: Acute effects of copper and mercury on the estuarine fish *Pomatoschistus microps* : Linking biomarkers to behaviour. *Chemosphere, 2009;76 : 1416–1427.*
5. Kazimierz S;. and Konstantin S): Nickel carcinogenesis. Mutation . Research/Fundamental and Molecular Mechanisms of Mutagenesis. 2003;Volume 533, Issues 1–2, , Pages 67-97.
6. Leelavinothan P. and Kasinathan A. :Hepatoprotective role of naringin on nickel-induced toxicity in male Wistar rats *European Journal of Pharmacology. Volume 650, Issue 1, 10 January 2011;Pages 364-370*
7. Magaye R.; Yue X.; Zou B.; Shi H.; Yu H.; Liu K.; Lin X.; Xu J.; Yang C.; Wu Aq. And Zhao J.: Acute toxicity of nickel nanoparticles in rats after intravenous injection *Journals . International Journal of Nanomedicine »2014; Volume 9 » Issue 1.*
8. Adjroud O .:The toxic effects of nickel chloride on liver, erythropoiesis, and development in Wistar albino preimplanted rats can be reversed with selenium pretreatment. *Environ Toxicol. 2013; 28(5):290-8*
9. Perumal E. and Leelavinothan P.:Ameliorating effects of troxerutin on nickel-induced oxidative stress in rats. *Redox Report Communications in Free Radical Research . 2013;Volume 18,: Issue 6Pages 224-232.*
10. Wasfi Dh .; Abdul Razak N. and Eman A .:Ameorative role of sylemarine extracted from *sylibum marianum* seeds on nickel chloride induce changes in testicular functions in adult male rabbits. *Bas.J.Vet.Res..2015;Vol.14,No.1.*

11. Shalan MG.; Abd Ali W. and El-Batanony MH.: The Protective Role of Vitamins (C&E), Selenium, Silymarin and Rehydran-N against Lead Toxicity under Heat Stress Conditions. *JOURNAL OF THE INDIAN SOCIETY OF TOXICOLOGY (JIST)* .2008;VOL 002.
12. Aboud, O. : Impact of lead, mercury and cadmium on the immune response of *Oreochromis niloticus*. *New York Science Journal*. .2008;3: 12-16.
13. Das KK.; Gupta AD.; Dhundasi SA.; Patil AM.; Das SN.and Ambekar JG.:Effect of L-ascorbic acid on nickel-induced alterations in serum lipid profiles and liver histopathology in rats. *J Basic Clin Physiol Pharmacol*.2006 ;17(1):29-44.
14. Amrita D.;Swastika N.; Salim A. and Kusal K. :Effect of Garlic (*Allium sativum*) on Heavy Metal (Nickel II and ChromiumVI) Induced Alteration of Serum Lipid Profile in Male Albino Rats *Int. J. Environ. Res. Public Health* 2008, 5(3) 147-151.
15. Husna M.; Sumera S.;; Sobia A.;and Sana B.: Effect of nickel toxicity on growth parameters and hepatic enzymes in major carp . *Indian J. Anim. Res.*, 2016;50 (3):370-373.

A Qualitative Study of Successful Exclusive Breastfeeding

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ABSTRACT

Exclusive breastfeeding is influenced by 3 factors; predisposing, enabling and reinforcing factors. Public Health Center of Guntung Payung has the highest coverage of exclusive breastfeeding from 8 public health center in Banjarbaru City and for 5 years has increased. This study aim to exploring the success of exclusive breastfeeding in the work area of Guntung Payung Public Health Center of Banjarbaru in 2017. This research using a qualitative design with a phenomenological approach. Participants were selected by purposive sampling and continued by snowball technique. The method used in-depth interviews on 3 participants ie mothers who give exclusive breastfeeding that has babies 6-12 months. Factors that contribute to maternal success of exclusive breastfeeding are predisposing factors of knowledge, experience, perception, beliefs, values , and attitudes. Possible factors are the availability and affordability of health facilities. The reinforcing factors are the support of husbands, families, health workers and the workplace. When mothers with predisposing factors experience obstacles in exclusive breastfeeding and have no enabling factors, reinforcing factors encourage mothers to continue the exclusive breastfeeding.

Keywords: *Exclusive breastfeeding, successful factor*

INTRODUCTION

Exclusive breastfeeding has a great contribution to the growth and endurance of the child. Children exclusively breastfed will grow and develop optimally and will not get sick easily. This is in line with some global studies and facts. The Lancet Breastfeeding Series in 2016 has proven that exclusive breastfeeding reduces death rates due to infection by 88% in infants aged under 3 months and 31.36% of 37.94% sick children for not receiving exclusive breastfeeding or about 82% of sick children for not receiving exclusive breastfeeding. Data from the Health Profile of the Republic of Indonesia for 4 consecutive years ie 2013, 2014, 2015, 2016 fluctuated, in 2013 by 54.3%, then decreased in 2014 to 52.3%, increased again to 55.7% in 2015 and a sharp decline to 29.5% by 2016. This is not in line with the government's

expectation that the coverage of exclusive breastfeeding increases every year.¹ Data from Banjarbaru City Health Office Profile in 2016 shows an exclusive breastfeeding coverage of 45.34 %. Banjarbaru has 8 public health centers which are Guntung Payung Public Health Center has the highest coverage of exclusive breastfeeding of 66.97%. Exclusive breastfeeding coverage of Guntung Payung Public Health Center for 5 consecutive years ie in 2012 until 2016 has increased. The coverage of exclusive breastfeeding in 2012 is 57%, 2013 is 58.71%, 2014 is 60.37%, 2015 is 62.1% and in 2016 is 66.97%. The coverage rate of exclusive breastfeeding of Guntung Payung Public Health Center exceeds the Ministry of Health's Strategic Plan for 2015-2019, which is 50% and exceeds the National Development Plan for 2015-2020, which is 50%.

A mother giving breast milk exclusively influenced by various factors, especially factors that affect behavior. According to Green, there are 3 factors that influence behavior that is predisposing, enabling and reinforcing factor.² The success of Puskesmas Guntung Payung is very proud considering the number of benefits that can be

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given by exclusive breastfeeding not only in infants but also in mothers, families, and countries. So it needs to be examined about the success of exclusive breastfeeding in the Working Area of Guntung Payung Public Health Center Banjarbaru.

MATERIALS AND METHOD

This study uses qualitative design with phenomenology approach. Participants were taken by purposive sampling and continued by snowball technique. The data were collected by the researcher using the data collection tool that is the in-depth

interview guide for three months, namely November 2017 until January 2018. Participants selected in this study have characteristics that can communicate well, mothers who have a child aged 6-12 months and willing to become participants. Methods of data collection using in-depth interviews with 3 participants, each participant interviews as much as 5 times with a duration of 45-60 minutes. Tools used as interview guides, stationery, notebooks and tape recorders. The collected data is given a coding to give the numbers 1, 2, and 3 on the first participant have code P1, P2 for the second participants, and P3 in participants 3. In the analysis process, researchers identify a thematic analysis.

RESULTS AND DISCUSSION

Table 1: Characteristics of Participants In-depth Interviews

Code of participants	Age	Number of children	Education	Tribe	Informant's work	Family type
P1	27	1	High school	Banjar	Housewife	Extended
P2	34	3	High school	Jawa	Employee	Main
P3	32	2	High school	Jawa	Housewife	Main

Table 1 shows the participants with a safe age as much as 100% of participants with primiparity 33% and multipara 67%, participants with low education 100%, Banjar tribe 33% and Javanese 67%, participants work 33% and did not work (housewife) 67% and the participant with the main family 67% and large (extended) families 33%.

The success of exclusive breastfeeding: Based on the results of in-depth interviews on the participants in accordance with the Green theory that there are three factors that influence the predisposing factors that include knowledge, experience, perception, beliefs, values, and attitudes, enabling factors that include availability of health services, affordability of healthcare facilities and reinforcing factors that include information, emotional, instrumental and reward support by husbands, families, workplaces and health workers. It can be seen from the following statement:

"... The reason I give milk to my child because breast milk is the best food for babies, by giving breast milk the child can be smart and good immunity. If given a supplementary food (early breastfeeding) I am afraid of affecting his intestines, when small, it is okay but does not

know how to be big, I read that the intestines are not strong ... " ³

"... Because breast milk is good for babies, body endurance, and development ..." ⁴

The knowledge gained from a variety of sources of information participants HCWs, maternal and child health books, electronic media include mobile phones, radio and google. It can be seen from the following statement:

"... I often read google ... read in a pregnant book guide (pink book) ..." ³

"... when pregnancy checking I was told by the midwife ..." ⁵

"... I heard lectures on the radio ... magazines about breast milk" ⁴

Participants who have experience from previous children or other children who provide benefits and comparisons between breastfeeding with breast milk and formula milk are among the factors that influence mothers to continue breastfeeding exclusively. It can be seen from the following statement:

"... I keep breastfeeding because I see from the experience of the previous child, the child who was given breast milk which was rarely sick ..." ⁵

In working participants, support from the workplace is a factor that affects participants still give exclusive breastfeeding, can be seen from the following statement:

*"... a very helpful thing I can give exclusive breastfeeding because I get permission from the inn (the place of work) to bring children and breastfeed there ..."*⁵

The values that participants have that participants give breast milk are a woman's obligations, this belief is a factor that influences participants to give exclusive breastfeeding, this can be seen from the following description:

*"... I give breast milk which is our duty as a mother, a child is a trust from God that must be preserved and given the best ..."*⁴

Participants stated that breastfeeding is an obligation obtained from listening to religious lectures on the radio, it can be seen from the following statement:

*"... I heard a lecture on the radio ..."*⁴

Participants have different responses to inhibitors, constraints and how to overcome these obstacles in exclusive breastfeeding. The participant's statement is described as follows:

Breast milk does not come out

*"... In the beginning, after giving birth to breast milk I did not come out ..."*³

Participants' efforts to overcome the obstacles experienced, can be seen from the statement as follows:

*"... After giving birth to milk I did not come out then my brother-in-law bought me ASIFIT, he said that it will make me can breastfeeding, the next day I can ..."*³

Participants can overcome obstacles because there is support from families who provide information about breastfeeding capsules and buy these capsules to get the breast milk.

The short nipple

*"... after giving birth my nipple out but short, it happened for 1 month ..."*³

Constraints experienced by the participants as a short nipple can be seen from the following statement:

*"... my child becomes difficult to suckle, first she searched while crying after got the nipple, she silence ..."*³

Participants' efforts to overcome the obstacles experienced, can be seen from the statement as follows:

*"... I just continue to feed for 1 month, ever to read on google that said just bothered, if the family see my short nipple, they just nudge too. I never asked health workers because I do not think it should be asked to health workers. I go to the midwife if my child is sick or yesterday because my child can not defecate, if about breastfeeding I never ask, I also do not know who to ask about breastfeeding, what I do I listen to family advice and read google if the advice to continue the feeding ..."*³

No facilities available for breastfeeding

*"...There is no special place for breastfeeding..."*⁵

Participants stated that they have no constraints, although there is no facility for breastfeeding because participants are allowed to bring children to work and are permitted to breastfeed anytime and anywhere when at work, can be seen from the statement as follows:

*"... there are no obstacles to breastfeeding because I can take the child to work if not be able to bring my child is difficult for exclusive breastfeeding ..."*⁵

*"... free, there is a table chair, I nursed while sitting in a chair or sit down below like this ..."*⁵

Predisposing Factors: The results of this study found that participants who exclusively breastfed had a safe life of 100%, participants with primipara of 33% and multiparas of 67%, low education of 100%, participants work 33% and not work 67%. Kriselly shows the number of children actually do not affect breastfeeding, because all the mothers who have one child or more all provide exclusive breastfeeding.⁶

From the research results, it can be seen that participants who give exclusive breastfeeding have more knowledge especially about breast milk, the level of knowledge of participants about breastfeeding can be seen from know and understand then applied and evaluate about exclusive breastfeeding. Knowledge of exclusive breastfeeding known from a variety of sources such as printed media (magazines and pregnant books), electronics (google and social media) and from health workers when pregnant or during labor. From 3 participants there are 2 participants who get information from Google (internet).

Participants have experience from previous child or child of others about exclusive breastfeeding. Participants also have various perceptions about exclusive breastfeeding. A good perception of exclusive breastfeeding makes mothers always have the view that breast milk is very important for the growth of the baby and breast milk is the best food for the baby so that the mother feels very necessary and good attitude and willing to give it.⁷

Breastfeeding is a woman's obligation, according to the participant as a mother, the child is a trust from God that must be kept and given the best. This is the reason why mothers give exclusive breastfeeding despite getting various obstacles. Participants have positive values that support the mother for exclusive breastfeeding. Participants have the attitude that the child should be given breast milk. A positive mother's attitude tends to practice exclusive breastfeeding practices, whereas negative attitudes tend not to practice exclusive breastfeeding.⁸

Supporting factors: Based on the results of in-depth interviews according to participants of availability of health facilities such as posyandu, public health center or any healthcare facilities. Whereas according to participant's workplace does not provide a special place for breastfeeding but a mother can breastfeed everywhere. The better the facility is, the higher the exclusive breastfeeding of the baby and the less the mother's facility the lower the exclusive breastfeeding of the baby.⁹ Most participants feel less information about exclusive breastfeeding and want to ask but there is a feeling of fear so that participants prefer to seek information from printed and electronic media.

Reinforcing Factor: Husband and family support for the success of breastfeeding. The results showed that mothers who exclusively breastfed receive early support from husbands and families in terms of breastfeeding. In this case, the form of support provided is the support of information, emotional and instrumental. Participants who have the main family, the husband is the next of kin in their families. Mothers whose husbands support for exclusive breastfeeding tend to give exclusive breastfeeding twice as much as mothers whose husbands are less supportive of exclusive breastfeeding.¹⁰ The husband's support to motivate mothers to breastfeed, to provide psychologically and prepare a balanced nutrition to the mother.¹¹ Mother that provide exclusive

breastfeeding, provided informational support by the family rather than mothers who are not provided with family support. The support of families who firmly think that breastfeeding is the best will make it easier for mothers to exclusively breastfeed their babies.¹²

From the results of research support health workers to exclusive breastfeeding in the mother in the form of information support and instrumental support. But most participants were informed about exclusive breastfeeding from print and electronic media, some participants said there was no information on exclusive breastfeeding, but almost all participants said they received both informal and instrumental support at childbirth and after the onset of childbirth about one week after childbirth, after that the participants said there was no further support to them during breastfeeding, the officer only advised the mother to breastfeed, no one asked if the mother had difficulty in breastfeeding and discussed issues related to breastfeeding. The role of health workers is very important in protecting, improving, and supporting breastfeeding efforts should be seen in terms of broad engagement in social aspects.¹³ Workplace related to exclusive breastfeeding by mothers.¹⁴ From the results of research, participants who work always take her child to the workplace, even though the workplace does not prepare a special room for breastfeeding but participants can breastfeed anywhere and anytime.

From the in-depth interview to the participants, participants had various inhibitions such as breast milk not coming out, short of the nipple, swollen breasts, unavailability of facilities for breastfeeding and no experience despite various obstacles but participants can continue breastfeeding.

CONCLUSION

When mothers with predisposing factors experience obstacles in exclusive breastfeeding and have no enabling factors, the reinforcing factors encourage mothers to continue breastfeeding exclusively.

Ethical Clearance: This study approved and received ethical clearance from the Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia. In this study, we followed the guidelines from the Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia for ethical

clearance and informed consent. The informed consent included the research title, purpose, participants' right, confidentiality, and signature.

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Conflict of Interest: The authors declare that they have no conflict interests.

REFERENCES

1. Ministry of Health. *Basic of Health Research*. Indonesian Health Research and Development Agency. Jakarta. Indonesia. 2016.
2. Notoatmodjo S. *Metodologi Penelitian Kesehatan*. Rineka Cipta. Jakarta. 2010.
3. Anonim. A Qualitative Study of Successful Exclusive Breastfeeding in Banjarbaru. *Indepth Interview*. Participant I. 2018.
4. Anonim. A Qualitative Study of Successful Exclusive Breastfeeding in Banjarbaru. *Indepth Interview*. Participant III. 2018.
5. Anonim. A Qualitative Study of Successful Exclusive Breastfeeding in Banjarbaru. *Indepth Interview*. Participant II. 2018.
6. Kriselly Y. Qualitative Study Against Low Exclusive Breast Milk Coverage in Work Area of Puskesmas Kereng Pangi Katingan Hilir District Katingan Regency, Central Kalimantan. *Essay*. University of Indonesia. 2012.
7. Afrinis N, John T. Perceptive Relationships and Exclusive Breastfeeding Practices with Infant Nutritional Status 0-6 Months in Kampar Riau District. *Jurnal Kebidanan STIKes Tuanku Tambusai Riau*. 2015. 71-80.
8. Koharingsih YD, Ngadiyono. Relationship between Attitudes and Husband Support with Exclusive Breast-Feeding Practices for Non-Working Mothers with Infants 7-12 Months in the Working Area of Ngemplak Simongan Sub-District, Semarang Barat District. *Jurnal Kebidanan*. 2013. 2 (4); 43-50.
9. Nurdiana I. Relation of Maternal Knowledge Level and Availability of Exclusive Breastfeeding Support Facilities by Breastfeeding in the Working Area of Bonorowo District Health Center Kebumen District. *Essay*. Faculty of Health Sciences. Muhammadiyah Surakarta University. Surakarta. 2015.
10. Ramadani, Hadi. Support Husband in Exclusive Breastmilk at Work Area Puskesmas Air Tawar Padang City, West Sumatra. *Jurnal Kesehatan Masyarakat Nasional*. 2010. 4 (6); 269-274.
11. Anggorowati, Nuzila F. Relationship between Family Support and Exclusive Breastfeeding to Infants in Bebengan Village, Boja District, Kendal District. *Jurnal Keperawatan Maternitas*. 2011. 1 (1); 1-8.
12. Kartika VM, Fitria PA, Isfaizah. Relationship of Family Support with Successful Exclusive Breastfeeding at Working Mother in Work Area of Bringin District Health Center of Semarang Regency. *Jurnal Komunikasi Kesehatan*. 2017. 8 (1); 13-18.
13. Arifiati N. Analysis of Factors Affecting Exclusive Breastfeeding In Infants In Sub-District Warnasari Citangkil Cilegon. *Essay*. STIKES Faletahan Serang. Banten. 2017.
14. Hanulan S, Artha B, Karbito. Factors Associated with Exclusive Breastfeeding By Breastfeeding Moms Who Work as Health Workers. *Jurnal Ilmu Kesehatan*. 2017. 2 (2); 159-174.

The Modeling of Optimizing the Role of Mothers as Prevention of Sexual Violence Against Pre-School Children in Batusangkar West Sumatra Indonesia 2017

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ABSTRACT

Introduction: sexual abuse cases against pre-school children are increasing every year in Indonesia, including Batusangkar. There is no model intervention can be used as an effort to prevent sexual abuse against pre-school children yet.

Objective: The purpose of this study was to establish the preventing model of sexual abuse prevention in pre-school age children in western Sumatra.

Method: qualitative and quantitative combination with non-equivalent control group design. The sample in this study is 180 pre school's mother (4-6 years old). the data analysis by using GLM Repeated Measure.

Results: the trials show that models can improve mother's knowledge and attitude to prevent sexual abuse against pre-school children with Multivariate test value $P = 0.00$ p-value at factor Klp is 0.00.

Conclusion: a preventing sexual abuse model against pre-school age children (4-6 years) with "ICAS" mother smart mother and child survived have made. It is recommended that this model can be used in other areas in Indonesia as an effort to prevent sexual abuse against pre-school children.

Keywords: *mother, primary prevention, pre-school age children, sexual abuse, intervention*

INTRODUCTION

Parents need to suspect if there are changes in behavior different from the usual ⁽¹⁾. for instance, children who had not wet the bed now become often wet their bed, sucking his thumb, daydreaming, or the weird walk pattern, when they don't want to clean their genital while taking a bath, they don't want to wear panties or frightened to see strangers etc ⁽²⁾. Based on the characteristics child should get the right explanation of sexual knowledge, especially from the mother as the closest to the child ⁽³⁾. Therefore, mothers need to have knowledge about the correct children's parenting pattern. The researcher feels it is necessary to have study intervention to mothers with pre-school children (4-6 years). the purpose of this study is to make an intervention model given a mother with pre-school children.

METHOD

- This research was conducted using two approaches, qualitative and quantitative. The main research is

quantitative with the quasi-experimental design of non-equivalent type control group design, which is a study using two subject groups. Measurements were performed before and after treatment using the control group.

- The population of this study is all pre-school females (4-6 years) in Batusangkar with 180 total sample. Sampling with multi-stage random sampling, based on the number of infants in Batusangkar. Starting from District to sub-District, Urban Village, and Village. After getting 2 locations that match the inclusion criteria. the intervention determination of groups and control groups is done by random allocation using coins. The distance between the control group and the intervention group is 15 km, so it will not interfere with the evaluation result. The study duration is 6 months, ie from June 2017 to December 2017.
- The research workflow is as follows

- Control group: only take 1 evaluation, this group gets nothing.
- Intervention Group: Pre test (first Evaluation) -> first Training -> (second evaluation) second Training -> (third evaluation) third Training -> Evaluation (fourth Evaluation).
- Pre-test, the first Intervention (first evaluation)
- The distance between the first intervention and the second intervention is one week (the first evaluation)
- the distance between the second intervention and the third intervention is 2 weeks (second evaluation)
- The distance between the third intervention with evaluation is 4 months
- Interventions given to mothers of preschool children are:
 - Sexual abuse against children
 - Mother's role and function in child development
 - Children's Basic needs for growth and development
 - Communication and sex education for children
 - The Learning media are: videos, presentations, group discussions, leaflets, intervention control sheets for the home contain things that need to communicate with their children. in this control sheet, there is also information about when and how many times mother need to have communication with her child.
- Assignment: mothers that participated in this training were given the task to conduct counseling to other mothers around the neighborhood. To find out whether there is a mother's activity, then the mother must fill the control sheet.
- The questionnaire is the measuring tool used to determine the knowledge and attitude of the mother for each evaluation.
- The pre-intervention questionnaire and post-intervention are same.
- The evaluation done for 4 times.
- The data Analyze by GLM Repeated Measure.
- This research is funded by DIPA Fund nursing faculty of Andalas University.
- This research has received permission from the local government of West Sumatra and Tanah Datar district.

RESULTS

The method of experimental model testing is using quantitative with the quasi-experimental design of Pretest-posttest control group design. the Intervention given to the respondent trials for 3 times, with 4 times the measurement. The interval of the first intervention with the second one is 2 weeks, then the second with the third is one month. In a simple illustration, the model "ICAS" the optimization of mother role as the primary prevention of sexual violence against pre-school children (4-6 Years) is as follows:

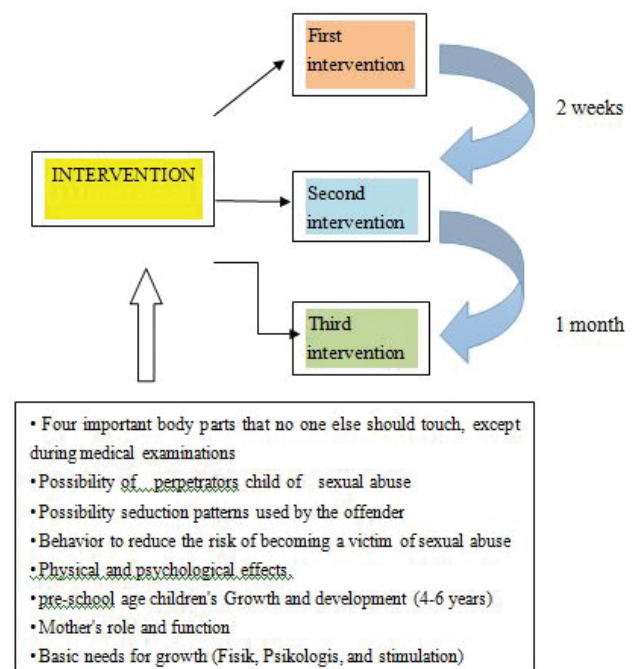


Figure 1: Model of "ICAS"

The trial of "ICAS" model for Optimizing the Role of mother with Under-five (4-6 years) as Prevention of Child Sexual abuse was followed by 180 respondents, consistof 90 respondents and 90 control subjects. All respondents were mothers of children aged 4-6 years. This intervention was conducted for 2 months. the Intervention given three times with four times the measurement. the Data analys by using GLM Reveated Measure. One of the requirements of this test is the data should be normally distributed.

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Training Implementation will be conducted from 10:00 to 12:00 WIB, with this following activity details

Activities	Time (minute)
The Introduction between facilitator and participants	10
Questionnaire/Pre Test	20
Explain the purpose of the training	5
TheScreening of si komal movie	10
Discussion based on Komal’s Movie’s content	15
Power Point Presentation	10
Group discussion	75
Results discussion	30
Closing	5
Amount of time	180 minutes

Based on the normality results data by using Kolmogorov-Smirnov Tests showed that the data on the variables of knowledge and attitude are normally distributed, so GLM repeated measure analysis can be done.

Table 1: the statistic test result on the increased of mother’s knowledge and attitude after getting 3 interventions and 4 times of measurement

Multivariate Tests ^a						
Effect	Value	F	Hypothesis df	Error df	Sig.	
factor1	Pillai’s Trace	.914	307.316 ^b	6.000	173.000	.000
	Wilks’ Lambda	.086	307.316 ^b	6.000	173.000	.000
	Hotelling’s Trace	10.658	307.316 ^b	6.000	173.000	.000
	Roy’s Largest Root	10.658	307.316 ^b	6.000	173.000	.000
factor1 * KLP	Pillai’s Trace	.875	202.069 ^b	6.000	173.000	.000
	Wilks’ Lambda	.125	202.069 ^b	6.000	173.000	.000
	Hotelling’s Trace	7.008	202.069 ^b	6.000	173.000	.000
	Roy’s Largest Root	7.008	202.069 ^b	6.000	173.000	.000

From Table 1, the multivariate test results indicating that the interventions that have been given to the mother in order to optimize the role of the mother as primary prevention of violence abuse against children aged 4-6 years increase the average value of knowledge and attitude of the mother. This is evidenced by the value of p at factor Klp is 0.0The following will be described on the results of knowledge hypothesis testing and mother’s attitude average, both in the control group and the intervention group according to the measurement of 1 week, 2 weeks and 1 month after getting the invention.

Analysis results show that from one week, two weeks and one month’s measurements showed that the increased of knowledge and attitude on each group, both

in the control group and in the intervention group. The increase has started in the intervention group after getting the first intervention. it means that there’s an increasing after getting in the intervention on the first week (p = 0.00). so does on the next two weeks and one month later (p = 0.00).The following will describe the average hypothesis test of knowledge and attitude, both in the intervention group and control group according to group differences within 2 months with three interventions.

Analysis results show that it is clear that the increase of average in knowledge and attitudes between the intervention group and the control group, the p-value for knowledge of 0.680 and the p-value in the attitude of 0.759. It can be seen in the picture profile plots below.

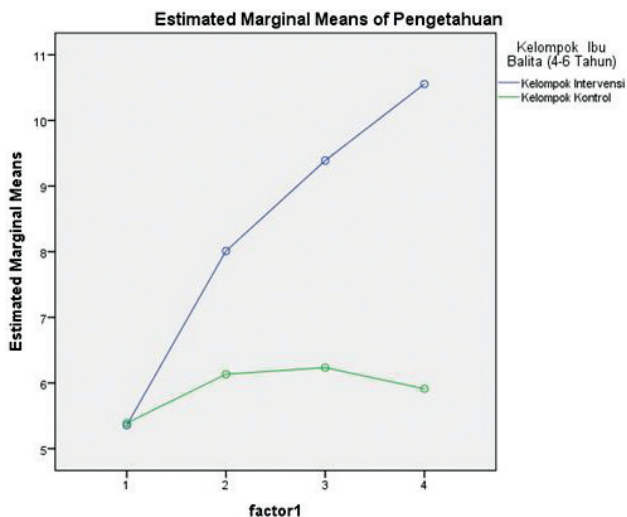


Figure 2: Graph of the average increase respondent’s knowledge in the beginning and after getting 3 interventions

ATTITUDE

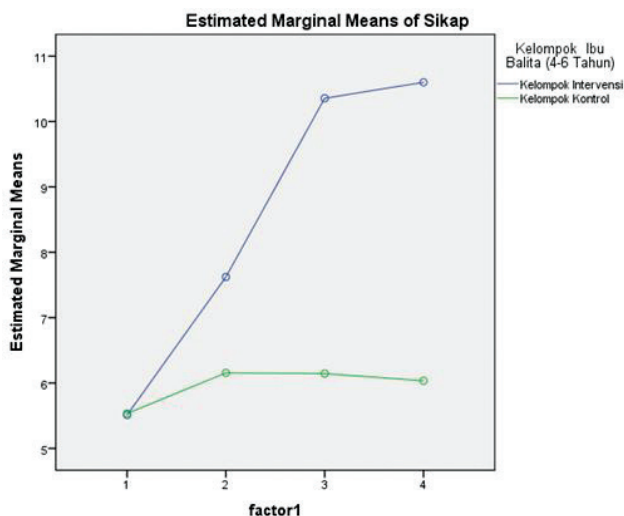


Figure 3: Graph of the increase of respondent’s attitude average in the beginning and after getting 3 times of intervention.

From figure 2 and figure 3 it is clear that there is an increase in average knowledge and attitude of respondent during 1.5-month intervention with 4 times measurement.

DISCUSSION

Research conducted by Neherta in 2015 provides the intervention by using: Movies, presentations, sketch stories, role play, videos, leaflets and songs as the media conducted in Padang, can improve the knowledge and assertiveness of children. However, this intervention

study is not enough if only given to children without supporting by various parties or professions, especially from families.

The data result by using GLM Repeated Measure was obtained there was an increase in the average knowledge and assertiveness of the intervention group compared with the control group. The increase of mother’s knowledge and attitude has been seen from the first week. It is proved by multivariate test result with p-value on factor Klp is 0.0

From field studies and literature reviews related to mother’s optimization, the appropriate interventions to solve this current issue of child sexual abuse are increasing mother’s knowledge to optimize the role and function of them.⁽²⁵⁾ the learning method is not only by using presentations but also given by using videos that contents sexual abuse occurs on children, perpetrators, modes used by offenders. Later on, the learning method was followed by giving materials about: the role and function of a mother, children’s basic need for growth and development⁽⁶⁾.

The lessons given to mothers need to be applied in their daily lives. Therefore, the mother is also given the task to spread the information they learned to their neighbors around her and filling out the check sheet about the work that mother need to do when their children are already going to bed, get up early, prepare to go to kindergarten. Then communicate between mother and child after returning from school and at rest ⁽⁹⁾. This check sheet was filled by all mothers in the intervention group for 30 days. during filling out the check sheets, it’s expecting they fill it out honestly.

Mother’s honesty is very necessary to educate their children becoming qualify person and useful for the nation. The filling of the sheet requires mother’s honesty, as the effort to improve her role and function as a mother. The result of filling the check sheet by mothers in the intervention group showed that 90% of mothers in the intervention group filled it up. Only 10% fill it with less than 75% of the questions on the check sheet.

The best nursing interventions to solve the problems in Batusangkar nowadays is to do primary prevention. One of them is to provide knowledge about sex to children. one of the necessary knowledge is to keep children away from sexual abuse and to reduce the risk

of children becoming a victim of sexual abuse. This sexual knowledge is necessary and important ⁽²⁶⁾. This sexual knowledge is necessary and important ⁽²⁷⁾ because knowledge is the most important domain that influences someone's action. Providing a checklist to mother on the intervention group for a month (30 days) is one of the advantages of the "ICAS" model that does not exist in other intervention models. a model does not always have advantages, but also a weakness.

CONCLUSION

There has been a model of "ICAS" mother's smart, children survived, a model of intervention given to mothers with preschool children as primary prevention to avoid pre-school children from sexual abuse. As an effort intervention by nurses against sexual abuse.

Conflict of Interest: No conflict of interest arose in this study.

Source of Finding: This study was conducted using a source of funds derived from the researcher himself

Ethical Clearance: This study has passed of the medical research ethics of the Dr. M. Djamil Hospital Padang Indonesian.

REFERANCES

1. Canton-Cortes D, Cortes MR, Canton J. Child sexual abuse, attachment style, and depression: the role of the characteristics of abuse. *J Interpers Violence*. 2015;30(3):420-36.
2. Cavanaugh CE, Harper B, Classen CC, Paesh O, Koopman C, Spiegel D. Experiences of Mothers Who Are Child Sexual Abuse Survivors: A Qualitative Exploration. *Journal of child sexual abuse*. 2015;24(5):506-25.
3. Connolly DA, Chong K, Coburn PI, Lutgens D. Factors Associated with Delays of Days to Decades to Criminal Prosecutions of Child Sexual Abuse. *Behavioral sciences & the law*. 2015;33(4):546-60.
4. Castelli B, Festa F, Di Sanzo MA, Guala A, Pellai A. Prevalence of child sexual abuse: a comparison among 4 Italian epidemiological studies. *La Pediatria medica e chirurgica : Medical and surgical pediatrics*. 2015;37(2):pmc 2015 114.
5. Aydin B, Akbas S, Turla A, Dundar C, Yuce M, Karabekiroglu K. Child sexual abuse in Turkey: an analysis of 1002 cases. *J Forensic Sci*. 2015;60(1):61-5.
6. Barron IG, Miller DJ, Kelly TB. School-based child sexual abuse prevention programs: moving toward resiliency-informed evaluation. *Journal of child sexual abuse*. 2015;24(1):77-96.
7. C MP, M CJ, Elias A, I OO, Awoere CT. Child sexual abuse among adolescents in southeast Nigeria: A concealed public health behavioral issue. *Pakistan journal of medical sciences*. 2015;31(4):827-32.
8. Mansbach-Kleinfeld I, Ifrah A, Apter A, Farbstein I. Child sexual abuse as reported by Israeli adolescents: social and health related correlates. *Child Abuse Negl*. 2015;40:68-80.
9. Bigras N, Godbout N, Briere J. Child Sexual Abuse, Sexual Anxiety, and Sexual Satisfaction: The Role of Self-Capacities. *Journal of child sexual abuse*. 2015;24(5):464-83.
10. Franco A, Ramirez L. [Child sexual abuse: clinical perspectives and ethico-legal dilemmas]. *Revista colombiana de psiquiatria*. 2016;45(1):51-8.
11. Harris LS, Block SD, Ogle CM, Goodman GS, Augusti EM, Larson RP, et al. Coping style and memory specificity in adolescents and adults with histories of child sexual abuse. *Memory*. 2016;24(8):1078-90.
12. Jennings WG, Richards TN, Tomsich E, Gover AR. Investigating the Role of Child Sexual Abuse in Intimate Partner Violence Victimization and Perpetration in Young Adulthood From a Propensity Score Matching Approach. *Journal of child sexual abuse*. 2015;24(6):659-81.
13. Killough E, Spector L, Moffatt M, Wiebe J, Nielsen-Parker M, Anderst J. Diagnostic agreement when comparing still and video imaging for the medical evaluation of child sexual abuse. *Child abuse & neglect*. 2016;52:102-9.
14. Leclerc B, Wortley R. Predictors of victim disclosure in child sexual abuse: Additional evidence from a sample of incarcerated adult sex offenders. *Child abuse & neglect*. 2015;43:104-11.

15. Meinck F, Cluver LD, Boyes ME. Longitudinal Predictors of Child Sexual Abuse in a Large Community-Based Sample of South African Youth. *Journal of interpersonal violence*. 2015.
16. Moirangthem S, Kumar NC, Math SB. Child sexual abuse: Issues & concerns. *The Indian journal of medical research*. 2015;142(1):1-3.
17. O'Leary P, Easton SD, Gould N. The Effect of Child Sexual Abuse on Men: Toward a Male Sensitive Measure. *Journal of interpersonal violence*. 2015.
18. Yuce M, Karabekiroglu K, Yildirim Z, Sahin S, Sapmaz D, Babadagi Z, et al. The Psychiatric Consequences of Child and Adolescent Sexual Abuse. *Noro psikiyatri arsivi*. 2015;52(4):393-9.
19. Vermeulen T, Greeff AP. Family Resilience Resources in Coping With Child Sexual Abuse in South Africa. *Journal of child sexual abuse*. 2015;24(5):555-71.
20. Thomas SP, Phillips KD, Blaine SK. Psychotherapy Experiences of Perpetrators of Child Sexual Abuse. *Archives of psychiatric nursing*. 2015;29(5):309-15.
21. Tener D, Eisikovits Z. Torn: Social Expectations Concerning Forgiveness Among Women Who Have Experienced Intrafamilial Child Sexual Abuse. *Journal of interpersonal violence*. 2015.
22. Guerra C, Pereda N. Research With Adolescent Victims of Child Sexual Abuse: Evaluation of Emotional Impact on Participants. *Journal of child sexual abuse*. 2015;24(8):943-58.
23. Kenny MC, Abreu RL. Training Mental Health Professionals in Child Sexual Abuse: Curricular Guidelines. *Journal of child sexual abuse*. 2015;24(5):572-91.
24. Kraye A, Seddon D, Robinson CA, Gwilym H. The influence of child sexual abuse on the self from adult narrative perspectives. *Journal of child sexual abuse*. 2015;24(2):135-51.
25. Abeid M, Muganyizi P, Massawe S, Mpembeni R, Darj E, Axemo P. Knowledge and attitude towards rape and child sexual abuse--a community-based cross-sectional study in rural Tanzania. *BMC public health*. 2015;15:428.
26. Ogunfowokan AA, Fajemilehin RB. Impact of a school-based sexual abuse prevention education program on the knowledge and attitude of high school girls. *J Sch Nurs*. 2012;28(6):459-68.
27. Walsh K, Zwi K, Woolfenden S, Shlonsky A. School-based education programmes for the prevention of child sexual abuse. *Cochrane Database Syst Rev*. 2015;4:CD004380.
28. Neherta M, Machmud R, Damayanti R, * A. Development and Testing of Intervention Model for Child Sexual Abuse Prevention on Primary School Children in Padang City, 2014. *Indian Journal of Community Health*. 2015(4):472-7%V 27.

Pathetic Health Status and Working Condition of Zambian Women

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ABSTRACT

Every human being has the right to access live in an environment with minimum health risks and to have right to use the services that can prevent or alleviate sufferings, treat diseases, promote good health throughout the individual's quality of life. Females living in middle income countries are being denied these basic human rights. The problems of working women are woven round the social, economic disequilibrium such as poverty, malnutrition, environmental degradation; the family lifestyle and ignorance were increased in recent decades. Hence, it is a felt need that to understand the health problems of women working in both sectors therefore, a comparative study has been conducted among them and the present paper discusses their health problems and the factors responsible for the same. The result found that, today a marked difference in the health status of women, especially that of women working in organized and unorganized sectors. It opens up the new avenues of scientific research to provide theoretical and empirical knowledge and propose a suitable solution to the nation for improved health and nutritional status of the women workers in the study area.

Keywords: Women, Health, Working Condition, Environment, Zambia

INTRODUCTION

The place of health among working women in the socioeconomic structure has been undergoing gradual change, but steady change during the past few centuries in almost all countries of the world. These changes have been influenced more by the changing socioeconomic structure and the face of economic development that overlook the society in this country⁽¹²⁾. A marked difference was found in the status of women and especially that of working women between rural and urban areas⁽⁸⁾. The problems of working women are woven round the social and economic disequilibrium such as poverty, malnutrition, environmental degradation, family lifestyle and ignorance due to plenty of reasons⁽¹²⁾. In the workplace, they were not given the facilities such as proper food, accommodations, medical facilities and educational assistance to their children⁽⁹⁾.

Working women are no different from the one at home when it comes to the traditional burden on her shoulders⁽¹²⁾. Domestic commitments, childcare and attention to elders, etc., are inseparably linked to her daily routine⁽³⁾. The malnutrition, inadequate diet, poor

health care and the attendant deficiencies are common with the woman at home and contributing negatively to their stamina at the working place and result as a poor productivity⁽⁷⁾.

Perhaps the biggest disability is woman suffers in terms of societal attitudes towards them. Cultural attitudes governing, developing societies still consider a girl child as an economic drain and a burden on the families⁽¹⁰⁾. Not only she is economically non-productive from the family's long-term perspective but, ultimately, she has to be given away to another family in the name of marriage. Families are thinking investment in women is a loss-making proposition goes the reasoning⁽⁵⁾. As a consequence, she is given an unequal access to nutrition, healthcare, education and skill-formation vise-à-vis the male child⁽¹¹⁾. The problems that women have to confront at places of work are, in a sense, the extension of some of their traditional disabilities to conform to a new setting⁽⁶⁾. Generally considered as docile, unambitious and trouble-free vi's-à-vis their male counterparts, women workers are sought to be assigned to monotonous, tedious and dead-end jobs⁽⁴⁾. This study initiated to elaborate the working women and their health status to the public view.

RELEVANCE OF THE STUDY

In Zambia, the vast majority of the female workers are employed in the informal sector. Owing to this, several major problems were faced by these segments due to the informal sector and social set-up⁽¹¹⁾. With the problem of informal sector employment in Zambia among women results, there is probably none so pressing, none as urgent as the problem of health status of rural women⁽²⁾. The right to health is the most basic of all human rights. It means that every human being has the right to live in an environment with minimum health risks and to have access to services that can prevent or alleviate sufferings, treat diseases, promote good health throughout the individual's life⁽¹⁾. Women in Lower middle income countries are being denied this basic human right especially Zambia⁽⁷⁾. It is a sad fact that they are not getting equal opportunities, even in the most basic needs of life such as health and basic living condition⁽⁷⁾. Hence, it is felt need that it is imperative to know the health status and problems of the women working in organized and unorganized sectors⁸. So far the research related to this concept in the study area is scanty, this primary attempt is made to document the real standard of the health status of the women working in both organized and unorganized sectors in the Chibombo district of Lusaka province.

DESIGN OF THE STUDY

Working women in organized and unorganized sector in the age group of 20-35 years of Chibombo district in Lusaka province constituted as respondents of this study. Purposive sampling method was used to select female workers and selection of 800 respondents among the study area by population method. The structured interview schedule was used in both work premises and outside to collect the information from the selected respondents. Anthropometric assessment was done to measure the nutritional status level of the women-respondents and the average is calculated to

some selected variables and presented in summary form and descriptive statistics also used.

SOCIAL STATUS OF WOMEN

Tribes, age, birth order, educational level, marital status, family type and household size are concerned for to measure the social status. While probing the about the tribes of the women-respondents more than 80 percent of the total constituted by Lozi in both sectors followed by Tonga (9 percent) Bemba (7 percent) and remaining (4 percent) are other tribes. Lozi constituted 84 percent and 76 percent each in the organized and unorganized sector respectively. It is found that the third birth ordered women has the maximum chance to be an employee in both sectors. The analysis of their ordinal position reveals that of the total the third in order of birth constituted about more than one third (39 percent) in the total, followed by fourth (32 percent) and fifth (29 percent) born.

While considering the age group of the women nearly half (48 percent) of them are in the age group of 20-25 years, followed by another 30 percent are 26-30 years age group. Only 22 percent of the total are in the age group of 31-35 years. The mean age of the total respondents was (26.2) and the mean age for the organized sector is found to be 24.7 while 27.7 stand for unorganized sector women.

EMPLOYMENT PATTERN

The occupation-wise distribution of the women-respondents reveal that of the total about three-fifths (59 percent) of them are constituted by women working in unorganized sectors while the rest 41 percent are from organized sectors. The employment pattern of organized sector women is found to be as a school teacher (29 percent), primary school workers (8 percent), and Village Health Nurses (4 percent) while the unorganized sector women as daily wagers (45 percent), entrepreneur (13 percent) and farming workers (1 percent).

Table 1: Mean for some selected variables

Variable	Mean		Mean to the Total (N = 800)
	Organised	Unorganized	
Age	24.7	27.7	26.2
Birth order	4	4	4
Monthly income (in ZMK)	3,000/-	1,500/-	2,000/-

However, in general both lack of time and tiredness prevents women of both sectors in performing of dual role. All the women of organized sector and 83.1 percent of unorganized sector do not face any problem in their work place whereas misunderstanding and jealous among the co-workers are the causes for the problem facing women, according to them.

DIETARY PATTERN

As far as the dietary pattern of the women-respondents is concerned a vast majority (93 percent) of the total women’s dietary pattern is foods of both animal origin and foods of vegetable whereas the remaining 7 percent in the total intakes foods of vegetable origin, exclusively during the working time.

While probing women-respondents’ per day meal pattern it is found that a large majority of the women of both sectors consumed bread with any drinks during breakfast and dinner. However, it is significant to note that while all the women of organized sector preferred toasted bread and eggs with any one vegetable for lunch Nshima with *Greens* and chicken and one fourths (25.4 percent) in the unorganized sector satisfies with the left-over. One-fifths (21.9percent) in the organized sector prefers *Chips* for dinner. In short, however, majority of the women’s per day’s meal pattern is found with Nshima with *Greens*. It is to be noted that about three-fifths of the women working in the organized sector refreshes with any drink along with *freeta* during mid-morning and afternoon whereas three-fourths (74.6 percent) of women in the unorganized sector are not.

HEALTH STATUS

Table 2: Health Problems of Women-respondents

Health problem	Percentage (N = 800)	
	Organised	Unorganised
Pain in joints	17.1	28.7
Back pain	19.5	17
Irritability	7.3	6.7
Indigestion	9.8	10.2
Headache	9.8	10.2
Obesity	9.8	-
Sense of giddiness	14.6	7
Constipation	12.1	10.2

Source: Computed from field data

Pain in joints, back pain, sense of giddiness, constipation, indigestion, headache and irritability are the common health problems. It is to be noted that women of unorganised sector is free from obesity. However, most of the women of unorganised sector are sufferers of pain in joints whereas back pain is prevalent among women in organised sector. For such physical ailments 85.4 percent of the women of the organised sector usually approach private hospitals whereas the same is found with 59.3 percent in the unorganised sector. However, nearly one-fourths (22 percent) in the unorganised sector never approach either private or government hospitals.

Table 3: Nutritional Status of the Women-respondents

Body Mass Index (By WHO standard)	Percentage (N = 800)	
	Organised	Unorganised
Under weight	12.2	76.3
Normal	73.2	23.7
Mild obese	14.6	-

While probing the nutritional status of the women-respondents by BMI it is significant to note that more than three-fourths (76.3 percent) in the unorganised sector is found with underweight whereas normal nutritional status was observed in 73.2 percent of the total organised sector. It is to be noted that obesity is seen among 14.6 percent of the women of organised sector.

FACTOR ANALYSIS

The factor analysis has yielded six factors based on Eigen values and percentage of variance accounted for each factor. The results are presented in Table 4.

Table 4: Factor loadings on Opinion of Women Employees about Issues in Workplace

Factors	Eigen values	Percentage of variance	Cumulative percent of variance
Factor I	3.217	20.104	20.104
Factor II	1.389	8.684	28.788
Factor III	1.355	8.469	37.257
Factor IV	1.212	7.576	44.833
Factor V	1.158	7.237	52.070
Factor VI	1.016	6.347	58.417

Source: Computed from field data

The components having Eigen values greater than '1' were converged as factors. The first factor accounted for 20.104 percent of the variance followed by other factors accounting for 8.684 percent, 8.469 percent, 7.576 percent, 7.237 percent and 6.347 percent respectively. Together, these six factors accounted for 58.417 percent of variation in the opinion of the women workers about the major issues in the study area.

The opinion with larger factor loadings under each factor is presented in table 5. There were three factors having significant loadings on factor I named as Health Issues. They were opinion about nutritional food (0.909), medical facilities (0.896) and maternity benefits (0.865) in the descending order of factor loadings. Factor II Discrimination consisted of two opinions with higher factor loadings. They were discrimination by Tribe (0.841) and discrimination by educational qualifications (0.723). Factor III Sexual Harasements had Open calling (0.697), Wrong Touch (0.602) and bad sign and volgur words (-0.509) with higher factor loadings.

Table 5: Factor Analysis

Opinion	Factor Loadings
Factor I- Health Issues	
Nutritional food	0.909
Medical facilities	0.896
Maternity benefits	0.865
Factor II- Discrimination	
Discrimination by Tribe	0.841
Discrimination by Qualification	0.723
Factor III- Sexual Harasments	
Open Calling	0.697
Wrong Touch	0.602
Signs and Words	0.509
Factor IV- Work Life Imbalance	
Time for family	0.736
Cooperation from the family members	0.702
Factor V- Compensation Issues	
Poor compensation	0.759
Compensation discribancy	0.547
Partiality in pay	0.518
Factor VI – Working Environment	
Absence of Restroom	0.855

Factor IV Work Life Imbalance consisted of two variables with higher factor loadings. They were

lack of time for family members (0.736) and poor cooperation from the family members (0.702). Factor V Compensation Issues consisted of three variables with higher factor loadings. They were poor Comenation Benefits (0.759), Compensation Discribancy (0.547) and partiality in payment (0.518). Absence of Restroom facilities (0.855) was having high factor loadings at Factor VI working environment.

The rotated factor matrix of the selected variables along with its rank has been presented in Table 6.

Table 6: Rotated Component Matrix

V. No.	Practice	Factor Loadings	Variable Rank
X1	Partiality in pay	.518	XIII
X2	Poor compensation	.602	XI
X3	Absence of Restroom	-.509	XIV
X4	Open Calling for illegal sex	.759	VI
X5	Wrong Touch at workplace	.736	VII
X6	Discrimination by Tribe	.855	IV
X7	Bad Signs and Words	.723	VIII
X9	Absence of Medical facilities	.896	II
X10	Lack of Time for family	.702	IX
X11	Discrimination by Qualification	.841	V
X12	Lack of Nutritional food	.909	I
X13	Absence of Maternity benefits	.865	III
X14	Compensation discribancy	.547	XII
X15	Cooperation from the family members	.697	X

Based on the component loadings, the variables can be ranked for its importance. Out of 16 variables, 14 have been grouped into 6 factors and have been assigned ranks from 1 to 14. The three variables X8 and X16 have not been grouped into any factor and the variance explained by these variables was minimum, they have not been ranked. It also reveals that except these two variables other fourteen variables are most important to test the work place issues of the women employees.

Recommendation

- Government should take initiation to provide the adequate knowledge and awareness about the nutritional and dietary patterns to the women;
- Both public and private should tie-up and provide the proper education to the women;
- Government should appoint the special health and welfare officers for women workers for their betterment;
- Employers should take care for their employees by providing adequate knowledge and the better working environment;
- Employers should pay more attention on Health issues faced by Women workers, workplace discrimination and sexual and ensure the healthy and safety working environment.

CONCLUSION

While concluding the present study it is to be highlighted that most of the women had general health problems, irrespective of organised or unorganised. Under nutrition is widely prevalent among the women in unorganised sector as they are not aware of proper dietary pattern. The poor educational level, insufficient income, and lack of awareness about food pattern are the causes that prevent women from achieving total well-being as well balanced health. Ironically, they all are in satisfaction regarding their food pattern that shows their unawareness on such. It concluded that still women are the victim in the domestic and the workplace to suffer from their counterpart in various ways, for this proper education should be provided to the male (gender sensitization). The changes should be start from the home to provide the hygienic living atmosphere to the women in the society. Further, numbers of scientific research are needed in the area to fulfil the gap by providing suitable solution to the nation for improved health and nutritional status and better working condition of the women workers.

Ethical Clearance: data used in this study pertained from the preliminary field survey at Zambia.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCE

1. Chanda D, Gosnell D (2006). "The impact of tuberculosis on Zambia and the Zambian nursing workforce". *Online Journal of Issues in Nursing*. 11(1).
2. Cherian M, Choo S, Wilson I, Noel L, Sheikh M, Dayrit M, Groth S (2010). "Building and retaining the neglected anaesthesia health workforce: is it crucial for health systems strengthening through primary health care?". *Bulletin of the World Health Organization*. 88(8): 637-639.
3. Gabrysch S, Cousens S, Cox J, Campbell OM (2011). "The influence of distance and level of care on delivery place in rural Zambia: a study of linked national data in a geographic information system". *PLoS Med*. 8(1). e1000394.
4. Hayman B, Wilkes L, Halcomb E, Jackson D (2013). "Marginalised mothers: Lesbian women negotiating heteronormative healthcare services". *Contemporary nurse*, 44(1): 120-127.
5. Hirschhorn LR, Oguda L, Fullem A, Dreesch N, Wilson P (2006). "Estimating health workforce needs for antiretroviral therapy in resource-limited settings". *Human Resources for Health*. 4(1):1.
6. Marchal B, Kegels G (2003). "Health workforce imbalances in times of globalization: brain drain or professional mobility?". *The International Journal of Health Planning and Management*. 18(S1): S89-S101.
7. Mwanahamuntu MH, Sahasrabudde VV, Pfaendler KS, Mudenda V, Hicks ML, Vermund SH, Parham GP (2009). "Implementation of 'see and-treat' cervical cancer prevention services linked to HIV care in Zambia". *AIDS (London, England)*. 23(6): N1.
8. Sanjoko N, Frich JC, Fretheim A (2008). "Barriers and facilitators to patients' adherence to antiretroviral treatment in Zambia: a qualitative study". *SAHARA-J: Journal of Social Aspects of HIV/AIDS*. 5(3): 136-143.
9. Serour GI (2009). "Healthcare workers and the brain drain". *International Journal of Gynecology & Obstetrics*, 106(2):175-178.
10. Tawfik L, Kinoti SN (2006). "The impact of HIV/AIDS on the health workforce in developing

- countries”. *document de base préparé pour Le Rapport sur la santé dans le monde*. 8.
11. Vettriselvan R, Anu S, Jesu Rajan FSA (2016). “Problems faced by women Construction workers in Theni District”. “International Journal of Management Research and Social Science”. 3(2):58-61
12. Vettriselvan R (2017). “Women and Health: A case of Working Women in Zambia”. *PAA Affairs, Quarterly Newsletter of the Population Association of America, Inc.* Spring 2017:8-9.

Knowledge, Attitude and Practice of Breast Self Examination (BSE) among Female Health Workers of Selected Hospitals of Dakshina Kannada District, Karnataka

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ABSTRACT

Background: The prevalence of breast cancer in Indian women is around 20% of all cancers. Health care professionals can play a significant part in teaching women. Early detection and screening is important to identify the preventive diseases.

Aim: This study aimed to determine the knowledge, attitude and practice of Breast Self Examination (BSE) among female health workers.

Method: This cross sectional survey was conducted among 210 health care workers from 2 different hospitals Karnataka state, India. Self administered questionnaire was used to obtain information such as demographic characteristics, knowledge, attitude and practice regarding Breast Self Examination

Statistical Analysis: Descriptive and inferential statistics was used by using SPSS 16 version.

Result: Around 127 (60.47%) of participants had an average knowledge about Breast Self Examination. Utmost 193 (91.90%) have a favorable attitude towards Breast Self Examination. Majority of 68.09% (143 out of 210) have performed Breast Self Examination. Though knowledge regarding Breast Self Examination was average, only 143 (68.09%) of them practiced BSE.

Conclusion: There is need to continue education programs and training sessions frequently to sensitize more people towards practicing BSE. Health care workers need to emphasize on practicing BSE more to generate awareness & periodic screening.

Keywords: *Breast Self Examination, Knowledge, Attitude, Practice, Barriers, Benefits, Female Health Workers, Nurses, Doctors*

INTRODUCTION

Globally breast cancer is the leading cause of cancer mortality in women. The incidence rates are high in developed countries. Breast cancer cases in urban Indian women are 25-30 new cases per 1, 00,000 women population per year. There are a projected 1,00,000 -1,25,000 new breast cancer cases in India every year. It is estimated to be doubled by the year 2025. [1,2]

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Female healthcare practitioners like medical doctors, nurses, allied health professionals are found to be more knowledgeable about breast cancer than any other population.^[3] Most Studies report regarding maximum awareness regarding BSE among woman.^[4,5] Regardless of the positive attitude to BSE, a study stated that its practice was little among some health care workers.^[3, 4, 5, 6 7] The findings like some health care workers did not practice BSE, and not aware about right techniques, negative attitude towards BSE among health care professionals puts up a new challenge for the hospitals and public for preventive practices.^[3]

Many studies conducted on identifying awareness, attitude and practice of Breast Self Examination among

health care workers recommended that there is a need for informative programs to create alertness concerning regular breast cancer screening among healthcare students. Thus making a point that there is lack of awareness, lack of positive attitude and practice issues among health care professionals.^[4,6] By identifying all these needs, the present study was planned to determine the knowledge, attitude, practice as well as benefits and barriers regarding the practice of BSE among healthcare workers.

MATERIAL AND METHOD

The aim of the study was to measure female healthcare workers knowledge, attitude and practice regarding Breast Self Examination (BSE). A descriptive cross-sectional survey using purposive sampling method was conducted during the period of November 2015 to February 2016 among 210 female healthcare workers from selected hospitals of Dakshina Kannada district in Karnataka state. Only female healthcare workers such as nurses, physiotherapists, speech therapists, lab technicians, doctors and interns in nursing were approached for participation in the study.

DATA COLLECTION AND ANALYSIS

After obtaining the institutional review board agreement, participants were informed about the study and informed consent was obtained and they were assured of the confidentiality of their responses. Each participant was given a self-administered survey which was intended to evaluate information such as socio-demographic data, a structured knowledge questionnaire, an attitude scale and practice questionnaire. The knowledge questionnaire consisted of various areas of breast cancer and BSE. It consisted of 20 MCQs with 4 options, and was classified as Good knowledge (75% and above), Average knowledge (50 %- 74%) and Poor knowledge (49 % and below).

The attitude scale consists of 15 items with statements focusing on the attitude towards the performance of BSE. The maximum and minimum score were 75 and 15 respectively. To analyze and interpret the perception, categories were made as Unfavourable attitude (15-45 score) and Favourable attitude (46-75 score). Practice questionnaire covered various practices related to BSE. It further included perceived benefits and barriers in relation to the performance of BSE. There were total 10 areas of practice, 4 benefits, and 6 listed barriers.

The data were evaluated by descriptive statistics and chi-square [SPSS 16.0]. Content validity of the instruments was established by giving the instrument to experts from different areas like Nursing, Allied Health, Medicine, Oncology departments. The reliability of the tools was established by conducting pilot study with 20 participants, using Cronbach's alpha for the attitude scale and Split-half method for the knowledge questionnaire and the values were (0.85) and (0.7) respectively.

FINDINGS

The total of 250 female healthcare workers was approached, a total of 210 were consented to participate in this study, producing a return rate of 84%.

Demographic information about the participants: Mean age of the participants were 25.98 in years. Most of the 127 (60.5%) were staff nurses. Majority 123(58.6%) participants were undergraduates. [Table 1]

Table 1: Frequency and percentage distribution of sample by selected demographic variables. n = 210
The mean ages of the samples are 25.98 (in years)

Sl. No.	Demographic Variables	Frequency	Percentage (%)
1.	Profession		
	Staff nurse	127	60.5
	Physiotherapist	1	0.47
	Speech therapist	3	1.4
	Lab technician	3	1.4
	Doctors	8	3.8
	Interns	67	31.9
2.	Marital status		
	Single	134	63.8
	Married	76	36.2
3.	Religion		
	Hindu	80	38.1
	Christian	117	55.7
	Muslim	5	2.4
	Others	8	3.8
4.	Educational qualification		
	PUC	29	13.8
	UG	123	58.6
	PG	31	14.8
	Others	27	12.8%

Conted...

5. Any information or training on BSE		
No	41	19.5%
Yes	169	80.5
6. Years of work experience in the hospital		
0-5	153	72.9
6-10	28	13.3
11-15	9	4.3
16 or more	20	9.5
7. Any family history of breast cancer		
Yes	10	4.8
No	200	95.2

Knowledge regarding BSE: About 60.47% possessed average knowledge regarding BSE. About 33.80% had a poor knowledge level about BSE and about 12 (5.37%) had a good knowledge level about BSE. [table 2]

Attitude regarding BSE: The majority of the participants 193 (91.90%) had favorable attitude towards

BSE. About 17 (8.10%) have an unfavorable attitude towards BSE. [table 2]

Table 2: Frequency and percentage distribution of the knowledge and attitude scores of the participants

Knowledge Scores	Frequency	Percentage
Good	12	5.73%
Average	127	60.47%
Poor	71	33.80%
Attitude Scores	Frequency	Percentage
Favorable	193	91.90%
Unfavorable	17	8.10%

Association between knowledge, attitude and selected variables: Chi-square value was calculated showed a significant association between knowledge and variables like marital status, profession and the source of information about BSE ($p < 0.05$). [table 3] There was no significant association found between attitude towards BSE and all demographic variables.

Table 3: Chi square test computed between perception of knowledge and selected demographic variables n = 210

Sl. No.	Variables	<median (\leq)	>median (\geq)	P value	X ² value	df	Significance
1.	Marital status						
	Single	57	77	0.017	8.248	1	S
	Married	48	28				
2.	Profession						
	Staff nurse	74	53	0.015	16.194	5	S
	Physiotherapist	1	0				
	Speech therapist	3	0				
	Lab technician	1	2				
	Doctors	2	6				
Interns	24	43					
3.	Family history						
	Yes	100	100	0.329	0.000	1	NS
	No	5	5				

Practice of BSE: Around 120 (57.14%) of the participants felt the need for frequent training to update their skills in performing BSE. A vast majority of 68.09% (143 out of 210) have performed Breast Self Examination [table 4].

Table 4: Frequency distribution table of practice of BSE by the study participants. N = 210

Sl. No.	AREAS	Frequency	Percentage
1.	Have you ever performed Breast Self Examination?	143	68.09%
2.	How often do you perform BSE : once in		
	Weeks	22	10.47%
	Months	57	27.14%
	Years	13	6.19%
	As and when I remember	4	1.90%

Conted...

3.	Undergone Breast Examination by a consultant for any breast problems	23	10.95%
4.	I have been Performing all the steps of BSE.	83	39.52%
5.	Frequent training is essential to update my skills in performing BSE.	120	57.14%
6.	Need assistance for performing BSE	25	11.90%
7.	By regular performing BSE, I am confident to identify changes in the breast.	128	60.95%
8.	My family members are affected with breast cancer	10	4.76%
9.	Even after reaching menopause, BSE should be continued	171	81.42%
10.	Being a Health care worker I am negligent about taking care of my own health	50	23.80%

Benefits and barriers to performing BSE: Almost 195 (92.85%) strongly feel that BSE helps to identify breast lumps at the earliest. 185 (88.09%) feel healthy and satisfied after performing BSE. 171 (81.42%) strongly feel that BSE helps to avoid unnecessary surgery and disfigurement . [figure 1] 132 (62.85%) feel that there is no need to worry about breast cancer in future if they keep performing BSE. About 72 (34.28%) find it time-consuming to perform BSE. [figure 2]

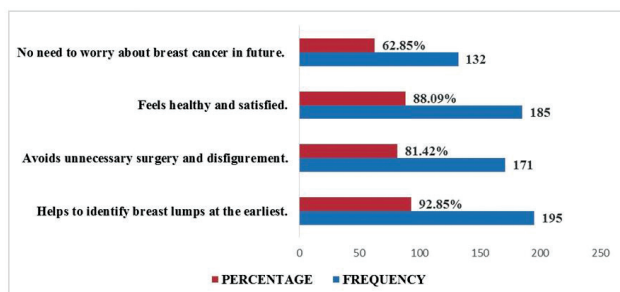


Figure 1: Percentage Distribution on Benefits of performing BSE

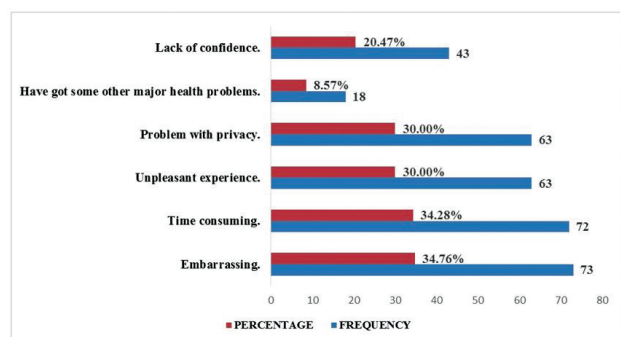


Figure 2: Percentage distribution on barriers of performing BSE

DISCUSSION

The average knowledge regarding BSE in this study population was average 60.47%. Another study done in Nigeria and in Gujarat (73%) among health professionals where the majority of the respondents had knowledge of

BSE. Education is shown to increase women’s awareness attitude and performance of BSE. [3, 16, 23] In contradiction with the present study, a study done in Malaysia and Iran revealed that knowledge, as well as behavior, was very poor among female healthcare workers. [7, 13]

The present study revealed that majority of the participants 193 (91.90%) had a favorable attitude towards the practice of breast self-examination. This finding was in consistent with other similar studies, which showed a significant influence of the training program in the form of a noteworthy increase in knowledge, promotion of positive attitude and improvement in the practice of BSE. [3, 4, 12, 13] In contrast to above findings a study reported that poor attitude of nurses towards BSE has affected their practice although they possessed adequate knowledge. [2]

The present study showed a substantial association between knowledge and demographic variables like marital status, profession, source of information regarding BSE among the healthcare workers. A similar study showed a positive association between level of awareness & educational level (<0.001). [16] In another study there was a statistically significant (p<0.001) positive correlation between attitude and practice. [26]

When the practice of BSE among health care professionals was analyzed, a vast majority of 68.09% (143 out of 210) have performed Breast Self Examination. 120 (57.14%) of the participants felt the need for frequent training to update their skills in performing BSE. 128 (60.95%) of the participants expressed that performing BSE, they are confident that they can identify the changes in the breast. In support of the present study, nearly 142 (38%) of the healthcare workers knew how to perform BSE. Around 97(25.9%) regularly performed BSE. [13, 21] In contrast with the above findings, a study report stated that lack of knowledge and motivation

was leading to poor practice.^[3,7] Among Asian woman 12% practice BSE monthly, 49% underwent at least one clinical breast examination during their lifestyle, 54% did not know ample about breast cancer and 21% said identifying cancer timely was important. ^[25] The results points out that nurses who possess adequate information regarding BSE will practice BSE. ^[6]

When barriers were taken into consideration, privacy issues, unpleasant experience, time factor and embarrassment was stated by majority of the participants. Contrasting evidence was found in other studies, where decreased level of practice, infrequent clinical BSE, cost of screening and traveling were reported as barriers for the practice of BSE among the Caribbean population. ^[24,15] Forgetfulness, procrastination, laziness, lack of time, fear of discovering a lump, no trust in their practice ability were stated in a study done in Nigeria.^[5]

169(80.5%) of the study population did receive information classes regarding BSE in their academics and even from continuing professional education classes. In a study 96% asked for further information regarding BSE and breast cancer. ^[23]

Study limitation: The sample of the study population includes health care professionals; hence the findings cannot be universal to a large population in India. Since this study involved health care professionals, the group which comprises of learned and informed people, so their knowledge levels are expected to be better compared to other populations.

CONCLUSION

The results indicate that the nurses have an average knowledge of BSE and this has reflected in their practice of BSE. The finding like, some of the nurses did not practice BSE due to lack of experience and confidence recommends that there is a need for continuing nursing education programs. Importance should be placed on BSE in undergraduate and postgraduate courses, especially for nurses, as they are mostly involved in patient care and education.

As some of the barriers mentioned in the study like, not knowing the correct method of BSE, time factor, embarrassment would be related with the poor practices. However, there is a likelihood to rise the knowledge, attitude and practices towards BSE through enrichment

of breast cancer awareness and by reducing the known barriers. Health care professionals need to play a key role in educating the community particularly the high risk women.

Conflict of Interest: None

Source of Funding: Self

Ethical Clearance: Approved

REFERENCES

1. Cancer statistics in Indian women [Internet]. Times of India [updated 2012 Oct 21]. Available from:<http://timesofindia.indiatimes.com/home/sunday-times/deep-focus/Cancer-statistics-in-Indian-women/articleshow/16897858.cms>.
2. Sharma PK, Ganguly E, Kamaraju T. Knowledge attitude & preventive practices of south Indian women towards breast cancer. *Research Journal of Medical Sciences*, 2012; 6 (6): 272-74.
3. Agboola AOJ, Deji-Agboola AM, Oritogun KS, Musa AA, Oyebadejo TY, Ayoade BA., Knowledge, attitude and practice of Breast Self Examination in female health workers in Olabisi Onabanjo University Teaching Hospital, Sagamu, Nigeria. *International Medical Journal Malaysia*. 2009; 8: 5-10.
4. Doshi D, Reddy BR, Kulkarni S, Karunakar P. Breast Self Examination knowledge attitude and practice among female dental students in Hyderabad city India; *Indian J Palliat Care*; 2012;18:68-73.
5. Kayode FO, Akande TM, Osagbemi GK, Knowledge, attitude and practice of BSE among female secondary school teachers in Ilorin, Nigeria. *Eur J Sci Res* 2005; 10: 42-7.
6. Sreedharan J, Muttappallymyalil J, Venkatraman M, Thomas M. Breast Self Examination among nurses in United Arab Emirates. *Asian Pac J Cancer Prev*. 2010; 11:651-4.
7. Rosmawati NHN, Breast Self Examination among women in suburban area in Terengganu; *Malaysia. Asian Pac J Cancer Prev*. 2009; 11: 1503-08.
8. Yerpude NN, Jogdand KS. Knowledge and practice of BSE among females in a rural area

- of south India. *National Journal of Community Medicine*. 2013; 4:329-332.
9. Champion V. Role of BSE in breast cancer screening; *Cancer*. 1992; 69: 1985-91.
 10. McCready T, Littlewood D, Jenkinson J. Breast self-examination and breast awareness: a literature review. *J Clin Nurs* 2005; 14: 570-78
 11. Dunder PE et al. Knowledge and attitude of BSE and mammography in a group of women in rural areas of western Turkey. *BMC Cancer* [Internet]. 2006 Feb 24; 6(43). Available from: <http://www.biomedcentral.com/1471-2407/6/43>.
 12. Seif NY, Aziz MA. Effect of BSE training program on knowledge, attitude, and practice of a group of working women. *J Egypt Natl Canc Inst*. 2000; 12: 105-15.
 13. Okolie. Breast Self Examination among female undergraduates in Nigeria; *Int J Nurs Midwifery*. 2012; 4: 1-7.
 14. Parsa P, Kandiah M. Breast cancer knowledge, perception and Breast Self Examination among Iranian women. *Int Med J*. 2005; 4: 17-24.
 15. Celentano DD, Breast Self Examination among adult women in Baltimore, *Am J Public Health*. 1983;73:1321-23.
 16. Kashfi SM, Khani JA, Yazdankhah M. Breast Self Examination among women in Nour abadmamasani health clinics. *Journal of Johrom University of Medical Science*. 2012;10 :36-40.
 17. Champion V. The role of breast self-examination in breast cancer screening. *Cancer*. 1992; 69:1985-91.
 18. Budden L. Registered nurses' breast self-examination practice and teaching to female clients. *J Community Health Nurs*. 1998; 15:101-12.
 19. Sobani ZA, Saeed Z, Baloch HN, Majeed A, Chaudry S, Sheikh A et al. Breast cancer, among women in Karachi, Pakistan. *J Pak Med Assoc*. 2012; 62; 1259-64.
 20. Okobia MN, Bunker CH, Okonofua FE, Osime U. Knowledge, attitude and practice of Nigerian women towards breast cancer: A cross sectional study. *World J Surg Oncol* [Internet]. 2006 Feb 21; 4(11). Available from: <http://www.wjso.com/content/4/1/11>.
 21. Faiza A, Sadia M, Juanita H, Shaista MK. Breast cancer risk factor knowledge among nurses in teaching hospitals of Karachi, Pakistan. *BMC Nurs*. 2006; 5:6. Open access journal.
 22. Pravin NY, Keerthi SJ. A study to assess the knowledge, attitude, and practices of community-dwelling women in Andhra Pradesh towards breast cancer. *Indian J Community Med*. 2005; 30: 84-86.
 23. Oza RJ, Prajapati JD, Ram R. A study on awareness toward the early detection of breast cancer on nursing staff in civil hospital, Ahmedabad, Gujarat, India. *Hlth line*. 2011; 2: 34-7.
 24. Modeste NN, Caleb-Drayton VL, Montgomery S. Barriers to early detection of breast cancer among women in a Caribbean population. *Pan Am J Public Health*. 1999; 5: 153-156.
 25. Choudhry UK, Srivastava R, Fitch MI Breast cancer detection practices of south Asian women: knowledge, attitudes, and beliefs. *Oncol Nurs Forum*. 1998;25:1693-701.
 26. Muttappallymyalil J, Sreedharan J, Venkatramana M, Thomas M. Attitude and Practice of Nurses in Imparting Knowledge on Breast Self Examination to Women in Ajman, United Arab Emirates. *Iran J Cancer Prev* 2010; 3:139-44.

Knowledge, Attitude and Practices (KAP) Regarding Malaria and its Prevention among Patients with Suspected Malaria in Mangaluru

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ABSTRACT

Background: Malaria continues to be a devastating disease in India and Mangaluru is endemic to malaria. The success of malaria control programmes has been directly proportional to the awareness in the community; hence this study has been conducted to assess patients' knowledge, attitude and practices towards the disease and its prevention.

Methodology: This is a cross-sectional study. Patients with suspected malaria attending the District hospital were included in the study. A validated questionnaire developed by the authors examined the respondent's knowledge, attitude and prevention practices towards malaria.

Results: Majority of the participants (89%) showed a reasonable knowledge of malaria including its mode of transmission and symptoms. Majority of the study population (81%) considered malaria to be a serious health problem, thus reflecting their attitude to the disease. However, only a small proportion of the participants (21%) stated that they use preventive measures every day.

Conclusions: Despite having a reasonable knowledge of malaria and its preventive measures, there was a stark lack in practice of these measures, which is distressing. There is an urgent need to implement strategies to motivate communities to use of the available preventive measures.

Keywords: Malaria, Mangaluru, Knowledge, Attitude, Practice

INTRODUCTION

Despite global efforts for its control, malaria is still one of the most prevalent and devastating vector borne communicable diseases in the tropics. Currently the official statistics available at the National Vector Borne Disease Control Programme (NVBDCP) for malaria in India indicates 0.7–1.6 million confirmed cases and 400-

1,000 deaths annually^[1]. Mangaluru city has a tropical climate and is endemic to malaria. The Annual Parasitic Incidence (API) is the number of reported malaria cases per 1000 population per year. Mangaluru is one of the only two districts in Karnataka State with an API of >2^[2]. In the year 2013 the annual incidence of malaria in Mangaluru was 4714 which drastically increased to 11021 in 2015 and 11037 in 2016^[3]. Currently the major challenges in controlling malaria in India, include insecticide resistance in mosquitoes and a rise in *Plasmodium falciparum* that are resistant to drugs throughout the country^[4].

The success of malaria control programmes is directly proportional to the awareness of the community. Studies on knowledge, attitude and practices (KAP) have demonstrated that, direct interaction with the community plays an important role in circumventing

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malaria spread. In view of this, health education should be tailor-made to suit the individuals' and community's current knowledge, attitude, and practice (KAP) about malaria^{[5],[6]}. Community insights, beliefs and attitudes about the aetiology, symptoms, efforts for prevention and treatment of malaria are often overlooked in malaria control measures^[7]. These attitudes can vary among individuals in the same house and from one community to the other^[8]. It is important to consider these challenges while developing strategies aimed at controlling malaria and reducing its burden^[9]. Hence this study has been conducted to assess patients' knowledge, attitude and practices towards the disease and its prevention.

METHODOLOGY

The study was conducted at the District hospital in Mangaluru from 01 November 2016 to 31 May 2017. The sample size was 195, calculated based on the results of the study conducted by Siddharudha Shivalli *et al*^[10]; considering the prevalence of knowledge and prevention practices of malaria as 12%, with a 95% confidence level, 5% absolute precision and a 20% dropout rate.

Study design and data collection: This was a hospital based cross-sectional study among participants with suspected malaria, attending the malaria clinic. The authors prepared a questionnaire which assessed the participants' knowledge, attitude and prevention practices towards malaria. The questionnaire prepared in English was validated by three experts (from the field of clinical medicine, community medicine and pharmacology) and translated to Kannada and Hindi. The translated version was also validated for content. Demographic details were also collected.

A 'knowledge score' which intended to record the participant's knowledge of malaria was worked out. To achieve a full score the respondents had to: state they had heard of malaria (1 point), consider that malaria can kill if untreated (1 point), mention sleeping under bed nets at night as one of the ways to prevent malaria (1 point), know the mode of transmission (1 point), be aware of symptoms of malaria (1 point), mention the time at which malaria-causing mosquitoes bite (1 point) and mention at least one way of prevention (1 point). The total score was 7 points.

RESULTS

Data was collected from 195 consecutive patients with suspected malaria. Table 1 depicts the demographic details of the participants. The male to female ratio was 8:1.

Table 1: Demographic details of Participants

Mean age (\pm SD)	32 (\pm 12) years
Male	173 (89%)
Female	22 (11%)
Occupation	
Construction workers and labourers	136 (70%)
Students	23 (12%)
Hotel worker	10 (5%)
Business	9 (5%)
Watchman	6 (3%)
Homemaker	4 (2%)
Others*	7(3%)

*Others included fishermen (2), Driver (2), police (1) and retired person (1)

Table 2: Basic knowledge about Malaria (n = 195)

Statements	YES	NO
Heard about Malaria	195 (100%)	0
Malaria can kill if it's not treated	(86%)	28(14%)
Sleeping under bed nets at night is one of the ways to prevent malaria	162 (83%)	33 (17%)
	Correct response	Incorrect response
Modes by which malaria spreads	177 (91%)	18 (9%)
Symptoms of malaria	180 (92%)	15 (8%)
Biting times of malaria mosquitoes	108 (55%)	87 (45%)
The ways to prevent and control malaria	178 (91%)	17 (9%)

Table 2 depicts the knowledge of the participants towards malaria and its prevention. Overall 73% of the participants were able to achieve a score of 6 points and above, and 32% of participants achieved the complete score of 7 points suggesting that they had a very good knowledge about malaria.

Table 3: Sources of information and need for further information among the respondents (n = 195)

Have heard any information related to malaria	114 (58%)
Source of information about malaria	
Newspapers	60(31%)
Television	53(27%)

Conted...

Health centre/clinic	53(27%)
Posters/pamphlets	41(21 %)
Neighbour	29(15%)
Radio	20 (10%)
Family member (at home)	19(10%)
Community health worker	7(4 %)
Have enough information about malaria	40(21%)
Desire more information about malaria	155(79%)
Aspect of malaria for which more information is desired*	
Control and prevention	113(58%)
Treatment	64(33%)
Signs and symptoms	31(16%)
Nature of the disease	31(16%)
Any information	25 (13%)
Preferred way/method to communicate this information*	
Health centre/clinic	135 (69%)
Newspapers	57(29%)
Posters/pamphlets	28(14%)
Community health worker	25 (13%)
Television	2(1%)

*Multiple responses are taken, hence the percentage does not add to 100 percent

Table 3 shows the need for more information about malaria felt by the participants. It was found that more than half of the participants (58%) received information

related to malaria mainly through newspapers (31%), television (27%) and health centres (27%). Despite having basic knowledge, 79% of the participants felt they needed more information regarding the treatment, control and prevention strategies which should be communicated through health centres (69%) and newspapers (29%).

Table 4: Attitudes towards malaria

	Agree	Disagree
Malaria is a serious and life-threatening disease	158 (81%)	37 (19%)
Malaria gets transmitted from one individual to another	105 (54%)	90 (46%)
Anyone can get malaria	159 (82%)	36 (18%)
I am sure that I can treat myself if I get malaria	26 (13%)	169 (87%)
I can buy anti-malarial drugs from the drug/ pharmacy to treat myself when I get malaria	31 (16%)	164 (84%)
I believe that as soon as I suspect that I am suffering from malaria I should visit health centre/clinic to get my blood tested	142 (73%)	53 (27%)
I should seek medical advice when I get malaria	155 (79%)	40 (21%)

Table 4 shows the right attitude of the study population towards malaria.

Table 5: Practices towards malaria prevention

1. Preventive measures followed (can tick more than one option)				
	Mosquito coil	95 (48%)		
	Bed nets	87 (45%)		
	To shut the windows and doors	20 (10%)		
	Repellents	9 (5%)		
	Mosquito mesh for windows	9 (5%)		
		Always	Sometimes	Never
2.	How frequently do you sleep under a bed net?	58 (30%)	66 (34%)	71 (36%)
3.	How frequently do other family members sleep under bed nets?	35 (18%)	61 (31%)	99 (51%)
4.	How frequently do you check for any holes/repair in the bed nets?	19 (10%)	74 (38%)	102 (52%)
5.	How frequently do you use mosquito repellent coils at your house?	62 (32%)	72 (37%)	61 (31%)
6.	How frequently do you use anti-mosquito spray in your house?	14 (7%)	61 (31%)	120 (62%)
7.	How frequently do you clean stagnant water near your house?	44 (23%)	61 (31%)	90 (46%)

Conted...

8.	How frequently do you visit clinic/health centre when you fall ill?	55 (28%)	109 (56%)	31 (16%)
9.	In the last 6 months have you or any other family member suffered from malaria	YES – 162(83%)		
10.	If yes, where do you go for treatment	Health centre/clinic (80%) (n = 195)		
11.	How soon after suspecting Malaria would you seek treatment?	12 hours (78%) (n = 195) 2-3 days (15 %) 4-6 days (7%)		

Table 5 depicts the practices followed towards malaria prevention. Though a majority of the participants had a fair knowledge of the prevention practices, most did not follow them. This lethargy of putting into practice the awareness that the participants already had is all the more staggering in light of the fact that 83% of the participants or one of their family members had suffered from malaria in the last six months. Although 45% of the participants believed that sleeping under bed nets would be an effective way of preventing malaria, only 30% used bed nets every day and 34% used bed nets only sometimes. Worse still, only 18% mentioned that other members of the family used bed nets. Only 10% would check for holes in bed nets regularly.

DISCUSSION

This study gives information on the knowledge, attitude and various prevention practices followed by patients attending the malaria clinic. A large number of participants were construction workers and labourers; which is probably why the gender ratio is skewed in favour of males. Further, such occupation puts these males at risk of getting bitten by mosquitoes. The awareness regarding malaria and its symptoms was high in our study population, similar to the findings of Dhawan *et al*^[11]. The poor use of preventive measures detected in this study, especially bed net use, requires immediate attention and action. Similar outcomes were reported by a few studies across India in Mangaluru^[10], New Delhi^[6] and other parts of the world like Haiti^[12], Turkey^[13], Ethiopia^[14] and Iran^[15]. In contrast to this, higher knowledge and better practice on bed net use was reported among majority of the participants in Bangladesh^[16], Nepal^[17] and Ghana^[18].

A staggering 46% of the participants stated they never cleaned stagnant water near their residence and only a third (31%) of the participants stated they cleaned stagnant water near their residence only sometimes. This shows that they were irregular in cleaning stagnant

water near their residence which could be a major site for breeding of mosquitoes. Seventy percent of the study population is construction workers staying in and around construction sites. The construction sites are known to have stagnant water for curing concrete as well as for storage and other construction related activities, and thus are breeding sites for mosquitoes. Hence this could be the reason for a high risk of malaria in our study population. But in the study conducted by Dhawan *et al*^[11] more than 90% of the participants stated that preventing the accumulation of stagnant water in the surrounding premises was the most common prevention method followed. Hence awareness has to be created in the community regarding stagnant water which is a breeding zone for mosquitoes and cleaning the sources of stagnant water as an effective way of preventing malaria. This study indicates a lack of malaria control and preventive measures being implemented which might be one of the most important causes responsible for the high endemicity of malaria in Mangaluru.

Around 83% of the participants mentioned that either they themselves or other members of the family had suffered from malaria in the last 6 months. Despite this, the use of preventive measures for malaria was lacking. Hence there is an urgent need not only to increase the knowledge regarding preventive measures but also to motivate the community regarding the better usage of these preventive measures.

Almost 78% of the participants mentioned that within 12 hours of onset of malaria symptoms they would seek treatment, with health facilities as their first treatment option. This suggests that treatment seeking pattern among participants was good.

Based on the results of the study appropriate health education can be implemented to raise community awareness about the cause, transmission of malaria and proper uses of preventive measures. The results of this study suggest that participants had a fair knowledge about the disease and prevention methods. Thus strategies should

be made to implement application of this knowledge especially regarding preventive measures like daily use of mosquito nets and clearing of stagnant water in their day to day life. This KAP survey can be utilized to provide inputs to improve the design of community-based malaria control programmes to promote the use of prevention methods already known to them.

There are a few limitations in our study. Firstly, since it is hospital based study the good knowledge and attitude depicted in the study population may not be applicable for the community. Secondly, the study population mainly included males and a smaller percentage of females. This could be because majority of the participants were construction workers and labourers. Thirdly, since it was a study based on their memory and there could be a recall bias. Fourthly, the practices mentioned were not directly observed and were assessed based on the interview.

CONCLUSION

Knowledge and attitude towards malaria among the participants were good but this knowledge did not necessarily translate into improved practice of preventive measures. This might be due to a poor socioeconomic background, low level of education and lack of motivation. Further emphasis should be made to improve awareness, availability of information through proper channels for adequate incorporation of strategies to prevent and control malaria. Measures need to be taken to implement strategies to increase the use of preventive measures and reduce the overall malaria burden.

Conflict of Interest: NIL

Source of Funding: Self

Ethical Considerations: The study was started after getting permission from the Institutional Ethics Committee, Kasturba Medical College, Mangalore, India (IEC KMC MLR 10-16/250) . Written informed consent was taken from all the participants.

REFERENCES

1. Malaria situation. National Vector Borne Disease control Programme. Available at <http://nvbdc.gov.in/Doc/malaria-situation.pdf> (Accessed 29 Jan 2018)

2. Malaria Elimination Plan in Karnataka 2016-2025 Programme. Directorate General of Health & Family Welfare. Government of Karnataka. Available at [http://www.karnataka.gov.in/hfw/kannada/Documents/Malaria%20Elimination%20Plan%20in%20Karnataka%20\(2016%20to%202025\).pdf](http://www.karnataka.gov.in/hfw/kannada/Documents/Malaria%20Elimination%20Plan%20in%20Karnataka%20(2016%20to%202025).pdf). Accessed 03-03-2018
3. Kakkilaya BS. Malaria site [Internet]. Mangalore:Dr. B.S. Kakkilaya; 2004. [Updated, Feb 23 2018; cited 2018 April 19] Available from: <http://www.malariasite.com>
4. Dash AP, Valecha N, Anvikar AR, Kumar A. Malaria in India: Challenges and opportunities. J Biosci 2008;33:583–592.
5. Singh R, Musa J, Singh S, Ebere UV. Knowledge, attitude and practices on malaria among the rural communities in Aliero, northern Nigeria. J Fam Med Prim Care. 2014;3:39–44.
6. Tyagi P, Roy A, Malhotra MS. Knowledge, awareness and practices towards malaria in communities of rural, semi-rural and bordering areas of east Delhi (India) J Vector Borne Dis. 2005;42:30–5
7. Deressa W, Ali A, Enquoselassie F. Knowledge, attitude and practice about Malaria, the mosquito and antimalarial drugs in a rural community. Ethiop J Health Dev. 2003; 17:99–104.
8. Rodriguez AD, Penilla RP, Henry-Rodriguez M, Hemingway J, Betanzos AF, Hernández-Avila JE.. Knowledge and beliefs about malaria transmission and practices for vector control in Southern Mexico. SaludPublica Mex 2003;45:110–6.
9. Munguti KJ. Community perceptions and treatment seeking for malaria in Baringo District, Kenya: Implications for disease control. East Afri Med J. 1998;75:687–91.
10. Shivalli S, Pai S, Akshaya KM, D’Souza N. Construction site workers malaria knowledge and treatment-seeking pattern in a highly endemic urban area of India. Malar J. 2016; 15:168
11. Dhawan G, Joseph N, Pekow P, Rogers C, Poudel K, Bulzacchelli M. Malaria-related knowledge and prevention practices in four neighbourhoods in and around Mumbai, India: a cross-sectional study. Malaria Journal. 2014;13:303.

12. Keating J, Eisele TP, Benett A, Johnson D, Macintyre K. A description of malaria-related knowledge, perceptions, and practices in the Artibonite Valley of Haiti: implications for malaria control. *Am J Trop Med Hyg.* 2008;78:262–9.
13. Simsek Z, Kurcer MA. Malaria: knowledge and behaviour in an endemic rural area of Turkey. *Public Health.* 2005;119:202–208.
14. Jima D, Tesfaye G, Deresssa W, Woyessa A, Kebedi D, Alamirew D. Baseline survey for the implementation of insecticide treated mosquito nets in malaria control in Ethiopia. *Ethiopian J Health Dev.* 2005;19:16–23.
15. Rakhshani F, Moghadam ARA, Alemi R, Moradi A. Knowledge, perceptions and prevention of malaria among women in SistanvaBaluchestan, Islamic Republic Iran. *Eastern Mediterranean Health J.* 2003; 9:248–56.
16. Ahmed SM, Haque R, Haque U, Hossain A. Knowledge on the transmission, prevention and treatment of malaria among two endemic populations of Bangladesh and their health-seeking behaviour. *Malar J.* 2009;8:173.
17. Joshi AB, Banjara MR. Malaria related knowledge, practices and behaviour of people in Nepal. *J Vector Borne Dis.* 2008; 45:44–50.
18. De La Cruz N, Crookston B, Dearden K, Gray B, Ivins N, Alder S, et al. Who sleeps under bednets in Ghana? A doer/nondoer analysis of malaria prevention behaviours. *Malar J.* 2006;5:61.

The Chance of Gifted Intelligent Students' Success in Career

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ABSTRACT

It is found that in some cases in the working world, workers who tend to have satisfactory academic achievement did not always have a career as bright as their intellectual capacity. This study employed a qualitative-phenomenological approach which is aimed to describe the chance of gifted intelligent students' success in a career. The method used is an interview. The subject in this study were gifted intelligent students who lived in a dormitory. It is found that soft skill is the quality of interpersonal and personal attribute that influences success at work. This study has identified 10 soft skills that are believed to be the most critical and necessary to be mastered in order to gain success in a career for gifted intelligent students. The ten soft skills are continuous learning, right orientation and futuristic thinking, effort and responsibility, hardworking, actively asking the question, enthusiastic, self-management, positive vibes to team or classmates, empathy, and respect to others. From the result, in conclusion, the chance of career success of gifted intelligent students is closely related to their soft skills.

Keywords: *gifted intelligent students, success in career, soft skill*

INTRODUCTION

Human resources are precious assets. Achieving bring career is the dream of every individual, even more for an individual as the prospective human resources who have an intellectual capacity above average, with high-grade point average (GPA) and aware of competition demand in the future. However, it is not few of those excellent human resources, having the high intellectual capacity as well as high GPA score, have weakness or even are not able to develop their career.¹

Gifted intelligent students are students who have a high intelligence quotient (IQ)^{2,3,4}, who accomplish academic achievement in mathematics and reading field.^{5,6} They are called extraordinary students because their intellectual capacity is beyond regular students' intellectual capacity, which is above average and is significantly different in some critical dimensions

of humanity function^{2,3,4}, more excellent academic achievement compared to other ordinary students at their age.^{7,8} They also have high ability in receiving various kinds of knowledge, strong memory as well as a big curiosity.^{9,10}

Indonesia has approximately 1.3 million gifted intelligent students at school age. As much as 2.2 percent or approximately 4,118 people among them are classified as gifted intelligent. Gifted intelligent students as prospective human resources in the future are equipped with a more significant ability to develop and tend to be over excitability compared to ordinary students in general, either from physical, intellectual, imagination or emotional.⁸ Gifted intelligent students as prospective human resources, who have intellectual potential above average, theoretically, have a bright chance to achieve future. Therefore, the optimization of intellectual strength is ideally accompanied by various things as well including the development of emotional, personality and social aspect.^{9,11,12} Non-intellectual aspects are as important as intellectual or academic ability aspects because achieving success in future life, besides influenced by intellectual capacity, is also supported by other aspects, known as soft skill. Gifted intelligent students are one of the prospective human resources in the future.

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Soft skill is an essential aspect for the prospective human resources especially when they enter the working world or start their career.¹³ The most influencing factor of failure in a career for human resources is the lack of learning and implementing soft skill. There is a lack of awareness that soft skill is the key to success when someone enters working world or career world.^{14,15} How hard these potential candidates of human resources try to prepare themselves for their future, perhaps even by obtaining a very satisfying GPA score, without the support of soft skill, it will be difficult for them to reach bright career success. Satisfying GPA score and competence as parameters will only help them to get the job, not to reach brilliant career.¹⁴

MATERIALS AND METHOD

This study applied phenomenological qualitative approach. This approach describes or reveals the meaning of a concept or an individual phenomenon experiences based on consciousness. This qualitative method with a phenomenological approach refers to a post-positivist philosophy, seeing reality as something that is holistic/whole, complex, dynamic, full of meaning and reciprocal. This phenomenological qualitative approach attempts to reveal the phenomena experienced by research subjects intensely.¹⁶ Also, the phenomenon that the researcher intends to examine is how is the picture of the career success chance of gifted intelligent students; regarding their soft skills. The soft skills examined in this study were revealed based on soft skills characteristic in a behavior.

Subjects in this study were gifted intelligent students. This study used purposive sampling technique, a sampling technique in nonprobability sampling based on characteristics owned by subjects that are taken for research. The subjects of this study were gifted intelligent students. This study used purposive sampling, a technique in nonprobability sampling based on characteristics owned by the subjects, which, in this case, were gifted intelligent students with IQ 130 and above taken for the research. Participants in this study were taken based on characteristics in participants or research subjects. There were of 4 research participants of this study. They were alumni of PL Domenico Savio Junior High School Semarang who are accepted as scholars in one of Junior Schools in Singapore. All participants had IQ above 130.¹⁶

Data collecting method used in this study was an interview, by the characteristic of qualitative research that focuses on an understanding of a symptom or phenomenon.¹⁷ Interview technique used in this study was a direct interview, that is direct communication between the interviewer and the interviewee. The interview was conducted personally so that the interviewer could obtain even information that was considered secretive for the interviewee. The form of interview used in this study was an open interview. In this case, the subjects knew that they were being interviewed and also knew the aim of the interview.¹⁶

In this research, data validation was conducted using the triangulation method. Triangulation used was methodology triangulation and source triangulation. Methodology triangulation is cross-checking of the degree of the confidence level of research findings deriving from data collecting, which covers observation, interview, and documentation. Source triangulation is cross-checking of the degree of the confidence level to obtain an agreement of research findings based on information used that is derived from a key informant.

FINDINGS AND DISCUSSION

The result of data analysis in this study shows that three subjects understand the goal of their future well. Learning is seen as the primary factor to prepare them and as something that they will need at work. Future can be positively achieved if it is well prepared far before. Nothing is instant. Every success must begin through a long process.

The subjects were struggling and studying hard for that. The three subjects had acknowledged what career interest they intended to reach. Two subjects prepared themselves to be scientists; a mathematician and chemist. One subject was interested in being an entrepreneur. Specifically, this subject intended to be a Chief Executive Officer (CEO) of a big company. One subject had not found out what he wanted to achieve in the future. This subject was still confused with what kind of career he wanted to have in the future.

Based on the result of data analysis, personal characters are found. Personal characters are universal appeal seen from daily behavior that supports the success of the subject in reaching their achievements. The group of those characters is commonly called soft skills. Soft skills shown by the subjects are in the following table:

Table 1: Analysis Table-Soft Skill Indicators

No.	Soft Skill
1.	Continuous Learning
2.	Good orientation & futuristic thinking
3.	Effort & responsible
4.	Hardworking
5.	Actively asking question
6.	Enthusiastic
7.	Self-management
8.	Positive vibes to team or classmates
9.	Empathy
10.	Respect for others

Human resources are a precious asset.¹ Data analysis in this study shows that in general the subjects understood very well the goal of learning. Learning is seen as the primary factor for prospective human resources and what they need when they enter their career path in the future. Learning is seen as the primary need.⁶ Future can only be achieved definitely when it is prepared well far before. There is no such thing as an instant way.

Every success must begin through a long process. The awareness of the importance of future describes that those subjects have futuristic thinking. This futuristic thinking attaches in subject self as an individual with intellectual capacity above average, which is manifested in great academic achievement.⁷ Futuristic thinking allows the subjects to make their life goal better through their strengths in various humanity dimensions they have.³

Soft skill is not merely to be learned, memorized or remembered. What is important is how to implement soft skills in daily life. It is not easy to teach a soft skill, but it is easy to spread it.¹⁸ It means that soft skill is not merely understood as a concept, but it is about how prospective human resources can apply them continuously in order to reach brilliant career.¹³

In concrete, this study has found that in accomplishing achievement, there are personal characters or soft skills attached to a subject that is implemented in their daily life. Those soft skills consist of continuous learning, right orientation and futuristic thinking, effort and responsible, hardworking, actively asking the question, enthusiastic, self-management, positive vibes to team or classmates, empathy, and respect to others.

Continuous learning shows that the subjects are willing to go through a learning process. The subjects are also active to improve themselves through practices and exercises until the goal of the learning is achieved. Moreover, the subjects also always learn a new concept, trying to apply a new method, and making an effort to know various kinds of relatively new technology. Other soft skills reflected from the subjects are right orientation and futuristic thinking. These soft skills show that the subjects can focus their effort to reach the goal and to project necessary things that have not been achieved.

Effort and responsible is the third soft skill found in the subjects of this research. It indicates that the subjects implement their characters to accomplish their achievement by working on everything that becomes their responsibility wholeheartedly. Hardworking is soft skill or personal characteristic that is also seen in the subjects' everyday life. It indicates that the subjects also have toughness in doing all the tasks that should be done.

Actively asking a question shows the willingness of the subjects to actively ask questions, clarify things particularly for things that they do not understand in order to get the same perception. On the other side, enthusiasm is as part of characters shown by the subjects in receiving a stimulus and other activities. This enthusiasm shows significant interest, spirit, and passion as the strength to do all activities to reach the intended final goal. Enthusiasm also becomes an excellent motivation for them to reach their life dream. Enthusiasm encourages the scholars never to stop learning.

Self-management is the ability to manage self, manage potential and time effectively. Self-management is a procedure in which an individual manage their behaviors. Self-management is a condition which, after an individual determines his/her future life goal for them, they must manage and maintain him/herself as well as they can in order to direct him/herself to the path of their life goal; including managing all steps and activities and self.¹⁹

Positive vibes to team or classmates are one of the soft skills found in this study. Positive vibes is another term for positive thinking that later is implemented in daily life by spreading aura and positive spirit to the surrounding. It can be seen in the willingness to support a group or individual success of the classmates. Another soft skill found from the subjects in this study is empathy. This soft skill can be seen in the willingness of the subjects to show their care to others and their

surroundings. Meanwhile, respect for others that are also one soft skill revealed in this study is the willingness to respect another individual¹³ in any condition. The subjects show those characters in their daily life.

The ten soft skills found in this study are a group of critical personal characters to support success. Soft skills are not merely to be learned, memorized, or remembered. What is more important is how to implement the soft skills in everyday life. Soft skills are not easy to be taught, but they are easy to be spread to others.¹⁸ By making them as a habit, soft skills will become the essential key for gifted intelligent students as prospective human resources to prepare their bright future career.

CONCLUSION

It is found that soft skills are interpersonal qualities and attributes owned by an individual that have real influence on the success of work. Soft skills are believed to be essential, and all gifted intelligent students as the future human resources have to master them. It is recommended that in order to reach success in career, the ten soft skills, consisting of continuous learning, right orientation and futuristic thinking, effort and responsible, hardworking, actively asking question, enthusiastic, self-management, positive vibes to team or classmates, empathy, dan respect to others, are necessary to be taught to gifted intelligent students.

Ethical Clearance: Before conducting the data retrieval, the researchers conducted a decent test of ethics conducted at the Faculty of Psychology, Semarang University to determine that this study has met the feasibility. Information on an ethical test that the study is eligible to continue. The feasibility of the research is conducted to protect the human rights and security of research subjects.

Source of Funding: Self-funding from the authors did in this study.

Conflict of Interest: The authors declare that they have no conflict interests.

REFERENCES

1. Suhariadi F. *Manajemen Sumber Daya Manusia Dalam Pendekatan Teoretis & Praktis*. Surabaya: Airlangga University Publishing and Printing. 2013.
2. Feldhusen JF, Giftedness, Talent, Expertise, Creative Achievement. *Conceptions of Giftedness*. New York: Cambridge University Press. 2005.
3. Gordon EW, Bridglall BL. *Conceptions of Giftedness*. New York: Cambridge University Press. 2005.
4. Sword L. *Psycho-social Needs: Understanding The Emotional, Intellectual and Social Uniqueness of Growing Up Gifted*. Gifted and Creative Services Australia. 2001.
5. Borland JH. *Gifted Education Without Gifted Children: The Case for No Conception of Giftedness*. New York: Cambridge University Press. 2005.
6. Cochran CS. *Effect of Social Support on the Social Self-Concept of Gifted Adolescents*. 2009.
7. Mangunsong F. *Psikologi dan Pendidikan Siswa Berkebutuhan Khusus*. Jakarta: Book Sales Services and Psychological Journal. Faculty of Psychology, University of Indonesia. 2009.
8. Schanella A, McCarthy S. *Innovative Interventions for Today's Exceptional Children: Cultivating a Passion for Compassion*. United States of America: Rowman and Little Field Education. 2009.
9. Forna GL, Frame MW. The Social and Emotional Needs of Gifted Children; Implications for Family Counseling. *The Family Journal; Counseling and Therapy For Couples and Families*, 2001 9(4), 384-390.
10. Ministry of Education and Culture. *Strategic Plan of the Directorate General of Secondary Education 2010-2014*. Jakarta: Ministry of Education and Culture. 2010.
11. Goleman D. *Social Intelligence. The New Science of Human Relationship*. New York: Bantam Dell. 2006.
12. Sugiarti R, Suhariadi F. Picture of Gifted Intelligent Students Social Competence. *International Journal of Humanities, Arts and Social Sciences*, 2017 3(1), 20-26.
13. Matteson, Miriam L, Anderson, Lorien, Boyden, Cynthia. "Soft Skills": A Phrase in Search of Meaning. Libraries and the Academy. 2016.

14. Manuti A, Pastore S, Scardigno AF, Giancaspro ML, Morciano D. Formal and Informal Learning in The Workplace. *International Journal of Training and Development*. 2015 19(1).
15. Pratt SQ, Richards JE. *Soft Skill Development in Youth Employment: A Scan of the Landscape*. Pratt Richards Group. 2014.
16. Moleong LJ. *Metodologi Penelitian Kualitatif*. Bandung: PT. Remaja Rosdakarya. 2005.
17. Creswell JW. *Research Design; Pendekatan Kualitatif, Kuantitatif, dan Mixed*. Yogyakarta: Pustaka Pelajar. 2010.
18. Shakir R. Soft Skills at The Malaysian Institutes of Higher Learning. *Asia Pacific Educ.Rev*. 2009 10, 309–315.
19. Gie. *Strategi Hidup Sukses*. Yogyakarta: Liberty. 1996.

Ability of Managing Medical Emergencies in Dental Setting among the Interns and Faculty of a Dental College in Mangalore

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ABSTRACT

Aim: To explore the perceptions, concerns, and experiences of interns and staff after their accident and emergency posting in a dental institution.

Objective:

- To evaluate the knowledge and awareness of Medical emergencies among the interns and staff in a dental institution.
- To comparatively evaluate the knowledge and awareness of Medical emergencies among the staff and interns of the institution.

Material and Method: A cross sectional questionnaire study was conducted in a DCI (Dental Council of India) recognized college. The data was collected using questionnaire method regarding the awareness and knowledge of medical emergencies among the interns and staff of a dental institution.

Data Collection: Questionnaires were introduced to the participants regarding the awareness and knowledge of medical emergencies after obtaining the informed consent. 155 questionnaires were distributed to the respondents of a dental college were included for this study.

Statistical Analysis: Descriptive statistics were tabulated. Chi-square tests were applied for this study.

Results: Only 53.2% among the staff respondents had attended a training program in BLS, whereas 86.6% of the interns had attended a training program in BLS. All the interns (100%) knew about the abbreviation of BLS. 96.8% of the staff aimed at the need of BLS training in the dental curriculum. 95.1% of the interns, and 88.7% of the staff were able to provide the right option on the signs of airway obstruction. 90.2% of the interns and 77.4% of the staff gave the right option of head tilt-chin lift maneuver to open the airway during obstruction.

Conclusion: Awareness of BLS among the staff and interns was not upto the mark, and hence it is now essential to make it mandatory in the field of dentistry for both undergraduate and postgraduate curricula.

Keywords: BLS Awareness, Cardiac resuscitation, Dentist knowledge of BLS

INTRODUCTION

Medical emergencies in dental practices are the most common encounters, and so specialized skills are required in the management of these situations. Dental curriculum should conduct workshops and training programs in basic life support. In India, the internship in medical and dental subjects is the final arena before graduation, and the interns are considered to be the

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future. Managing medical and emergencies boosts up the confidence level among upcoming graduates.¹ In case of cardiac emergencies, administering basic life support [BLS] is the most important contribution of the dentist until definitive treatment is achieved. Rapid changes in the demographics of the population, with the increase in longevity rate have led the people having medical conditions which predispose to a medical emergency or taking medication may influence their dental management and persons aged above 65 years.² Dentist and their staff acquire proper training in the management of emergencies to a level based on their clinical responsibilities. Skills learned should be refreshed on annual and regular basis, and training can be undertaken at specialized centers.³ Basic Life Support (BLS) is a simple life-saving protocol following a cardiac arrest. It is an integral part of emergency resuscitative care that aims to retain sufficient ventilation and circulation until the cause of the arrest is detected and eliminated.⁴ The present study assessed the knowledge and attributes towards the BLS and ACLS and other medical emergencies among the interns, post graduate students and faculty in a dental institution.

MATERIAL AND METHOD

Study Design: A cross sectional study

Target Population: Participants were selected from a DCI (Dental Council of India) recognized dental college. Questionnaires was distributed to the respondents.

Data Collection: The participants were introduced with the questionnaire regarding the awareness and knowledge of medical emergencies among the interns and staff of a dental institution.

Sample Size: 155 questionnaires were distributed to the respondents of a dental college who were included for this study.

Inclusion criteria:

- Interns and Staff of a dental college who consented to take part in the study.

Exclusion criteria:

- Interns and staff of a dental college who did not consent to take part in the study.

Expected Study of Duration: Data collection was started after obtaining approval from the Institutional Ethics Committee center. Data collection was carried out till the sample size is reached.

Validity of the checklist: The checklist was validated before finalizing after obtaining approval from the IEC committee. Content validation of the questionnaire was carried out.

Study Location: The study was conducted among interns and staffs of a recognized dental college.

Data Collection: A cross-sectional study was conducted among interns and staffs of a dental colleges in Mangalore. Confidentiality pertaining to the information was obtained during the course of the study and was maintained at every stage of the study.

Data Management and Statistical Analysis: Descriptive statistics was tabulated. Chi square tests was applied.

Ethical considerations:

- Ethical clearance to conduct the study was obtained from the Institutional Ethics Committee of the dental college.
- Confidentiality pertaining to the information obtained during the course of the study was maintained at every stage of the study.

Table I: Have you undergone training programme in BLS

		Group			Total
		Staff	Interns		
a	Yes ^a	Count	33	71	104
		%	53.2%	86.6%	72.2%
	No ^a	Count	29	11	40
		%	46.8%	13.4%	27.8%
Total	Count	62	82	144	
	%	100.0%	100.0%	100.0%	

a. $\chi^2=19.585$ $p<0.001$ vhs

Table II: What does BLS stand for

		group		Total
		Staff	Interns	
Basic life support	Count	61	82	143
	%	98.4%	100.0%	99.3%
Basic life services	Count	1	0	1
	%	1.6%	0.0%	0.7%
Total	Count	62	82	144
	%	100.0%	100.0%	100.0%

a. $p=0.431$ ns

Table III: Do you think BLS training should be part of the compulsory dental curriculum?

		group			Total
		Staff	Interns		
aw4	Yes	Count	60	82	142
		%	96.8%	100.0%	98.6%
	No	Count	2	0	2
		%	3.2%	0.0%	1.4%
Total		Count	62	82	144
		%	100.0%	100.0%	100.0%

a. p=0.184 ns

Table IV: Signs of airway obstruction include which of the following

		group			Total
		Staff	Interns		
Poor air exchange	Count	3	1	4	
	%	4.8%	1.2%	2.8%	
High-pitched noise while inhaling	Count	3	2	5	
	%	4.8%	2.4%	3.5%	
Inability to speak	Count	1	1	2	
	%	1.6%	1.2%	1.4%	
All of the above	Count	55	78	133	
	%	88.7%	95.1%	92.4%	
Total		Count	62	82	144
		%	100.0%	100.0%	100.0%

a. $\chi^2=2.447$ p=0.485 ns

Table V: Which of the following sequences is correct for BLS

		Group			Total
		Staff	Interns		
1.00	Count	26	32	58	
	%	41.9%	39.0%	40.3%	
2.00	Count	7	4	11	
	%	11.3%	4.9%	7.6%	
3.00	Count	9	7	16	
	%	14.5%	8.5%	11.1%	
4.00	Count	20	39	59	
	%	32.3%	47.6%	41.0%	
Total		Count	62	82	144
		%	100.0%	100.0%	100.0%

a. $\chi^2=5.129$ p=0.163 ns

a. $\chi^2=12.120$ p=0.007 ns

Table VI: Check for pulse for no more than

		group		Total	
		Staff	Interns		
5 seconds	Count	14	21	35	
	%	22.6%	25.6%	24.3%	
10 seconds	Count	35	42	77	
	%	56.5%	51.2%	53.5%	
15 seconds	Count	13	19	32	
	%	21.0%	23.2%	22.2%	
Total		Count	62	82	144
		%	100.0%	100.0%	100.0%

a. $\chi^2=0.391$ p=0.822 ns

RESULTS

Only 53.2% among the staff respondents had attended a training program in BLS, whereas 86.6% of the interns had attended a training program in BLS (Table I). All the interns (100%) knew about the abbreviation of BLS, and 98.4% of the staff gave the correct abbreviation of BLS (Table II). 96.8% of the staff aimed at the need of BLS training in the dental curriculum (Table III). 95.1% of the interns, and 88.7% of the staff were able to provide the right option on the signs of airway obstruction (Table IV). 14.5% of the staff and 8.5% of the interns only were able to discuss the right sequence for BLS (Table V). Only 25% of the staff and interns were able to discuss the right answer on checking the pulse for not more than 5 seconds (Table VI). 90.2% of the interns and 77.4% of the staff gave the right option of head tilt-chin lift maneuver to open the airway during obstruction. 78% of the interns and 51.6% of the staff were able to give the correct opinion for the most appropriate rate of CPR for an adult.

DISCUSSION

In the present study, we found that the staff and interns of the dental college did not have appropriate BLS knowledge. The findings of this study are in accordance with previous studies which showed similar results and found that knowledge and awareness of BLS need to be updated^{5,6,7}.

Most of the participants in our study, staff and interns feel the need for improvisation of BLS knowledge and thus should be included in the undergraduate dental curriculum. According to Pillow et al., 98.2% of students believed that BLS should be made mandatory in the medical student curriculum⁸.

In the results of the study done by Roshana et al., they found that almost 95% of the study participants opinioned the need of BLS training should be included in the undergraduate teaching programme⁹. A study done by Sharma et al. also support that all interns (100%) from medical and dental fields need the inclusion of BLS in their academic curriculum along with structured BLS training. This study is also in accordance with the study of Zaheer et al. which showed that 79% of participants gave the opinion that BLS should be a part of the undergraduate teaching programme^{10,11}.

In this study, one question (related to the abbreviation of BLS) was correctly answered by 98 % of the participants, These results are similar to those obtained by Roshana et al.⁹, who found that one question (related to the abbreviation of CPR) was correctly answered by 96.7% of the participants, whereas the rest of the questions were correctly answered by less than 50% of the participants.

In a study conducted by Sharma and his co-workers, found that medical and dental interns had inadequate knowledge on BLS. In this present study, however, dental interns had average knowledge about BLS.

CONCLUSION

Awareness of BLS among the staff and interns was not satisfactory, and hence it is now essential to make it mandatory in the field of dentistry for both undergraduate and postgraduate curriculum. According to this study, a need for the hands on workshop should be made mandatory.

Ethical Clearance: Taken from Institutional Ethical committee, MCOCS, Mangalore.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

1. S. Elanchezhian, Sugumari Elavarasu, K. Vennila, R. Renukadevi, M. Nazargi Mahabob, B. Sentilkumar, S. Raja. Awareness of Dental Office Medical Emergencies Among Dental Interns in Southern India: An Analytical Study. *Journal of Dental Education* 2013; 77(3):364-369.
2. Praveen S. Jodalli, Anil V. Ankola. Evaluation of knowledge, experience and perceptions about medical emergencies amongst dental graduates (Interns) of Belgaum City, India. *J Clin Exp Dent*.

- 2012;4(1):e14-8.
3. K. Sneha Shenoy, H. N. Pallavi, K. Pushpanjali, Vaibhav Gupta. Perceptions, concerns, and experiences of dental interns after accident and emergency posting: A qualitative study. *J Indian Assoc Public Health Dent* 2016;14:332-7.
4. Ohoud Alotaibi, Faizah Alamri, Laila Almufleh, Wedad Alsougi. Basic life support: Knowledge and attitude among dental students and Staff in the College of Dentistry, King Saud University. *The Saudi Journal for Dental Research* 2016; 7, 51–56.
5. Shrestha Roshana, Batajoo KH, Piryani RM, Sharma MW. Basic life support: knowledge and attitude of medical/paramedical professionals. *World J Emerg Med* 2012;3(2):141–5
6. Chandrasekaran Shanta, Kumar Sathish, Bhat Shamim Ahamed, Saravanakumar P Mohammed, Shabbir P Mohammed, Chandrasekaran VP. Awareness of basic life support among medical, dental, nursing students and doctors. *Indian J Anaesth* 2010;54(2):121–6.
7. Sahithi Reddy, Dolar Doshi, Padma Reddy, Suhas Kulkarni, Srikanth Reddy. Awareness of basic life support among staff and students in a dental school. *J Contemp Dent Pract* 2013;14(3):511–7.
8. Tyson Pillow Malford, Donald Stader, Matthew Nguyen, Dazhe McArthur, Robert McArthur, Shkelzen Hoxhaj. Perceptions of basic, advanced, and pediatric life support training in a United States medical school. *J Emerg Med* 2014;46(5):695–700.
9. Shrestha Roshana, Batajoo KH, Piryani RM, Sharma MW. Basic life support: knowledge and attitude of medical/paramedical professionals. *World J Emerg Med* 2012;3(2):141–5.
10. Sharma Raghava, Attar Nazir R. Adult basic life support (BLS) awareness and knowledge among medical and dental interns. *NUJHS* 2012;2(3):6–13.
11. Hassan Zaheer, Zeba Haque. Awareness about BLS (CPR) among medical students: status and requirements. *J Pak Med Assoc* 2009;59(1):57–9.
12. Sharma R, Attar NR. Adult basic life support (BLS) awareness and knowledge among medical and dental interns completing internship from Deemed University. *NUJHS* 2012; 2: 6–13.
13. Marsden AK. Guidelines for Cardiopulmonary Resuscitation Basic Life Support Revised recommendations of the Resuscitation Council (UK). *BMJ* 1989; 299: 442–445.

Emerging Trends and Changing Pattern of Online Banking in India

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ABSTRACT

Success of any task depends on the level of preparatory work and method of implementing the plan framed. Therefore the Success of digital India depends on the level of preparatory work in the information technology and database and method of implementing the Digital India program. The present study is a review article which throws light on electronic banking i.e., online banking in the post liberalization era. In specific terms, it is a comparative study of online banking scenario before and after digital India movement. Chapter one provides basic idea about the digital India. Chapter two lists the review of literature. Chapter three exhibits the evolution of online banking. Chapter four discuss about the online banking in the post liberalization period and the last chapter concludes with emerging trends and changing pattern of online banking.

Keywords: Digital India, electronic banking, online transactions, Digital cards

INTRODUCTION

The highlighting feature of the post liberalization era in Indian scenario, witnessed the dramatic changes in banking services especially the online banking system. The climax of the online banking system is the campaign of digital India. Digital India is a campaign launched by the Government of India, on 1st July 2015 at Indira Gandhi Indoor Stadium, Delhi, to improve the online infrastructure by means of increasing the internet connectivity and all the citizens of the country were offered with online government services by reducing the paper work. For this purpose, from July 1 to July 7 of 2015, has been declared as Digital week and a project with various schemes announced to make India digitally empowered country such as Digital Locker, e-health, e-education, national scholarship portal and e-sign, e-governance etc. worth of more than one lakh crores and the project expected to be completed by 2019. The modus operandi of Digital India is to concentrate on three elements; mentioned by Government of India to improve under the digital India movement are creation of digital infrastructure, digital literacy and digital service delivery.

This project will ensure the economic growth and economic development in India particularly in the rural areas by connecting the rural regions and remote villages

with high-speed internet services through BBNL (Bharat Broadband Network Limited) a part of project connecting 2,50,000 villages and other residential areas of India, which in turn enhance the nine pillar programs – broadband highways, public internet access programme, mobile connectivity everywhere, e-kranti, e-governance, information to all, IT for jobs, early harvest programmes and electronic manufacturing. The digital India programme has been started by the Government of India to ensure seven components

- To ensure the broadband highways.
- To ensure the universal access to mobile phones.
- To facilitate people with high speed internet.
- To bring e-Governance by reforming government through digitization.
- To bring e-Kranti through electronic delivery of services.
- To make available online information for all.
- To ensure more IT jobs.

The digital India campaign paves way to a new regime to Indian Banking System, as the banking services are digitalized. The online banking gains its importance as each and every citizen is digitally connected through

Subscriber Identity Module. The current study visualizes the emerging trends and changing pattern of online banking in India.

REVIEW OF LITERATURE

Geetha Sharma¹ has listed out the various problems of online banking in her research article. According to her, apart from the security issues, there are many other issues like the internet user base is very limited, lack of digital infrastructure, absence of a regulatory framework for internet banking transactions in India, mindset of Indian customer etc.

F N Mahmadi, Z F Zaaba and A Osman² The results suggested that most of the end-users are continually experiencing significant difficulties especially in relation to the technical terminologies, security features and other technical issues. Although the security features are provided to provide a shield or protection, users are still incapable to cope with the technical aspects of such implementation.

Vidhya Jolly³ suggested that conducting demonstration to customers to make them aware of the features of internet banking and how to use them; Discuss with customer before introducing new services so as to know user friendly the system; Improvement of the security system as well along with the system development; and creating a strong customer care team which can support the customers in using such advanced systems.

Jaroslav Belas, Michal Koraus, Felix Kombo, Anton Koraus⁴ suggested that it is vital for a commercial bank as a business unit to undertake such measures to ensure a proper and efficient protection of customer's deposits. The current situation demands from commercial banks to pay extraordinary attention to electronic banking security.

Evolution of online Banking: During 1980's, our banking activities were really inimical in nature because even to know your balance in the account, one should go to the respective bank, wait in queue and submit the pass book for entry. Sometimes, there will be no reason for nonappearance for entry in the pass book. Suppose if you want to make payment to your client or receive amount, then there are list of things that we need to plan to visit the bank, like taking leave from office to complete the withdrawal of money as banking hours are 10 am to 2 pm and you have to go to the respective

branch of the bank with the identity proof and address proof. If the withdrawal amount is comparatively high, the banking authority may instruct us to wait for few hours and sometimes, next day due to insufficient funds. But today, almost all the banking activities are in our finger tips and get completed in few seconds. This is the power of online banking. For e.g. now, a customer can take a copy of the bank statement (mini or detailed), check the balance amount, transfer funds from wherever he is. Although many people are enjoying the advantage of the online banking through digital banking tools, most of them are still not aware of online banking system which may save our time and energy.

1981: New York city banks test at home-banking

1983: Bank of Scotland Institutes First UK internet banking service (on-line banking)

1994: Stanfold Federal Credit Union Offers US internet banking

1995: Presidential Bank offers to customer to access to their accounts on-line

1996: Initiation of NetBank

1999: Bank of Internet USA as a Part of incorporation of BofI Federal Bank (holding) July 6th

2000: BofI opened the net-banking for business July 4, 2000

2001: Bank of America made an history of gaining 3 million online customer

2007: Net bank founded in 1996, closed in 2007

2009: Ally bank, a full-fledged internet bank joined with customer centric approach to banking

2010: Bank of Internet USA – Mobile internet banking, popmoney for money transfer and EMV-chip debit card

2012: Net bank name and domain were acquired by BofI Federal Bank

2017: Online banking as standard Practice

Online banking in the post Liberalization Era: The post liberalization era of India has witness a tremendous changes in the information technology, especially after the initiation on E-governance during

mid-1990s. E-governance initiatives in India took a broader dimension and for wider sectoral applications with emphasis on citizen-centric services. The major ICT initiatives of the Government included, inter alia, some major projects such as railway computerization, land record computerization, etc. which focused mainly on the development of information systems. Later on, many states started ambitious individual e-governance projects aimed at providing electronic services to citizens. The national level e-Governance programme called National e-Governance Plan was initiated in 2006. There were 31 Mission Mode Projects under National e-Governance Plan covering a wide range of domains, viz. agriculture, land records, health, education, passports, police, courts, municipalities, commercial taxes, treasuries etc. 24 Mission Mode Projects have been implemented and started delivering either full or partial range of envisaged services. All new and on-going e-governance projects as well as the existing projects, which are being revamped, should now follow the key principles of e-Kranti namely 'Transformation and not Translation', 'Integrated Services and not Individual Services', 'Government Process Reengineering (GPR) to be mandatory in every MMP', 'ICT Infrastructure on Demand', 'Cloud by Default', 'Mobile First', 'Fast Tracking Approvals', 'Mandating Standards and Protocols', 'Language Localization', 'National GIS (Geo-Spatial Information System)', 'Security and Electronic Data Preservation'. The portfolio of Mission Mode Projects has increased from 31 to 44 MMPs. Many new social sector projects namely Women and Child Development, Social Benefits, Financial Inclusion, Urban Governance, e-Bhasha, etc. have been added as new MMPs under e-Kranti.

CONCLUSION

The current study tries to insist that online banking along with the new Indian consumers, the Government of India is developing the digital ecosystem, has evolved rapidly over the last few years. After initiation of Digital India program, which connect architecture layers of economics with the bank, right from Aadhar, India Stack, Bharat Bill Payment System and Goods and Service taxes. Even the Regional Transport Offices of India emerged with digitalization by insisting online service from April 1, 2018. There will be only one form for all the services such as applying for driving license, NOC, renewal, Public Carrier and other requirements. This indicates

the speed of the Indian government to upgrade and the interest in developing digital ecosystem at national level. India is in the midst of a digital revolution, with Internet users going beyond just search and social networking and moving to more mature activities like online shopping, online courses, online movies and online business chats through online banking.

DISCUSSION

More than 50 percent of consumers are dissatisfied with their online banking and mobile app experience largely because of fear of hidden charges, lack of trust, complicated information provided among others. This is also indicated by the very low downloads of mobile apps of financial institutions when compared with e-commerce apps.

Ethical Clearance: completed. (Dept. level committee at VELS)

Source of Funding: Self

Conflict of Interest: NIL

REFERENCES

1. Geetha Sharma, "Study of Internet Banking Scenario in India", *International Journal of Emerging Research in Management and Technology*, ISSN 2278-9359, Vol. -5, Issue -5, May 2016.
2. F N Mahmadi, Z F Zaaba and A Osman, "Computer Security Issues in Online Banking: An Assessment from the Context of Usable Security" *IOP conference Series; Materials Science and Engineering*, Volume 160, Number 1, 2016.
3. Vidhya Jolly, "The influence of internet banking of the efficiency and cost savings for banks customers" *International Journal of Social Sciences and Management*; Volume 3, Issue 3, pp. 163-170. 2016.
4. Jaroslav Belas, Michal Koraus, Felix Kombo, Anton Koraus – "Electronic Banking Security and customer satisfaction in commercial bank" *Journal of Security and Sustainability Issues*: Volume 5, Number 3, 2016.

Impact of I.S.M. on Shipping Management Companies and their Owner

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ABSTRACT

The open enemy is better than doubtful friend. Likewise, the International Safety Management (ISM) is better than ad hoc management. The current study throws light on the role of shipping companies after implementation of International Safety Management (ISM). Chapter one provides basic idea about shipping companies and their practices and evolution of ISM Code. Chapter two lists review of literature. Chapter three briefs the role and responsibilities of shipping manager. Chapter four envisages the challenges faced by the shipping manager. Chapter five portrays the current status of shipping business and final chapter concludes findings of the study.

Keywords: *ISM, Ship Manager, Manning technical Management, Shipping.*

INTRODUCTION

Shipping Management Company is one which maintains the ships in all aspects of operation, manning, business operation, maintenance, insurance, day to day routine affairs, reputation, quality control, communications and administration related matters. After the implementation and enforcement of International Safety Management (ISM), all the shipping companies are in a position to rely on the ship manager for the purpose of proper documentation of each and every aspects of the operation of ship. The International Maritime Organization (IMO) insisted the ISM code for the purpose, to provide an international standard for the safe management and operation of ships and for pollution prevention. The code establishes safety-management objectives and requires a safety management system (SMS) to be established by “the Company”, which is defined as the ship owner or any person, such as the ship manager or bareboat charterer, who has assumed responsible for maintaining and operating the ship. Each and every shipping company has to establish and frame a policy for achieving the objectives of the ISM code prescribed. It extends to, providing necessary resources and shore-based support.

Based on the ISM Code, all the shipping management companies are expected “to designate a person or persons ashore having direct access to the highest level of management”.

EVOLUTION OF ISM CODE

International Maritime Organisation¹ Resolution A.741(18) by which the Assembly adopted the International Management Code for the Safe Operation of Ships and for Pollution Prevention (International Safety Management (ISM) Code), IMO adopted on 23 November 1995 resolution A.788(19) on Guidelines on implementation of the International Safety Management (ISM) Code by Administrations. Noting that the ISM Code was expected, under the provisions of chapter IX of the International Convention for the Safety of Life at Sea (SOLAS), 1974, to become mandatory for companies operating certain types of ships, as from 1 July 1998, and recognizing that an Administration, in establishing that safety standards are being maintained, has a responsibility to ensure that Documents of Compliance have been issued in accordance with the Guidelines, and that there may be a need for Administrations to enter into agreements in respect of issuance of certificates by other Administrations in compliance with chapter IX of the 1974 SOLAS Convention and in accordance

with resolution A.741(18), IMO recognized further the need for uniform implementation of the ISM Code. Having considered the recommendation made by the Maritime Safety Committee at its sixty-fifth session and the Marine Environment Protection Committee at its thirty-seventh session, the Assembly adopted the Guidelines on Implementation of the International Safety Management (ISM) Code by Administrations (resolution A.788(19)). The resolution urged Governments, when implementing the ISM Code, to adhere to the Guidelines, in particular with regard to the validity of the Document of Compliance and the Safety Management Certificate required by the ISM Code; and also urged Governments to request the companies concerned to apply for certification under the ISM Code as soon as possible but not later than twelve months prior to the ISM Code becoming mandatory for ships belonging thereto; to inform the Organization of any difficulties they have experienced in using these Guidelines, so that the Maritime Safety Committee and the Marine Environment Protection Committee could keep the annexed Guidelines under review and to amend them as necessary. The Guidelines on implementation of the International Safety Management (ISM) Code by Administrations, resolution A.788(19) were replaced with revised Guidelines, which were adopted by resolution A.913(22) in November 2001 which revoked resolution A.788(19). Further revision of these guidelines resulted in Guidelines on implementation of the International Safety Management (ISM) Code by Administrations adopted by resolution A.1022(26) in December 2009.

This resolution revokes resolution A.913(22) with effect from 1 July 2010. Revised guidelines on the implementation of the International Safety Management (ISM) Code by Administrations were adopted by resolution A.1071(28) in December 2013. This resolution revokes resolution A.1022(26) with effect from 1 July 2014. These Guidelines established basic principles for

verifying that the Safety Management System (SMS) of a Company responsible for the operation of ships or the SMS for the ship or ships controlled by the company complies with the ISM Code; and for the issue and periodical verification of the DOC and SMC. These Guidelines are applicable to Administrations.

Latest Amendments of ISM Code: The ISM Code was amended in December 2000 by resolution MSC.104(73), and these amendments entered into force on 1 July 2002. It was further amended in December 2004 by resolution MSC.179(79), and these amendments entered into force on 1 July 2006. It was further amended in May 2005 by resolution MSC.195(80), and these amendments entered into force on 1 January 2009. The ISM Code was also amended in December 2008 by resolution MSC.273(85). This resolution was adopted on 1 January 2010, and the amendments entered into force on 1 July 2010. The Code was further amended in June 2013 by resolution MSC.353(92) and these amendments entered into force on 1 January 2015.

Research gap: The Maritime Safety Committee (MSC), at its eighty-first session (May 2006), reviewed the report of a study on the impact and effectiveness of the ISM Code which was carried out by a Group of Independent Experts selected from administrations, organizations, academia and the shipping industry. Based on the data collected, the group concluded that where the ISM Code had been embraced as a positive step toward efficiency through a safety culture, tangible positive benefits were evident; and ISM Code compliance could be made easier through a reduction in the administrative process. After introduction of the ISM the shipping companies are required to maintain the registered SMS policies and to get approved registration to operate the ships.

For a small companies the establishment cost will become higher as a separate policy, manual and system to be maintained. For bigger companies the reduction of the staff can be made by handing over to maintain their ships on time basis. The ship management company will have their system, policy and manual in place for operating the specific types of ships. These management companies are approved and certified to carry out the operation of ships in different capacities.

REVIEW OF LITERATURE

Bjorn-Morten Batalden and Are Kistoffer Sydes²: Companies seem to fail in ensuring

that the crew members are properly qualified for the tasks they are assigned to or expected to do. Familiarization and training within maritime safety management seem to have the potential of being reconsidered. A more thorough and structured work in mapping the knowledge and skills possessed by crewmembers, perhaps linking it to thorough risk assessment of key shipboard operations is needed. Another area of concern is the vast amount of deviation from existing systems. Even though there has been done research on the link between the formal SMS and the actual conduct of operations, there seems to be a need for more research in this area. The study of inspection and audit regimes does also seem to be in need of attention.

Dimitrios X, Kokotos³: The analysis of the Greek shipping accidents in restricted waters produced a validation of the ISM Code effectiveness. It was shown that the ISM Code constitutes an effective policy measure for shipping safety. It is indicated that the ISM-Code constitutes an effective policy measure for shipping safety, particularly for human safety. Although the ISM-Code implementation led to significant reduction of human-induced accidents, additional reduction is necessary. Further studies in this field will lead to the adoption of additional regulations for the shipping safety. The results of the analysis reported in the present work can be used by decision makers in companies and international organizations to build knowledge-based expert systems and augment their information in the field of safety policy and management.

Johnny JMDC Lam Kai Leung⁴: In his Dissertation, concluded that the Safety is no longer limited to prescriptive rules and documentation only. It is about continuous improvement on safety performance and procedures, which requires a change of mind and attitude. In the long term the reputation of our register will depend on

how well we can guarantee effective enforcement of international standards on our ships. In this context, the following measures can only be most welcome.

Two more empirical study on ISM code, **Min-Jung Lee⁵ (2016) and Zhou Shen⁶(1999)**, have witnessed the need of ISM code in shipping companies and its role on owners liabilities in financial claims, discussing with comparative analysis of ISM and PSC Data and Ship Owners Liability for maritime claims respectively.

Role and Responsibilities of Shipping Manager: The shipping manager is person who undertakes all the activities related to the Ship Management Company. The Ship Management Company is the one which maintain the ships in all aspects of operation, manning, business operation, maintenance, insurance, day to day related affairs, reputation, quality control, communications and administration related matters.

The need for the ship manager increased after the introduction of international safety management, which insisted for the proper documentation of each and every aspect of the operation of the ship. The ship management companies commit themselves and manage the vessel for manning, technical management, chartering, quality control and other regular work routines. A small company can operate the ships on the reputation of the management company. In fact most of the ships are known with manager's name only, not by the owners.

Normally the main problem of manning is taken care of by the management company. With increase in wages and shortage of the seafarers, it is becoming difficult for the ship owners to get the required manning for the ships. The sea farers, with the increase in the trend of contract wages compared to the permanent wages, where they can demand for the rank and higher wages at different places, will be at their own choice of employment. Ship managers are in a position to get the manning of their choice of budget and nationality to suit their requirement. Seafarers prefer these management companies so as to get more exposure to different types of ships and their required wages. All formalities of the employment of the seafarers with regard to certification, in house training and approval for the employment from concerned administration are carried out by the ship managers. These managers are having the approval for the giving employment for the seafarers from the

administration. Ship managers are in a position to manage with different nationalities, to get the required certified seafarers at owner's requirement.

Technical management is a real critical area for ships operation. A budgeting with the vessel's employment is more important. A really skilled technical manager with experience to foresee the requirement of vessel will be able to make a budget to suit the vessel's earning. Ship managers are in a position to execute the same. Economical budgets which can feed the vessel's requirement without hampering the performance of the vessel and get more profit are made by the management companies. This is achievable one for managers as they handle similar ships from different owners and a comparative study is made by them. With the sources available a proactive type of budget can be made. Thus reducing the breakdown maintenance cost. The unwanted expenses can be cut down and thus increasing the profit margin. Some of the cases only technical advice is given by the ship managers. A yard delivery work also can be given to the managers, so as the managers can ensure proper set of equipments to suit the administration requirement and employment requirement. With the latest regulations and inspection requirement becoming stringent for the employment of the vessel, a good preparation of the vessel can be achieved by the managers.

With the help of managers the legality and the certification of the vessel for the employment can be made easier. It is not that the owners cannot carry out these jobs, but involves lot of manual labour and hiring of highly qualified professional to do the same. Vessel employment requires more of a certification by the way of inspection to grade the vessel at higher category. These regular inspections carrying out with different set of crew will be slightly difficult. Ship managers are in a position to provide the experts to prepare the vessel for the inspection, by carrying out the pre inspection and enforcing the remedial action for the defects, so as to present and maintain the vessel in perfect condition. With regular inspections like, PSC inspection, SIRE inspection and Class inspection, apart from the mandatory inspection, a deficiency will make the vessel employment difficult. To maintain the market value of the vessel, the results of inspections are more important. Charterer's requirement is fulfilled on behalf of owners. Issues regarding loading fuel consumption speed and routes are managed by the managers. All legal issues and the procedures are handled

by the managers. Insurance, regarding the cargo and carriage handled by managers on behalf of owners. Only the financial responsibility lies with the owners. Owners can demand for their views to be carried out in all aspects. Managers liaise with owners and charters to carry out the vessels scheduled maintenance without hampering the vessels employment.

DISCUSSION

Owners can have a trouble free time if good managers are handling the ship. Financially profitable as the separate establishment for maintaining the lesser number of ships is eliminated. All the documentation and certification will be with the managers. Needless to say the employment for the sea farers increases. A quality and experienced people will be available for operating the ship including the seafarers. All legal matters and administration requirement can be fulfilled without any hassle. Owners will be able to present a higher grade vessel to the charterer and the shippers. A good commercial way to make safe profit. However, Owners may not get their standard expected on the vessel. The profit margin may be less. May have to compromise for the substandard supply due to low budgeting effect. The pride of owning the ship will erase as the owners stand behind the screen. Unknown owners are increased, which gave raise to uncertain security to the sea farers including their wages.

CONCLUSION

By all means job opportunities increased both on board and on shore. A known systematic way of operation is established. The number of ships increased in spite of stringent regulations enforced. More ways of making profit is found. Anyway last but not the least the pride of the profession is enriched on monetary terms.

Ethical Clearance: completed. (Dept. level committee at VELs)

Source of Funding: Self

Conflict of Interest: NIL

REFERENCES

1. International Maritime Organization, cit. "ISM Code and Guidelines on Implementation of ISM Code" 2012. <http://www.imo.org/en/OurWork/HumanElement/SafetyManagement.aspx>

2. Bjorn-Morten Batalden and Are kristoffer Sydnes, "WMU Journal of Maritime Affairs" Maritime Safety and ISM Code: a study of investigated casualties and incidentrts" Volume 13, Issue 1, pp 3-25, April 2014.
3. Dimitrios X Kokotos, "A Study on Shipping Accidents Validates the effectiveness of ISM Code", Department of maritime Studies, University of Piraeus, Piraeus, Greece, PP. 387-392, 2012. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.1005.5764&rep=rep1&type=pdf>
4. Johnny JMDC Lam Kai Leung, "An analysis of the implementation of the ISM Code in Mauritius after 1 July 2002 and beyond", The Maritime Commons: Digital Repostory of the world Maritime University World Maritime University, dissertation, 2000
5. Min-Jung Lee, "A study on the Effectiveness of the ISM Code through a comparative analysis of ISM and PSC Data" The Maritime Commons: Digital Repostory of the world Maritime University World Maritime University, dissertation, 2016.
6. Zhou Shen, "The potential impact of the ISM Code on ship Owners Liability for maritime claims" The Maritime Commons: Digital Repostory of the world Maritime University World Maritime University, dissertation, 1999.

Impact of Training Effectiveness on the Stake Holders in IT Companies—A Study with Reference to Chennai City

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ABSTRACT

This study focuses the effectiveness of training and development in IT companies and to measure the influence of training effectiveness on the benefits of stake holders. The researcher used regression analysis to find the result. It is concluded that the innovative updated training and development create skill and knowledge to the employees. They motivate them to have good career elevation and better job satisfaction. It is concluded that the innovative updated training and development create skill and knowledge to the employees. They motivate them to have good career elevation and better job satisfaction.

Keywords: Stake Holders, Training and Development, Post Training.

INTRODUCTION

IT companies in India need to compete with their counter parts in foreign countries on the domain of productivity, price, profitability, employee retention and innovation. This compels them to implement latest training and development programs for their employees. The main aim of these programs has a multiple goal of getting advantage to the stake holders namely employer, employee and customers. The benefits of stake holders can be realized in the form of the following aspect.

1. Profit to the employees.
2. Career elevation, monetary benefits and skill development to the employees.
3. Cost advantage and product satisfaction to the customers

Training program in IT companies are periodically decided by the top level executives and carved out by middle level manager. The training material is updated as per the need for the best product in their marketing arena. There is a monstrous dimension of competition prevailing among the IT companies. The product of the IT companies requires a global standard to meet out competition and they should also quote a best retrenched price. In these contents, the study becomes essential to exactly determine the effectiveness of training in IT companies.

LITERATURE REVIEW

Charles W. Read, Brian H. Kleiner (2016) - This paper sought to replicate on the importance of training and the importance of learning theory. Ten learning methods were identified to be the best namely videotapes, lectures, one-on-one instruction, role plays, games/simulation, case studies, slides, computer-based training, audiotapes and films. The study also detailed on the factors considered for selecting the training method and the various ways of evaluating the trainees after completing the program¹.

Mark Stam, Eric Molleman(2015) - This article highlighted the role of career development and strategic training policies among IT companies and young IT professionals. The study examined the ability of the IT professionals to integrate the business processes, strategic issues and handling information technology. Organisations were expected to plan both for short and long term, quantitatively and qualitatively for IT professionals by means of strategic training policy and being a part of the learning organisation sharing knowledge².

Abdelgadir N. AbdelhafizElbadri(2014) - This comprehensive study was attempted to examine the emphasis given for training activities both internal and external to maintain competitiveness in the market. The study was conducted among 30 Polish companies to determine the training needs, developing programs and assessing outcomes. The results revealed that

many companies neglected to assess training needs and evaluate outcome properly, providing for suggestions and improvements³.

Shawn Kent (2013) - This article examined the values of Mentor system prevailing in the organisations. The employees who became more productive, derived greater career satisfaction and enjoyed accelerated career growth were identified. Mentoring was considered to be a mutually advantageous way to both attract and retain employees. Mentoring programs were inexpensive, to inspire future leaders, improve management and staff relationship and prepare people to succeed an aging workforce. Mentors could provide just in time, development to those employees aspiring to grow⁴.

Susan Geertshuis, Mary Holmes, Harry Geertshuis, David Clancy, Amanda Bristol (2012) - This paper supported the earlier work to implement good practices in training and its evaluation. The learning process is influenced by multiplicity of factors based on perceptions about learning and performance outcomes. Organisations were expected to implement cost effective evaluation methods acknowledging the status of the learner. The study also examined the evaluation methodologies and the role played by the trainers in improving learning process⁵

Gaps in the literature: The above highlighted research works on training developments did not address a essential problem of determining augmented benefits of training to the stake holders. Never the less they did not ascertain a pure employee opinion on their employee and customer benefits due to the effectiveness of innovative training offer to them. Therefore the present study mainly focus on these two unraveled gaps in the literature to exactly determine the stake holders advantage over innovative training and development programmes.

OBJECTIVES OF THE STUDY

1. To study the effectiveness of training and development in IT companies.
2. To measure the influence of training effectiveness on the benefits of stake holders.

Hypothesis: There is no significant influence of training effectiveness on the benefit of stake holders.

METHODOLOGY

The present research entirely leans upon primary data, which is collected through a well-designed and ordered questionnaire. It consists of four parts namely training effectiveness measurement, benefits to

employee, employer and customers. These statements are designed in Likert’s five point scale which ranges from strongly agree to strongly disagree.

Data collection: The researcher applied convenient sampling method to collect 50 responses each from top 10 IT companies in and around Chennai. After scrutiny, it is found that 27 of them are with flaws. Hence the total sample size is 473.

Data analysis: After obtaining the responses, the data are tabulated and systematically analyzed using the statistically tools namely F-test, ANOVA and linear multiple regression analysis.

ANALYSIS AND DISCUSSION

The application of one-way ANOVA on the total scores of employees perception on employer benefit, employee benefit and customer benefit and the following results are derived with respect to employees designation and experience.

Table 1: Influence of organizational variables on Training Effectiveness

Variables	F	Sig
Designation	46.312	.000
Experience	63.297	.000
Method of training	39.048	.000
Effectiveness	21.013	.000
Training courses	35.445	.000
During Training	76.625	.000
Post Training	36.947	.000
Benefits to Employees	59.279	.000
Benefits to Employers	31.280	.000
Benefits to Customers	36.137	.000

From the above table it is found that the F-values are statistically significant at 5 percent level. It shows that the top level executives strongly agreed that the training programs are highly effective than other employees. The employees with more than twenty years of experience simply agreed that the training to the employees brought high productivity and benefits to all the three stake holders.

The application of linear multiple regression analysis on independent variable effectiveness of training and the dependent factors employee benefits, employer benefit and customer benefit and brought the following result.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1.	.639 ^a	.408	.395	.49688

From the above table, it is found that R-value = 0.639, R-Square = .408, adjusted R-square is 0.395 are statistically significant and the independent variables are 39% variance over the training effectiveness. This leads to the further verification of regression fit of unique dependent and multiple independent variables.

Table 3: ANOVA^a

	Model	Sum of Squares	df	Mean Square	F	Sig.
1.	Regression	83.178	11	7.562	30.627	.000 ^b
	Residual	120.483	488	.247		
	Total	203.661	499			

From the above table it is found that the F-value 30.627, P-value = 0.000 are statistically significant at 5 percent level. This implies the regression fit is significant and the independent variables appropriately explain the dependent factor training effectiveness. The individual influence of all the eleven independent variables are presented in the following co-efficient table

Table 4: Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1.	(Constant)	.262	.245		1.068	.286
	Designation	.045	.037	.050	1.233	.218
	Experience	.042	.047	.039	.877	.381
	Method of training	.023	.039	.023	.588	.557
	Effectiveness	.124	.043	.127	2.909	.004
	Training courses	.052	.040	.053	1.312	.190
	During Training	.037	.036	.041	1.035	.301
	Post Training	-.167	.048	-.141	-3.490	.001
	Benefits to Employees	.491	.056	.405	8.760	.000
	Benefits to Employers	.048	.033	.059	1.446	.149
	Benefits to Customers	.107	.053	.092	2.002	.046

a. Dependent Variable: Timeliness

From the above table it is found that all the three R² values are greater than 0.30 which shows that there is a deep relationship between effectiveness of training and the three factors benefits to the employer, employee and customers. The significant F-values, B-values and t-values further enhanced and proved that the effectiveness of training had very significant influence over the benefits of the stake holders. The hypothesis is rejected in this analysis.

FINDINGS AND CONCLUSION

It is concluded that the innovative updated training and development create skill and knowledge to the

employees. They motivate them to have good career elevation and better job satisfaction. The employees are able to get maximum and desired productivity to have lucrative business environment. The customers are able to get good and expected product from the companies at cheap price. It is further concluded that the training and development programs in IT companies are highly effective and they have tremendous optimistic input on the stake holders employer, employee and customers.

Conflict of Interest: Nil

Ethical Clearance: Taken from UGC Committee

Source of Funding: SELF

REFERENCES

1. Charles W. Read, Brian H. Kleiner, Which training methods are effective?, *Management Development Review*, Vol. 9, Iss. 2, Apr 1996, pp.24 – 29
2. Mark Stam, Eric Molleman, Matching the demand for and supply of IT professionals: Towards a learning organisation, *International Journal of Manpower*, Vol. 20, Iss. 6, Sep 999, pp.375–387
3. Abdelgadir N. AbdelhafizElbadri, Training practices of Polish companies: an appraisal and agenda for improvement, *Journal of European Industrial Training*, Vol. 25, Iss. 2/3/4, Mar 2001, pp.69 - 79
4. Shawn Kent, Mentoring: An age old idea whose time has come in corporate America, *Effective Executive*, Feb 2001, pp.29-31
5. Susan Geertshuis, Mary Holmes, Harry Geertshuis, David Clancy, Amanda Bristol, Evaluation of workplace learning, *Journal of Workplace Learning*, Vol. 14, Iss. 1, Feb 2002, pp.11 - 18

Assessing and Ensuring Sustainability of Nirmal Gram Panchayats in Rajasthan, India

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ABSTRACT

The sustainability of *Nirmal Gram Panchayats* is a serious problem in all the states of India. The extensive literature review reveals that the key interrelated factors affecting the sustainability are; socio-economic, technical, environmental and institutional. A research was undertaken to assess the four factors and develop the State Sustainability Index to measure the sustainability of *Nirmal Gram Panchayats* in Rajasthan. Five parameters were included in each factor of sustainability and equal score was assigned to each of the twenty parameters. All the twenty parameters were assessed through rapid assessments utilizing survey questionnaire, visual inspection check lists, semi-structured interviews, focus group discussions, and water quality testing in ten randomly selected *Nirmal Gram Panchayats* in ten districts of Rajasthan. The district sustainability indices were derived for all the ten districts analyzing the scores assigned to five parameters included in each factor. The State Sustainability Index of Rajasthan was worked out as 46.52 % by averaging the scores of district sustainability indices of ten districts, which is categorized as low with high concern. The institutional factor having lowest sustainability score and the highest value of correlation coefficient with its variables and environmental factor having low score of sustainability and very high correlation coefficient needed highest and very high priority respectively for implementing remedial measures at the Gram Panchayat level. The technical factor having highest sustainability score and moderate value of correlation coefficient and socio-economic factor having moderate sustainability score and moderate correlation coefficient needed high and moderate priority respectively for implementing remedial measures at household level.

Keywords: Sustainability, *Nirmal Gram Panchayats*, Total Sanitation Campaign, Open defecation free, Rapid Assessment, Panchayati Raj Institutions.

INTRODUCTION

Government of India (GOI) initiated Total Sanitation Campaign (TSC) in the year 1999 in rural areas to eradicate the practice of open defecation. The TSC was evolved from the experience of the Central Rural Sanitation Program (CRSP), India's first nationwide program for rural sanitation launched in 1986 in the Ministry of Rural Development with the objective of improving the quality of life of rural people and to provide privacy and dignity to women^[1]. The key

principles of TSC were enunciated as follows: low to no subsidy, focus on awareness generation, community centered and demand responsive approach, reliable supply chain, school sanitation and hygiene education and involvement of Panchayati Raj Institutions (PRIs) and Non-Governmental Organizations^[2]. To add vigor to the TSC, in June 2003, Government of India (GOI) initiated an incentive scheme for *Nirmal Gram Panchayats* (fully sanitized and open defecation free Gram Panchayats), Blocks and Districts called the '*Nirmal Gram Puraskar*'^[1]. By 2013, 28590 Gram Panchayats (GPs) were awarded *Nirmal Gram Puraskar* (NGP) out of which 326 Gram Panchayats were from Rajasthan^[3]. While the NGP contributed in raising awareness about rural sanitation and community health, issues of sustainability in many awardees villages were noted in independent evaluations^[2]. The evaluation study on TSC by Planning Commission, GOI^[4] in 156 *Nirmal Gram Panchayats* in 20 states including Rajasthan

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reveals that only 100 *Nirmal Gram Panchayats* were best performing. The findings of study carried out in 162 *Nirmal Gram Panchayats* in six states indicate that only 6 Gram Panchayats maintained the open defecation free status^[5]. The assessment study of impact and sustainability of 664 *Nirmal Gram Panchayats* in 56 districts of 12 states reveals that provision of sustainable water supply, maintaining safe distance between toilet pits and nearest water source, and exposure of Panchayati Raj Institutions (PRIs) to various low cost options for sanitation are major technical challenges and disposal of solid and liquid waste is a major environmental challenge in achieving the sustainability^[6]. A sanitation survey conducted by National Sample Survey Organization (NSSO) during May-June 2015 covering 73176 households in 3788 villages in 26 states of India^[7] on the basis of households having toilets and using them, ranked Rajasthan at 20th rank. Well sustained and used water supply and sanitation facilities mean that for a period that covers the design life of technologies used to provide services each member of all households in the project area has a regular and dependable delivery of water-acceptable in terms of quality and quantity, practices safe disposal of waste 365 days per year^[8]. A sanitation system that is sustainable, protects and promote human health, does not contribute to environmental degradation or depletion of resource base, is technically and institutionally appropriate, economically viable and socially acceptable^[9]. Sustained behaviors result from giving high priority and adequate resources to hygiene promotion^[10]. The flush/pour flush toilets connected to pit latrine, septic tank, piped sewer system, ventilated improved pit latrine, pit latrine with slab, composting toilet come under the category of improved sanitation^[11]. Long term sustainability of WASH (water, sanitation and hygiene) interventions is widely recognized as a complex and persistent challenge facing communities, governments and international development partners alike^[12]. The sustainability index tool is made up of a number of frame works, each framework focuses on five factors of sustainability that have been established from an extensive review of literature and include: institutional, management, financial, technical and environmental factors^[13]. The WASSI (Water and Sanitation Sustainability Index) was developed and calculated for the city of Salta in northern Argentina as a single sustainability score for an entire city to disseminate the results to wider audiences and convey unambiguous messages to policy makers^[14]. The

sustainability of *Nirmal Gram Panchayats* is a serious problem in all the states of India including Rajasthan. The extensive review of literature reveals that the key factors affecting the sustainability of *Nirmal Gram Panchayats* are: institutional, environmental, socio-economic and technical and there is a need to develop state sustainability index as a measure of sustainability, for the state of Rajasthan. Therefore the research has been undertaken to assess and analyze these four interrelated factors to develop and determine the state sustainability index for taking remedial measures for ensuring the sustainability of *Nirmal Gram Panchayats* in Rajasthan.

RESEARCH METHODOLOGY

The sustainability of a *Nirmal Gram Panchayat* is defined as continuous and satisfactory functioning as well as effective use of water and environmental sanitation facilities by all households throughout the year in that *Nirmal Gram Panchayat*. The four key interrelated factors of sustainability are: socio-economic, technical, environmental and institutional. Each factor has five parameters which have been assessed through rapid assessments in ten randomly selected *Nirmal Gram Panchayats* one each in each district, covering total 10 out of 28 districts utilizing the following research methods:

- Household Questionnaire
- Visual inspection check lists
- Testing bacteriological quality of water utilizing H₂S strip vials
- Semi-structured interviews
- Focus Group Discussions

The parameters included under each of the four factors of sustainability are as follows:

Socio-economic parameters at household level; toilet used by all family members, proper storage and handling of water, proper collection and disposal of solid waste, hand-washing with soap/ash by all family members at critical times, proper disposal of waste water.

Technical parameters at household level; toilet structure in good condition and functional, toilet pit is at a safe distance (≥ 10 m) from water source, hand-washing facility is available, water is available within/near house, water is potable by testing using H₂S strip vial.

Environmental parameters at Gram Panchayat level; Well-maintained functional community/institutional toilet (s) in use by men and women, well maintained functional School/Anganwadi toilet(s) in use by girls and boys and clean school campus, potable community water source (s) with proper arrangement for collection and disposal of waste water and clean surroundings, proper arrangement for collection and disposal of solid waste, proper arrangement for disposal of waste water.

Institutional parameters; Functional and active village water and sanitation committee, community participation in planning and monitoring of water and sanitation facilities, availability of adequate funds for operation and maintenance of community/institutional water and sanitation facilities, availability of plans and funds for solid waste and waste water management systems, availability of technical and financial support from external support agencies in planning, implementation, operation and maintenance of water and sanitation facilities.

Every parameter under each factor is assigned a maximum score of 20 if it is fully met. The actual score is assigned to each parameter after assessment. The average

score of all the five parameters under each factor is worked out as percentage of total maximum score of 100. In each of the ten Nirmal Gram Panchayat 15 randomly selected households were surveyed utilizing the pre-designed and field tested questionnaire, and visual inspection of household water and sanitation facilities was also carried out in each household utilizing the pre-designed and field tested check list. The bacteriological quality of water was checked by testing water utilizing H₂S strip vials. One or more randomly selected community/institutional water and sanitation facilities depending upon their total number in the Nirmal Gram Panchayat were visually inspected utilizing pre-designed and field tested check list and the score was assigned to relevant parameter under environmental factor. The focus group discussions and semi-structured interviews with various stake holders were conducted and score was assigned to relevant parameters under institutional and environmental factors. The district sustainability index was worked out as percentage of total scores of the four factors of sustainability assessed in the Nirmal Gram Panchayat in that district. The State Sustainability Index (SSI) of Rajasthan was worked out by averaging the scores of district sustainability indices of all the ten districts.

RESULT AND DISCUSSIONS

The district wise scores of all the four factors of sustainability in ten districts, district sustainability indices and state sustainability index of Rajasthan derived from the rapid assessments of ten *Nirmal Gram Panchayats* one each in each district are given at Table 1:

Table 1: District wise Scores of four Factors and District Sustainability Indices in ten districts

Name of District/State	Technical Factor (%)	Socio- economic Factor (%)	Environmental Factor (%)	Institutional Factor (%)	District/State Sustainability Index(%)
Ajmer	68	36	39	20	40.75
Bundi	68	63	41	30	50.50
Churu	60	64	28	20	43.00
Hanumangarh	64	33	30	20	36.75
Jaipur	76	39	40	25	45.00
Jhunjhnu	76	56	35	30	49.25
Karoli	70	60	25	20	43.75
Pali	64	57	40	25	46.52
Rajsamand	79	71	56	45	62.75
Sikar	70	70	28	20	47.00
Rajasthan	69.5	54.9	36.2	25.5	46.52
State Sustainability Index is 46.52					

Keeping in view the significance and utility of State Sustainability Index (SSI) it has been categorized in four categories as follows:

- SSI<50 Low- with High Concern
- SSI >50 and < 75 Medium- with medium concern
- SSI>75 and <100 High-with low concern
- SSI= 100 Highest- with no concern

The above categorization of SSI highlights its importance, expresses concern and draws attention of policy makers, implementers and elected representatives for taking timely remedial measures to achieve the highest score of sustainability index of *Nirmal Gram Panchayats* in Rajasthan.

The state sustainability index is 46.52% which falls under the category of low with high concern needing urgent attention to increase its value and ensure sustainability of *Nirmal Gram Panchayats* in Rajasthan. The scores of four factors of state sustainability index are; technical 69.50%, socio-economic 54.90%, environmental 36.20% and institutional 25.50%. The score of technical factor is the highest whereas the score of institutional factor is the lowest and the score of socio-economic factor is higher than the score of

environmental factor of state sustainability index. The factor analysis of four factors in ten districts reveals that institutional factor has extremely high correlation with its variables and environmental factor has very high correlation with its variables whereas technical factor has high correlation with its variables and socio-economic factor has moderate correlation with its variables. Both institutional and environmental factors pertain to Gram Panchayat level and technical and socio-economic factors pertain to household level. The institutional factor having lowest sustainability score and highest value of correlation coefficient needs highest priority for implementing remedial measures at Gram Panchayat level. The environmental factor having low sustainability score and very high value of correlation coefficient needs very high priority for implementing remedial measures at Gram Panchayat level. The technical factor having highest score of sustainability and high value of correlation coefficient needs high priority for implementing remedial measures at household level. The socio-economic factor having moderate sustainability score and moderate value of correlation coefficient needs moderate priority for implementing remedial measures at household level. The priority needed for the four factors of sustainability is shown at Table 2:

Table 2: Factor wise priority needed for four factors of sustainability

Sl. No.	Factor of Sustainability	Sustainability Score	Correlation coefficient value	Level of priority needed	Action level
1.	Institutional	25.5	0.972	Highest	<i>Nirmal Gram Panchayat</i>
2.	Environment	36.2	0.878	Very High	<i>Nirmal Gram Panchayat</i>
3.	Technical	69.5	0.791	High	Households in <i>Nirmal GP</i>
4.	Socio-economic	54.9	0.412	Moderate	Households in <i>Nirmal GP</i>

In order to increase the value of state sustainability index the simultaneous remedial measures are needed both at Gram Panchayat and household levels in all the *Nirmal Gram Panchayats* of Rajasthan.

CONCLUSION

In order to ensure the sustainability of *Nirmal Gram Panchayats* in Rajasthan the following remedial measures are necessary at various levels in the order of priority for all the four factors of sustainability in all the *Nirmal Gram Panchayats*:

Institutional Sustainability: All the three tiers of Panchayati Raj Institutions viz. Gram Panchayat,

Block Panchayat and District Panchayat should be strengthened by providing them with adequate funds and skilled functionaries and building their capacities in planning, implementation, operation & maintenance and monitoring of water and environmental sanitation interventions at *Nirmal Gram Panchayat* level.

Environmental Sustainability: The State Water and Sanitation Mission and the respective District Water and Sanitation Mission should provide technical support to all *Nirmal Gram Panchayats* in developing, implementing and managing solid and liquid waste management plans of actions to ensure proper solid and liquid waste management in each and every *Nirmal*

Gram Panchayat in Rajasthan. The Village Water and Sanitation Committee in each *Nirmal Gram Panchayat* should involve local communities in maintaining the clean environment around community/institutional water supply sources and community sanitation facilities as well as on the streets and in open spaces.

Technical Sustainability: The capacity of elected representatives, technical staff and local masons of all the *Nirmal Gram Panchayats* and the respective Block Panchayats should be built in all the aspects viz. design, construction, operation & maintenance and monitoring, of various technical options of household toilet, community toilet, School/Anganwadi toilet, hand-washing facility and hand pump/stand post platform and drains.

Socio-economic Sustainability: All the *Nirmal Gram Panchayats* should train and involve school teachers, anganwadi workers, health workers, village water and sanitation committee members, ward members, community based organizations and self-help groups for undertaking hygiene education programme through regular home visits covering all the households in their respective *Nirmal Gram Panchayat*.

Ethical Committee Clearance: Not Applicable

Source of Funding: Self financed

Conflict of Interest: Nil

REFERENCES

1. Ministry of Rural Development, Government of India, "India Country Report," presented in *The Second South Asian Conference*, Islamabad, 2006.
2. Ministry of Drinking Water and Sanitation, "Country Paper India," Government of India, New Delhi, 2016.
3. Ministry of Drinking Water and Sanitation, "<http://NirmalGrampuraskar.nic.in/Report/Rpt>," Government of India. [Online]. [Accessed 20 April 2016].
4. Programme Evaluation Organisation, "Evaluation Study on Total Sanitation Campaign," Planning Commission, New Delhi, 2013.
5. TARU Leading Edge Consultant, "Impact Assessment of Nirmal Gram Puraskar Awarded Panchayats," UNICEF, New Delhi, 2008.
6. Centre for Media Studies, "Assessment Study of Impact and Sustainability of Nirmal Gram Puraskar," DDWS, Ministry of Rural Development, Government of India, New Delhi, 2011.
7. Ministry of Drinking Water and Sanitation, "Swachh Survekshan Gramin-2016," Government of India, New Delhi, 2016.
8. Water and Sanitation Programme, "Sustainability Planning and Monitoring in Community Water Supply and Sanitation," World Bank, Washington, 2003.
9. E. Kvarnstorm, "Sustainability Criteria in Sanitation Planning," presented in *26th WEDC International Conference*, Dhaka, Bangladesh, 2004.
10. S. Cairncross, "It does not! Some findings from multi-country study of hygiene Sustainability Criteria in Sanitation Planning.," *Waterlines*, vol. 22, no. January 2004, pp. 4-7, 2004.
11. WHO/UNICEF, "Joint Monitoring Programme: Progress on Water and Sanitation," WHO, Geneva, Switzerland, 2008.
12. AGUACONSULT, "Ghana Country Report: Sustainability Index of WASH Activities.," Rotary International-USAID, Essex, UK, 2013.
13. AGUACONSULT, "Final Report: WASH Sustainability Index Tool-Assessment of Activities under the TWB-MRB and iWASH projects," USAID-Global Water for Sustainability, Essex, UK, 2014.
14. M. A. Iribarnegaray, "A comprehensive Index to Assess the Sustainability of Water and sanitation management systems.," *Water Sanitation and Hygiene for Development*, vol. 2, no. 3, pp. 205-222, 2012.

Effect of Surface Finish on Stain Affinity of a Lithium Disilicate Esthetic Ceramic Material

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ABSTRACT

Purpose: To evaluate the influence of two different surface treatments on the stainability and color change of ceramic restorations.

Materials and Method: Veneering lithium disilicate was used to fabricate standardised discs (n=60). These discs were abraded using a red band diamond abrasive. Samples were divided in three groups. Surface Roughness (Ra) values before and after the surface treatment were calculated using a surface profilometer. These specimens were further subdivided into 2 subgroups with 10 samples each. Colour change (ΔE) values were calculated at 6, 12, 18 and 24 days.

Results: Independent t test for the groups Polish and Reglaze showed a significant difference ($p = 0.003$). One way ANOVA for the Green tea group showed a significant difference ($p = 0.007$) at 12 days between Control and Polish and Control and Reglaze. One way ANOVA for the Turmeric group showed a significant difference at 12, 18 and 24 days.

Conclusion: For increased periods of clinical usage corresponding to increased immersion times, reglazing was necessary to prevent stain absorption especially against Turmeric.

Keywords: Color stability. emax Press. Turmeric. Green Tea.

INTRODUCTION

All ceramic materials are a popular material of choice in esthetically critical areas on account of its translucency, color intensity, excellent biocompatibility and durability. [1] The long term success of these restorations depends on the skill of the clinician and technician, strength [2] and their ability to mimic color. The color of porcelain can be affected by numerous factors like number of firings, [3] core and veneer thickness, [4,5] repeated staining, [6] artificial aging [7] and surface finish. [8]

Post-insertion adjustments are required to correct occlusal interferences, finish the margins and improve the appearance. [9] This causes removal of the glaze layer thereby increasing surface roughness, [10] wear of the opposing dentition [11] the pattern of light distribution affecting colour [8] and stain affinity. [10,12,13,14]

Studies to determine the most suitable surface treatment to minimize the surface roughness have been conducted and the results have been variable. [11,15-19] Research regarding the relationship between the surface roughness and stainability is scarce. Motro [10,20] has reported a 83% correlation between the surface roughness (Ra) value and the color change (ΔE).

Turmeric and Green Tea are popular dietary constituents of the Asian cuisine. Turmeric has reported to have greater staining capacity when compared to tea, coffee and red wine in composite resins. [21,22] No previous research on the effect of Turmeric and Green

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Tea on ceramics has been conducted. The purpose of this study was to evaluate the influence of two different surface treatments on the stainability and to correlate the roughness to the color change. The null hypothesis is that there will be no difference in the surface treatment techniques and no correlation between surface roughness and color change.

MATERIALS AND METHOD

A compatible veneering ceramic for a pressable ceramic was used to fabricate 60 disks of standard dimensions (10×2 mm), (e.max Ceram Dentine Transpa Incisal, Ivoclar Vivadent). An oversized brass mould was used to standardise the specimen dimension and compensate for the porcelain shrinkage. The samples were fabricated and fired according to the manufacturer's instructions.

All the groups were abraded by a single operator using a using a red band (fine grit) diamond rotatory cutting instrument (Mani Bur CR-22F) with water cooling using a high speed handpiece to simulate chair-side clinical adjustment. The thickness of the specimen was verified after the adjustment procedure to ensure equivalent removal of material from all specimens. The

specimens were placed in an ultrasonic cleaner for 180 seconds. The initial surface roughness value (Ra) was recorded using a surface profilometer (Mitutoyo SG 301). These specimens were then divided into three groups of 20 samples each: Group C (Control), no surface treatment was performed, Group R (Reglaze), a thin layer of emax Ceram glaze paste was applied, Group P (Polish) this specimen was polished using a Shofu Porcelain Adjustment Kit (Shofu Inc, Japan). Polishing was performed using a low speed handpiece at 10,000 rpm without water cooling. The specimens were cleaned ultrasonically and a final surface roughness value (Ra) was recorded. A spot spectrophotometer (il Pro, X-Rite, USA) was used to measure color in this study(ΔE). The specimens were then subdivided into two subgroups (10 samples each) which were immersed in standard dilutions of Green Tea (Lipton, Pepsico, India) and Turmeric (MTR, Bangalore, India) in artificial saliva (MP Sai) at 37°C in an incubator. The solutions were stirred every 12 hours +/- 1. The color values (ΔE) in the specimen was measured at repeated time intervals of 6, 12, 18 and 24 days which corresponds to half year, one year, one and half year and 2 years of clinical usage respectively. ΔE was calculated according to the formula $\Delta E = \sqrt{([\Delta L]^2 + [\Delta a]^2 + [\Delta b]^2)}$.

STATISTICAL ANALYSIS

The level of significance was set at p-value (< 0.05) and SPSS.20 was used for analysis. One way ANOVA followed by a Post hoc Tukey test and Pearson's correlation co-efficient was used to compare the relationship between final surface finish of the specimen and its color stability.

Table 1: Independent t test to compare the surface roughness value between the two groups

GROUPS		N	Mean	Std. Deviation	t	df	P VALUE
ROUGHNESS DIFFERENCE	POLISH	20	3.412000	1.2100918	3.217	38	.003
	REGLAZE	20	2.411500	.6860434			

Table 2: One way ANOVA for the Green Tea Group showing significant difference at 12 days

	GROUPS	N	Mean	Std. Deviation	Statistics/ mean squares	df2(welch)/ F(Anova)	P VALUE
DIFFERENCE 6-BASE	CONTROL	10	1.39	1.115995	0.586	0.503	0.61
	POLISH	10	1.46	1.366423			
	REGLAZE	10	1.01	0.61905			
	Total	30	1.286667	1.060817			
DIFFERENCE 12-BASE	CONTROL	10	2.6	1.520234	6.835	15.943	0.007
	POLISH	10	1.17	0.452278			
	REGLAZE	10	0.67	0.658365			
	Total	30	1.48	1.267743			

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DIFFERENCE 18-BASE	CONTROL	10	2.73	2.5373	2.117	16.338	0.152
	POLISH	10	0.99	0.664078			
	REGLAZE	10	1.08	0.656252			
	Total	30	1.6	1.711825			
DIFFERENCE 24 - BASE	CONTROL	10	1.46	1.493095	1.972	1.713	0.199
	POLISH	10	0.59	0.53427			
	REGLAZE	10	0.87	0.969593			
	Total	30	0.973333	1.099195			

Table 3: One way ANOVA for the Turmeric Group showing significant difference at 12, 18 and 24 days

	GROUPS	N	Mean	Std. Deviation	Statistics/ mean squares	df2(welch)/ F(Anova)	P VALUE
DIFFERENCE 6-BASE	CONTROL	10	2.35	1.163567	3.809	2.546	0.097
	POLISH	10	2.51	1.533659			
	REGLAZE	10	1.37	0.884496			
	Total	30	2.076667	1.286718			
DIFFERENCE 12- BASE	CONTROL	10	2.5	1.544884	4.321	16.892	0.007
	POLISH	10	0.91	0.687103			
	REGLAZE	10	1.29	0.769488			
	Total	30	1.566667	1.243558			
DIFFERENCE 18- BASE	CONTROL	10	3.34	1.822818	11.045	4.154	0.027
	POLISH	10	2.9	1.474977			
	REGLAZE	10	1.34	1.574237			
	Total	30	2.526667	1.799221			
DIFFERENCE 24 - BASE	CONTROL	10	3.6	1.520234	7.603	3.596	0.041
	POLISH	10	3.2	1.590248			
	REGLAZE	10	1.93	1.225697			
	Total	30	2.91	1.578815			

RESULTS

The means and standard deviations of the ΔRa value for the Polish and Reglaze group were 3.41 ± 1.21 and 2.41 ± 0.69 respectively. Unpaired student ‘t’ test between the groups was statistically significant. (p = 0.003) (Table 1). Based on the mean values obtained Shofu was more efficient form of surface finishing when compared to reglazing.

Using One way ANOVA for the Green Tea group a significant difference at a period of 12 days (p = 0.007) was obtained. Post hoc Tukey test showed that the difference was significant between Control and Polish and Control and Reglaze group. (Table 2)

For the Turmeric Group, One way ANOVA significant difference was found at 12 days (p= 0.007), 18 days (p= 0.027) and 24 days (p=0.041). Post hoc Tukey test for 12 days showed significant difference between the Control and Polish and Control and Reglaze Groups. For 18 and 24 days, significant difference was found between Control and Reglaze.(Table 3).The Pearsons correlation coefficient between color change at 24 days and surface roughness was 40.8% which was suggestive of a poor correlation.

DISCUSSION

The null hypothesis was rejected because different surface treatments affected the color change of the lithium

disilicate ceramic material for both the staining agents. Post-insertion treatments contribute to a rough surface affecting the properties of the restoration,^[8-11] therefore surface finishing either by Reglazing or Polishing using different techniques is advocated.^[18-20,23-25]

Based on the results of the unpaired t test, Polishing using Shofu kit is more efficacious in reducing surface roughness in comparison to reglazing. Polishing using Shofu Porcelain adjustment kit has reported surfaces equivalent to glazing.^[8,15,25] Similar conclusions of polishing giving superior results have been reported by Manjuran et al,^[17] Scurria et al,^[24] and Wright et al.^[27] Different materials and adherence to different polishing protocols were responsible for the findings that were in contradiction to other studies in literature.^[10,17,24]

The value of surface roughness that is obtained using a profilometer is affected by the pore size, that will depend on the degree of condensation of porcelain.^[20] Two surface roughness values (i.e initial and final) were measured and their difference (ΔRa) was subjected to statistical analysis to give more accurate results compared to the previous studies which used a single Ra value.

The ability to perceive a variation in color is a subjective phenomenon and can range from values as low as $\Delta E=0.5$ to as high as $\Delta E=4$. Using the same criteria used for evaluation by Motro et al^[10], $\Delta E > 2$ was considered to be clinically unacceptable.

Based on the ΔE values obtained after 24 days, for all the groups (Control, Polish and Reglaze), the type of surface treatment influenced the color change. In the present study Control group showed the highest color change values after 24 days. Similar findings have been reported by Esquivel et al,^[12] who reported greater staining in unglazed specimens using methylene blue when compared to glazing by both visual and colorimetric evaluation. In addition, Motro et al^[10] has also reported an unacceptable color change in the readjusted specimen when immersed in a coffee solution. The type of surface treatment procedure also affects the stainability.^[1,13,14] Yilmaz et al^[13] reported that polished porcelain stained more than glazed porcelain in methylene blue.

One way ANOVA for the Green Tea group revealed that at a period of 12 days the Control had more colour change when compared to the groups with surface

treatment. At 18 and 24 days also the control group had greater change but the change was not statistically significant. Um and Rutyer et al^[30] studied the effect of tea on composites and reported that tea stains can easily be removed from the specimen. One way ANOVA for the Turmeric Group showed a significant difference between Control and the two Groups at 12 days. At 18 and 24 days, which corresponds to one and a half and two years respectively, only a difference between Control and Reglaze was reported. These findings revealed that polishing using Shofu was not effective in maintaining the color stability of the specimens. Reglazing which is a process by which a thin layer of glassy material is applied, will seal off the pore and prevent further color change.

Using $\Delta E > 2$ as the cut off value, Turmeric showed clinically unacceptable color change for the Polish and Control Group after 12 days. A poor correlation between the surface roughness and the colour change was found in the present study which was in contradiction to those reported by Motro.^[10] This could be attributed to the method in which the sample was made and the instrument that was used to measure the surface roughness. Fuzzi et al^[29] has reported that the surface profilometer gives a surface roughness value based on the stylus tracing a path over the specimen which is a linear measurement therefore making Ra value not accurate to predict characteristics like wear, resistance to abrasion as well as the absorption of the pigments. Even Tholt et al^[30] has theorized that some profilometer readings of the ceramic surface may be misleading and that the presence of voids on a ceramic surface makes measuring the surface roughness of this material very difficult contributes to deceptive results.

The clinical implications based on the findings of the present study is that reglazing is mandatory in order to make the ceramic inert to the absorption of staining agent as it seals all the open pores. As reglazing has limitations like the glaze layer being easily worn off, increased wear of enamel and an additional appointment, numerous ceramic polishing kits are commercially available which claim "glaze-like" finish. These agents (Shofu Kit) in accordance to the findings of the present study, is not sufficient to prevent color change of the specimens. Further research, to establish a polishing protocol that will achieve color stability of the restoration in addition to other advantages over reglazing is required.

CONCLUSION

Within the limitations of this study certain important conclusions were drawn:

1. Polishing gave more smooth surfaces than Reglazing
2. Turmeric is a strong staining agent that can alter the color of emax Press specimens over long clinical usage.
3. Reglazing is an appropriate surface treatment to protect the ceramic from absorbing stain.

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Source of Funding: Self

REFERENCES

1. Sarikaya I, Güler AU. Effects of different surface treatments on the color stability of various dental porcelains. *J Dent Sci* 2011;6:65-71
2. Rashid H. The effect of surface roughness on ceramics used in dentistry: A review of literature. *European journal of dentistry* 2014;8:571-9.
3. Uludag B, Usumez A, Sahin V, Eser K, Ercoban E. the effect of ceramic thickness and number of firings on the color of ceramic systems: A in vitro study. *J Prosthet Dent.* 2007;97:25-31.
4. Heydecke G, Zhang F, Razzoog ME. In vitro color stability of double-layer veneers after accelerated aging. *J Prosthet Dent.* 2001;85:551-7.
5. Heffernan MJ, Aquilino SA, Diaz-Arnold AM. Relative translucency of six all-ceramic systems. Part II: core and veneer materials. *J Prosthet Dent* 2002;88:10-5.
6. Cho MS, Lee Yk, Lim BS, Lim YJ. Changes in optical properties of enamel porcelain after repeated external staining. *J Prosthet Dent* 2006;95:437-43.
7. Dikicier S, Ayyildiz S, Ozen J, Sipahi C. Effect of varying core thicknesses and artificial aging on the color difference of different all-ceramic materials. *Acta Odontologica Scandinavica* 2014;72:623-629
8. Sarac D, Sarac YS, Yuzbasioglu E, Bal S. The effects of porcelain polishing systems on the color and surface texture of feldspathic porcelain. *J Prosthet Dent* 2006;96:122-8.
9. Wright MD, Masri R, Driscoll CF, Romberg E, Thompson GA, Runyan DA. Comparison of three systems for the polishing of an ultra-low fusing dental porcelain. *J Prosthet Dent* 2004;92:486-90.
10. Pelin F, Karagoz Motro, Pinar Kursoglu -Effects of different surface treatments on stainability of ceramics *J Prosthet Dent* 2012;108:231-7.
11. Owen S, Reaney D, Newsome P. Finishing and polishing porcelain surfaces chairside *Int Dent J Australasian Edition.* 2011;6:68-73.
12. Esquivel JF, Chai J, Woznaik WT. Color stability of low fusing porcelain for titanium. *Int J Prosthodont* 1995;8:479-85.
13. Yilmaz C, Korkmaz T, Demirkoprulu H, Ergun G, Ozkan Y. Color Stability of Glazed and Polished Dental Porcelains. *J Prosthodont* 2008;17:20-4.
14. Atay A, Oruç S, Ozen J, Sipahi C. Effect of accelerated aging on the color stability of feldspathic ceramic treated with various surface treatments. *Quintessence Int* 2008;39:603-9
15. Al-Wahadni, Martin DM .Glazing and finishing dental porcelain: A literature review. *J Can Dent Assoc.*1998;64:580-3
16. Martinez-Gomis, Bizar J, Angkada JM, Samso J, Perarie M. Comparative evaluation of four finishing systems on one ceramic surface. *Int J Prosthodont* 2003;16:74-77
17. Manjuran NG, Sreelal T. An in vitro study to identify a ceramic polishing protocol effecting smoothness superior to glazed surface. *J Indian Prosthodont Soc* 2014;14:219-27.
18. Oliveira MCS, Vieira AC, Miranda CB and Noya MS. The effect of polishing techniques on the surface roughness of a feldspathic porcelain. *Rev. odonto ciênc.* 2008;23:330-332
19. Akar GC, Pekkan G, Çal E, Eskitaşçıoğlu G, Özcan M. Effects of surface-finishing protocols on the roughness, color change, and translucency of different ceramic systems. *J Prosthet Dent* 2014;112:314-21.
20. Kursoglu P, Karagoz Motro PF, Kazazoglu E.

- Correlation of surface texture with the stainability of ceramics. *J Prosthet Dent* 2014;112:306-13.
21. Ergün G, Mutlu-Sagesen L, Ozkan Y, Demirel E. In vitro color stability of provisional crown and bridge restoration materials. *Dent Mater J* 2005;24:342-50.
 22. Gupta R, Parkash H, Shah N, Jain V. A spectrophotometric evaluation of color changes of various tooth colored veneering materials after exposure to commonly consumed beverages. *J Indian Prosthodont Soc* 2005;5:72-8.
 23. Sethi S, Kakade D, Jambhekar S, Jain V. An In-vitro investigation to compare the surface roughness of autoglazed, reglazed and chair side polished surfaces of Ivoclar and Vita Feldspathic porcelain. *J Indian Prosthodont Soc* 2013;13:478-485
 24. Sarikaya I, Güler AU. Effects of different polishing techniques on the surface roughness of dental porcelains. *J App Oral Sci* 2010;18:10-6.
 25. Wang F, Chen JH, Wang H. Surface roughness of a novel dental porcelain following different polishing procedures. *Int J Prosthodont* 2009;22:178-80
 26. Scurria MS, Powers JM. Surface roughness of two polished ceramic materials. *J Prosthet Dent* 1994;71:174-7.
 27. Wright MD, Masri R, Driscoll CF, Romberg E, Thompson GA, Runyan DA. Comparison of three systems for the polishing of an ultra-low fusing dental porcelain. *J Prosthet Dent* 2004;92:486-90.
 28. Um CM, Ruyter I. Staining of resin-based veneering materials with coffee and tea. *Quintessence international* 1991;22:377-386.
 29. Fuzzi M, Zaccheroni Z, Vallania G. Scanning electron microscopy and profilometer evaluation of glazed and polished dental porcelain. *Int J Prosthodont* 1996;9:452-8
 30. Tholt B, Miranda-Júnior WG, Prioli R, Thompson J, Oda M. Surface roughness in ceramics with different finishing techniques using atomic force microscope and profilometer *Operative dentistry* 2006;31:442-9.

Effect of Exposure Time of Eugenol Containing Temporary Cement on Tensile Bond Strength of Permanent Restorations Luted with Self-Adhesive Dual Cure Resin Cement- An *In Vitro* Study

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ABSTRACT

Purpose: To evaluate the effect of eugenol containing provisional luting agents on tensile bond strength and failure mode of self-adhesive resin cement system at different time intervals.

Materials and Method: Sixty freshly extracted premolars having standardized mesiodistal width of 3mm, buccolingual dimension of 6mm and height of 3mm were randomly divided into 4 experimental groups (n=15) according to the exposure time to eugenol; no exposure-CG, 24hour(h) exposure-1G, 7days-7G and 14days-14G. Provisional crowns (DPI –self cure Tooth molding Powder) were fabricated for all specimens except the control group(CG) , cemented using eugenol containing temporary cement (Kalzinol; DPI)and stored in a water bath for the allocated time period. Permanent crown were fabricated with Ni-Cr alloy (Wiroloy) and cemented with Self-Adhesive Resin Cement (RelyX U200) . Universal testing machine (2mm/min) was used to determine the tensile load testing. The mode of fracture was analyzed at a magnification of 10 X using stereomicroscope. The results were analyzed with 1-way ANOVA (a=.05) followed by a Tukey B post hoc test.

Results: Macrotensile bond strength for CG (5.61 Mpa ± 0.83) was significantly higher than 1G (3.03 Mpa±0.87) (p<.001).There was no significant difference between 7G (4.29 Mpa±0.69) and 14G (4.95 Mpa±0.75). The significant mode was adhesive failure for 1G (78.6%), other specimens demonstrated predominantly a mixed failure.

Conclusion: The tensile bond strength is significantly reduced if the permanent cementation is carried out within 24 h of provisional cementation of eugenol containing temporary cement.

Keywords: Bond strength, provisional, macrotensile

INTRODUCTION

Zinc Oxide Eugenol (ZOE) is perhaps the most widely used provisional luting cement on account of its sedative effect, low cost, ease of removal and seal against leakage.¹

The bonding mechanism of adhesive resin agents to dentine is generally based on tissue hybridisation, the morphology and the extent of demineralisation induced

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by the luting agent components and the depth of resin diffusion.²

Conventional resin cements require the application of a total-etch system or a self-etching primer. Self-adhesive resin cements is an alternative to conventional adhesive cementation. In order to achieve a self-adhesive reaction of this cement to the tooth structure, new methacrylate monomers with phosphoric acid groups are incorporated in the cement thereby eliminating separate steps such as etching and bonding.³⁻¹¹ Despite the nature of the adhesive agents, factors that might interfere with the bonding ability of adhesive systems to enamel or dentin include the adhesion strategy¹² conditioning time,¹³ solvent removal method,¹⁴ thickness of the adhesive layer,¹⁵ substrate structure¹⁶ and the provisional restorative material previously used.^{1,17}

Eugenol-containing provisional materials are not recommended to be placed as liners or bases under resin-based adhesive. Remnants of provisional cement will be incorporated into the hybridized complex, which may affect the bonding performance of this system.

The diffusion rate of eugenol released from ZOE is reported to peak after 1 day (about 0.3 nmol/min) and then decrease slowly to 0.08 nmol/min after 14 days¹⁸ thereby presumably not affecting the bond strength¹⁹

This in vitro study aims to evaluate the effect of exposure time of eugenol containing provisional cements on the macrotensile bond strength of self-adhesive resin cement to dentin.

MATERIAL AND METHOD

Material used in the study are presented in Table 1. The study was conducted following approval from the Institutional Ethics Committee (Ref No: MCODES/198/2012). Sixty non carious and anatomically sound maxillary first premolars extracted for periodontal or orthodontic reasons were collected after obtaining

informed consent All the teeth were prepared with a uniform circumferential reduction, to obtain mesio-distal width of 3mm, the bucco-lingual width of 6mm, and the height of 3mm. The occlusal surface was made perpendicular to the long axis of the tooth, using a wheel diamond bur. Thereafter, polyvinylsiloxane impressions (Aquasil; Dentsply, Gurgaon, India) of each specimen were made for the purpose of provisionalisation and fabrication of dies.

The specimens were randomly divided into four equal groups (n=15). Fifteen specimens served as controls (CG), Permanent copings were fabricated in the conventional manner with a circular occlusal extension as an attachment, placed vertically, on the flat occlusal surface. This extension helped to engage with the upper member of "Universal testing machine" (INSTRON Model 3366, UK), once cast into the metal. The final fit of each cast crown was verified on its corresponding die.

Provisional cement was mechanically removed with ultrasonic scaler for the concerned groupings until the dentin surface becomes visually free of the luting agent and the definitive restorations were sandblasted and cemented with self-etch adhesive luting agent (RelyX U200; 3M ESPE, Deutschland, GmbH, Germany) according to the manufacturer's instructions. The specimens were stored in distilled water at 37° C for 24 hours before subjecting them to the macro tensile test.

The tensile test was accomplished by the 'Universal testing machine', using 'Crown-pull test' at a cross head speed of 2.0 mm per minute, until failure. Thereafter, the mode of fracture between the tooth substrate, the resin cement and permanent crown was analyzed under stereo microscope with 10X magnification. All the analysis was performed using SPSS version 20. A p-value of <.05 was considered statistically significant. Categorical variables are compared using Chi-square test and tensile bond strength was compared using ANOVA with post-hoc Tukey test.

Table1: Manufacturer, composition and Lot number of material used

	Manufacturer	Composition	Lot No
Kalzinol	Dental Products of India The Bombay Burmah Trading Corporation Ltd, Mumbai India	Resin Bonded zinc oxide eugenol cement	9141

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Rely X™ U200	3M ESPE, Deutschland, GmbH, Germany	Base paste: glass powder treated with silane, 2-propenoic acid, 2-methyl 1,10-(1-[hydroxymetil]-1,2-ethanodlyl) ester dimethacrylate, triethylene glycol dimethacrylate (TEGDMA), silica treated silane, glass fiber, sodium persulfate and per-3,5,5-trimethyl hexanoate t-butyl; catalyst paste: glass powder treated with silane, substitute dimethacrylate, silica-treated silane, sodium p-toluenesulfonate, 1-benzyl-5-phenyl-acid barium, calcium, 1,12-dodecane dimethacrylate, calcium hydroxide, and titanium dioxide	601637
DPI-RR	Dental Products of India, The Bombay Burmah Trading Corporation Ltd, Mumbai India	Polymethylmethacrylate Powder and liquid monomer	172/RL09030
Wirrolloy	Bego, Bremen, Germany	Ni-67%, Cr -25% Mo -5% Si -1.8% , Mn, Nb , B-1%	12445

Table 2: One Way ANOVA for effects of eugenol at different time intervals on bond strength (MPa) of self-etch resin

	N	Mean	SD	F Value	Df2	P value
CG	11	5.6873	.89306	16.187	23.793	<.001
1G	14	3	.96077			
7G	13	4.2308	.72501			
14G	13	4.8462	.68874			
Total	51	4.3639	1.26915			

CG, Control Group; 1G,24h exposure to eugenol; 7G, 7 day exposure to eugenol; 14G, 14day exposure to eugenol; N, Number of specimen; SD, Standard Deviation; MS, Mean squares; df, Degrees of freedom, F: anova statistics.

Table 3: Post hoc Tukey test showing intergroup comparison of bond strength after exposure to eugenol containing provisional cements for 24h,7days and 14 days

Posthoc Tukey test comparison		MD	Std. Error	P Value
CG	1G	2.68727*	.33233	<.001
	7G	1.45650*	.33791	<.001
	14G	.84112	.33791	.075
1G	7G	-1.23077*	.31769	.002
	14G	-1.84615*	.31769	<.001
7G	14G	-.61538	.32352	.241

Table 4: Percentage of Failure mode

	CG	1G	7G	14G	Total
Adh	0 (0%)	11 (78.6%)	3 (23.1%)	1 (7.7%)	15 (29.4%)
CohR	1 (9.1%)	0 (0%)	0 (0%)	2 (15.4%)	3 (5.9%)
CohT	1 (9.1%)	0 (0%)	1 (7.7%)	1(7.7%)	3 (5.9%)
M	9 (81.8%)	3 (21.4%)	9 (69.2%)	9 (69.2%)	30 (58.8%)

Fishers exact value of 24.327 and p value of **<0.001**

Adh, Adhesive; CohR, Cohesive within the resin substrate; CohT, Cohesive within dentin substrate; M, Mixed

RESULTS

The mean macrotensile bond strength, and their respective standard deviation, and failure are presented in Table 2,3 and 4.

Results of the one way ANOVA test showed the mean bond strength (MPa) of CG (5.6873) is highest followed by 14G(4.8462), 7G(4.2308) and 1G(3) respectively. This difference is statistically significant ($p < .001$). Post hoc Tukey test shows that the difference between CG, 1G and 7G is statistically significant ($p < .001$). The difference between CG and 14G is statistically not significant ($p = .075$).

Fishers exact Chi-Square test (table III) depicts the significant mode was adhesive failure for specimens with 24h exposure to eugenol (1G) (78.6%) while all other specimens; CG (81.8%), 7G (69.2%), 14G (69.2%) demonstrated a predominantly mixed failure.

DISCUSSION

The findings demonstrated that the bond strength of the self-adhesive resin cement to dentine was affected by the exposure time to eugenol.

The bond strength of self-adhesive cements in the current study was significantly lower in all specimens with temporary cement contamination ($3 \pm .96077 - 4.8462 \pm .68874$) than in control specimens ($5.6873 \pm .89306$ MPa).

The findings of this study are in agreement with reports that showed the bond strength of adhesive resin to the dentine was affected by exposure to eugenol.^{1,18,21-24} However other studies have reported contradictory results.^{17,19,25-31}

Resarchers^{11,24} reported greater reduction in bond strength following eugenol exposure with self etch resins as compared to the two step etch and rinse systems. The demineralization pattern differs for etch and rinse adhesive resins as compared to self-etch resins. In etch and rinse adhesive resins 30-40% phosphoric acid is used to create demineralization and dissolution of minerals to a depth of 3-5 μ m, which allows micromechanical interlocking and/or entrapment of the resin with the

tissue substrate.³²⁻³⁵ In Self-adhesive cements the smear layer is not removed with acids prior to the application of self-etching adhesives and the depth of demineralization is minimal, it is likely that more remnants of provisional cement will be incorporated into the hybridized complex, which may affect the bonding.

The present study also reported statistically significant findings with least mean bond strength at 24h exposure, followed by 7G, 14G and CG. Eugenol is able to demineralize, penetrate and diffuse throughout the dentin^{18,19} with eugenol concentration higher at the surface dentin adjacent to zinc oxide eugenol cement and decreases toward the pulp. After release, its diffusion rate increases and reaches its peak within 24 h of contact with dentin, decreasing slowly after 14 days.^{18,19} It is also known that the polymerization of resin-based materials and adhesive systems is induced by chemical- or light-activated radicals. The hydroxyl group of eugenol tends to protonate these radicals and block this reactivity¹

S Erkut et al¹⁷ reported temporization influences shear bond strength to dentin. No significant difference between eugenol containing and eugenol free temporary cements were observed.

Yap et al²⁷ suggested that the powder liquid ratio (P:L) of the provisional cement lower than that recommended by the manufacturer affected the bond strength of the final cementation.

The significant mode was adhesive failure for specimens with 24h exposure to eugenol (1G) (78.6%) while all other specimens; CG (81.8%), 7G (69.2%), 14G (69.2%) demonstrated a predominantly mixed failure. Adhesive failures may be explained by the contamination of the dentine and diffusion of the eugenol. Mixed failures may be explained by the fact, that resin cements contain minimal amount of filler and hence the magnitude of polymerization shrinkage is quite high as compared to highly filled direct composite resin. The amount of curing stress generated in resin cement varies with degree of compliance (i.e. ability to relieve shrinkage strain).

CONCLUSION

The bond between self-adhesive resin cement and the dentin is significantly reduced if the permanent cementation is carried out within 24 h of application of eugenol containing temporary cement. The bond strength between self- adhesive resin cement and dentin can be regained to

a satisfactory level if the permanent cementation is done after 7 days of temporization with eugenol containing provisional cement. The significant mode was adhesive failure for 24h exposure to eugenol, other specimens demonstrated predominantly a mixed failure.

Conflict of Interest: Nil

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REFERENCES

1. Carvalho CN, de Oliveira Bauer JR, Loguercio AD, Reis A. Effect of ZOE temporary restoration on resin dentin bond strength using different adhesive strategies. *J Esthet Restor Dent* 2007;19:144-52.
2. Mitchell CA, Abbariki M, Orr JF. The influence of luting cement on the probabilities of survival rate and modes of failure of cast full-coverage crowns. *Dent Mater* 2000;16:198-206.
3. Peumans M, Van Meerbeek B, Lambrechts P, Vanherle G. Porcelain veneers: a review of the literature. *J Dent* 2000;28:163-77.
4. El Zohairy AA, DeGee JA, Mohsen MM, Feilzer JA. Effect of conditioning time of self-etching primers on dentin bond strength of three adhesive resin cements. *Dent Mater* 2005;21:83-93.
5. Aguiar TR, Andre CB, Correr-Sobrinho L, Arrais CA, Ambrosano GM, Giannini M. Effect of storage times and mechanical load cycling on dentin bond strength of conventional and self-adhesive resin luting cements. *J Prosthet Dent* 2014;111:404-10.
6. Peutzfeldt A, Sahafi A, Flury S. Bonding of restorative materials to dentin with various luting agents. *Oper Dent* 2011;36:266-73.
7. Suzuki TY, Godas AG, Guedes AP, Catelan A, Pavan S, Briso AL, et al. Microtensile bond strength of resin cements to caries-affected dentin. *J Prosthet Dent* 2013;110:47-55.
8. Yaman BC, Ozer F, Takeichi T, Karabucak B, Koray F, Blatz MB. Effect of thermomechanical aging on bond strength and interface morphology of glass fiber and zirconia posts bonded with a self-etch adhesive and a self-adhesive resin cement to natural teeth. *J Prosthet Dent* 2014;112:455-64.
9. Vrochari AD, Eliades G, Hellwig E, Wrbas KT. Curing efficiency of four self-etching, self-adhesive resin cements. *Dent Mater* 2009;25:1104-8.
10. Burgess JO, Ghuman T, Cakir D. Self-adhesive resin cements. *J Esthet Restor Dent* 2010;22:412-9.
11. De Angelis F, Minnoni A, Vitalone LM, Carluccio F, Vadini M, Paolantonio M, et al. Bond strength evaluation of three self-adhesive luting systems used for cementing composite and porcelain. *Oper Dent* 2011;36:626-34.
12. Duke ES. New technology directions in resin cements. *Compend Contin Educ Dent* 2003;24:606-8, 10.
13. Barcellos DC, Batista GR, Silva MA, Rangel PM, Torres CR, Fava M. Evaluation of bond strength of self-adhesive cements to dentin with or without application of adhesive systems. *J Adhes Dent* 2011;13:261-5.
14. Sauro S, Toledano M, Aguilera FS, Mannocci F, Pashley DH, Tay FR, et al. Resin-dentin bonds to EDTA-treated vs acid-etched dentin using ethanol wet-bonding. *Dent Mater* 2010; 26: 368-379.
15. Kimmes NS, Barkmeier WW, Erickson RL, Latta MA. Adhesive bond strengths to enamel and dentin using recommended and extended treatment times. *Oper Dent* 2010;35: 112-119.
16. Reis A, Klein-Júnior CA, de Souza FH, Stanislawczuk R, Loguercio AD. The use of warm air stream for solvent evaporation: Effects on the durability of resin-dentin bonds. *Oper Dent* 2010; 35:29-36.
17. de Silva AL, Lima DA, de Souza GM, dos Santos CT, Paulillo LA. Influence of additional adhesive application on the microtensile bond strength of adhesive systems. *Oper Dent* 2006; 31: 562-568.
18. Cavalcanti AN, Mitsui FH, Lima AF, Mathias P, Marchi GM. Evaluation of dentin hardness and bond strength at different walls of Class II preparations. *J Adhes Dent* 2010; 12: 183-188.
19. Erkut S, Kucukesmen HC, Eminkahyagil N, Imirzalioglu P, Karabulut E. Influence of previous provisional cementation on the bond strength between two definitive resin-based luting and dentin bonding agents and human dentin. *Oper Dent* 2007; 32: 84-93.

20. Silva JP, Queiroz DM, Azevedo LH, Leal LC, Rodrigues JL, Lima AF, et al. Effect of eugenol exposure time and post-removal delay on the bond strength of a self-etching adhesive to dentin. *Oper Dent* 2011;36:66-71.
21. Ganss C, Jung M. Effect of eugenol-containing temporary cements on bond strength of composite to dentin. *Oper Dent* 1998;23:55-62.
22. Nasreen F, Guptha ABS, Srinivasan R, Chandrappa MM, Bhandary S, Junjanna P. An in vitro evaluation of effect of eugenol exposure time on the shear bond strength of two-step and one-step self-etching adhesives to dentin. *J Conserv Dent* 2014; 17:280-4.
23. Paul SJ, Schärer P. Effect of provisional cements on the bond strength of various adhesive bonding systems on dentine. *J Oral Rehabil.* 1997; 24 :8-14.
24. al-Wazzan KA, al-Harbi AA, Hammad IA. The effect of eugenol-containing temporary cement on the bond strength of two resin composite core materials to dentin. *J Prosthodont* 1997; 6: 37-42.
25. Ribeiro JC, Coelho PG, Janal MN, Silva NR, Monteiro AJ, Fernandes CA. The influence of temporary cements on dental adhesive systems for luting cementation. *J Dent* 2011; 39: 255-262.
26. Fiori-Junior M, Matsumoto W, Silva RA, Porto-Neto ST, Silva JM. Effect of temporary cements on the shear bond strength of luting cements. *J Appl Oral Sci* 2010;18: 30-6.
27. Jung M, Ganss C, Senger S. Effect of eugenol-containing temporary cements on bond strength of composite to enamel. *Oper Dent* 1998; 23: 63-68.
28. Peutzfeldt A, Asmussen E. Influence of eugenol-containing temporary cement on efficacy of dentin-bonding systems. *Eur J Oral Sci* 1999; 107:65-9.
29. Yap AU, Shah KC, Loh ET, Sim SS, Tan CC. Influence of eugenol-containing temporary restorations on bond strength of composite to dentin. *Oper Dent* 2001;26:556-61.
30. Fonseca RB, Martins LR, Quagliatto PS, Soares CJ. Influence of provisional cements on ultimate bond strength of indirect composite restorations to dentin. *J Adhes Dent* 2005; 7: 225-230.
31. Leirskar J, Nordbø H. The effect of zinc oxide-eugenol on the shear bond strength of a commonly used bonding system. *Endod Dent Traumatol* 2000; 16: 265-268.
32. Latta MA, Kelsey WP, Murdock CM. Effects of adhesive liner and provisional cement on the bond strength of nickel/chrome/beryllium alloy cemented to dentin. *Quintessence Int* 2005;36:817-823.
33. Chaiyabutr Y, Kois JC. The effects of tooth preparation cleansing protocols on the bond strength of self-adhesive resin luting cement to contaminated dentin. *Oper Dent* 2008;33: 556-63.
34. Nakabayashi N. Resin reinforced dentine due to infiltration of monomers into dentine at the adhesive interface. *Dent Mater J* 1982;1:78-81.
35. Van Meerbeek B, Inokoshi S, Braem M, Lambrechts P, Vanherle G. Morphological aspects of the resin-dentin interdiffusion zone with different dentin adhesive systems. *J Dent Res* 1992;71:1530-40.

Culture and Health Behavior of Buton Society of Baubau City, Southeast Sulawesi

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ABSTRACT

Cultures form habits and responses to health and disease in society regardless of their level and background. Local beliefs arise in locality with different settings of life, traditions, customs and cultures. Similarly, the traditions of the Buton tribe in Baubau city are believed to be 'Dole-dole' as an effort to give immunity to infants and toddlers (under five years). This study aims to find the strengthening of public health promotion in dole-dole tradition as local wisdom in Buton City, Baubau. The method used is qualitative with ethnography approach, 12 informants consisting of 5 regular informants, 4 supporting informants and 3 key informants. Based on empirical and theoretical studies, the study found that Dole-dole is considered a traditional immunization that can prevent and cure disease in children. This tradition is backed by the belief since the ancestors by the ancestors of Buton people who have been doing dole-dole and give healing. It is believed and always carried on from generation to generation until now.

Keywords: *Dole-dole, Tradition, Health, Buton Tribe*

INTRODUCTION

A variety of ways that individuals do in a society as an effort to improve their health. One of them is to preserve the tradition that is considered as a positive thing to maintain health¹⁻³. The belief of the Butonese people to the Dole-dole tradition has traditionally assumed that a must is done because of the assumption that the child will be easily sick if not implement the tradition^{4,5}. Although most Buton people do not fully understand the meaning of the dole-dole tradition, there are concerns that it is not implemented and will be bad for the health of their children. Impact, all parents who have babies and toddlers constantly conserve the dole-dole tradition.

The dole-dole tradition is important and is considered a disease prevention for the Buton community⁶. This hereditary confidence may lead to a lack of coverage of maternal and child health services (KIA), particularly

immunization coverage in infants. Based on data from Baubau City Health Office, the coverage of complete basic immunization in 2015 was only 76% while the target to be achieved was 90%⁷. There is a belief that unhealed diseases such as skin diseases are more due to the lack of dole-dole tradition⁸.

MATERIALS AND METHOD

The research method was qualitative with ethnographic approach⁹. The informants were 12 people consisting of 5 regular informants ie the community who do dole-dole tradition, 2 religious leaders and 2 community leaders as key informants and 3 shamans (bisa') as supporting informants. Data collection techniques used observation, in-depth interviews and Focus Group Discussion (FGD) as well as object-related documentation.

The research instrument is the researcher himself equipped with a voice recorder, a camcorder to record activities or all events in the field such as the implementation of dole-dole traditions, photo cameras to document research activities, field notes to record all events during the study and interview guides for informants as well as observation sheets. In-depth

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interviews using interview guidance instruments have been created to explore information related to the health behavior of the Butonese community. Observation of participation was done to build rapport or good relationship between researchers with informant, this observation is helpful when taking data because it has been established proximity with informant so that data collected related dole-dole tradition more deeply and wide. In addition, study documents derived from the books of sociologist Buton and local government documentation related to dole-dole traditions helped in enriching the required information.

The validity of this research data using several types of triangulation, among others: triangulation of sources by confirming the answers between Buton community leaders, shamans (bisa') and communities that conserve doles. Technique triangulation was done to get the data suitability through in-depth interview, observation and documentation about dole-dole tradition. Time triangulation was done to confirm the answers of informants at different times as the distinctiveness of qualitative research that information extraction is done continuously to obtain data. In addition, extension of observation was also done because at the time of data analysis there is still less information, so the research continued to get the required information. Data that has been collected during the research and then analyzed thematically with the process of coding information according to a complex theme or indicator and then done an interpretation of the dole-dole tradition phenomenon

RESULTS

Buton Society's Belief in Dole-Dole Tradition: Related to dole-dole tradition, Buton people believe that tradition is an obligation let alone this tradition has been carried out from generation to generation. Buton people become dole-dole conservationists although they are hard to explain how the process of the tradition can heal. But the belief of the Butonese people will be ritualized in their internalized lives and become their understanding of the causes and treatment of illness. In the dole-dole tradition, there are two kinds of treatment based on the perceived cause, but more dominant is the personalistic-oriented illness or perceived illness. The same view by the Buton community on the illness is experienced when the child is already feeling (in Butonese language called Kaepeta) or a sign that his parents can recognize as itching, and scabies commonly experienced by a child if not yet dole-dole. His method of cure is believed to be

the practice of dole-dole.

The involvement of Shamans on the dole-dole ritual is believed to be a cure because the symptoms of the disease are felt by the individual so that his treatment is personalistic, that is through the ritual by offering the produce of the earth and the sea and the prayers of Shamans.

Based on research, Buton people do dole-dole tradition is intended to prevent the occurrence of things that are not desirable and treatment in case of health problems in children such as growth and developmental delays, weakness of the physical condition or the disease. The procession of dole-dole tradition as traditional immunization can be shown in Figure 1.



Figure 1: The procession of dole-dole tradition as traditional immunization

For treatment, there is actually no age limit as long as there is a request from the parent or family to do dole-dole. Generally dole-dole done at the age of five because according to the beliefs of Buton people at that age usually already show symptoms of pain like scabies so there must be dole-dole tradition. However, when the child has grown up and maturing and experiencing life problems, it is obligatory to carry out the dole-dole tradition.

According to the belief in the dole-dole tradition, the symptoms of the illness that appear and demonstrated by the child will be known by their parents so that the treatment is in accordance with the stages of healthy behavior that they believe. Although the people of Buton strongly believe in their traditions, they also take advantage of health facilities but tradition is the best-regarded option in handling health problems.

Healthy or sick behavior is a person's personal or autonomous attitudes towards him/her like trust, motives, values, perceptions and other cognitive elements that underlie the actions of the individual to maintain and

improve his health, including disease prevention, personal hygiene, and so on. Because healthy or sick behavior is a personal choice, the decision in promotive, preventive and curative efforts is entirely the decision of the individual concerned. Decisions based on this belief will be strengthened if supported by the surrounding environment such as the value of tradition held and support of people around and the availability of facilities to make the decision.

Buton Society Motivation in Implementing Dole-Dole Tradition: Motivation is the underlying reason for an act that a person does. Motivation as an internal or external condition causes a person to be motivated to achieve a certain goal. The motivation of Buton people in doing dole-dole tradition is of course based on a certain purpose that is to get better result in handling health problems experienced. Implementation of dole-dole in addition to preserving her ancestral heritage and the existence of health problems is also intended as a rejection of reinforcement and the binding of inner birth between children as adults while in the overseas to always remember his hometown.

As has been described previously, that the preservation of tradition to avoid the things that are not desirable, the fear of unlucky when not doing so unconsciously the community can be encouraged to participate in carrying out the tradition. The existence of the term 'koraeaka' or anything that happens because there is a reason, motivates the people of Buton to preserve the tradition so as not to fall on misfortune. Such a tradition is believed by the community, must be implemented and if not done will get a bad impact. This indicates that the behavior is triggered, and the occurrence is not spontaneous, and leads to a goal both exclusively and inclusively.

The concept of one group of people is different from the concept of other sick-healthy groups, so the response to the treatment is different. Although the process of behavior change has something in common for every individual but not everyone feels that health is a necessity until they are ill. When sick people will feel that health is a necessity. This is one of the triggers of the emergence of motivation. Each behavior must have a purpose means that behavior is generally motivated by a desire to achieve a certain goal. In the dole-dole tradition of various motives underlying the people of Buton why this tradition is preserved for generations. Motivation is a cultural preservation because they do not want to get bad things, both as a disease prevention and cure of disease.

Dole-dole Tradition in Health Aspects: The diversity of cultures possessed by the Indonesian people is instrumental in influencing the behavior of the community in preserving a culture. This of course raises variations in human behavior including behavior in both positive and negative aspects of health. In relation to the behavior of Butonese people in the dole-dole tradition, the implementation is intended as preventive and curative. Culture greatly affects health-related behaviors, many of which are unnoticed by a person that behaviors carried on long ago have an impact on health. As is the case in this study, the public perception of the cause of the disease especially for children affected by scabies and impaired growth is believed because dole-dole has not been implemented. This perception declined from generation to generation and became the belief of Buton people and did not dare to be broken.

The basis of disease determination in the Buton community is based on symptoms expressed by the child and identified by the parents so that a person can determine interventions for healing. It is related to the Butonese people's view that although medical treatment will not heal the illness if they do not carry out doles.

It is difficult to associate and explain the part of the material used so that the child healed. To achieve healing as expected, ritual should be performed. Ritual is a form of culture and is a subjective reality that must be believed.

DISCUSSION

Traditions should be preserved as long as local traditions do not have a negative impact on public health. Many traditions are still preserved but sometimes people are less aware of the tradition turns out to have an impact that is less supportive of public health status^{10,11}. In line with research conducted by Syahrin¹² on the traditional treatment of the Butonese people, the Buton Society's view of disease is a series of cultural processes.

In addition, the sick outlook for Butonese society can also be seen from the development dimension of Butonese culture, where the internalized perception in the personality system is a combination between; (1) a small tradition (the Butonese view before Hindu-Buddhist influence); (2) the great tradition of Butonese society after the influence of Islamic culture; (3) The influence of modern traditions. Modern traditions give a style to the Buton society's view of current diseases. The view of

sickness and disease in Buton society is still dominated by small traditions and great traditions. Their views on sickness and illness are caused by agents and healing and prevention by means of rituals (ceremonies)⁴.

Related to health behavior, healthy-sick on the implementation of the dole-dole tradition of Buton people can be said that the search for treatment exists that from traditional to medical and from medical to traditional. There are groups of people who regard the cause of the disease as personalistic or hold the concept of illness and there is also a medical from the traditional to the more dominant society hold the concept of naturalistic etiology (disease). But it can be ascertained that for those who practice dole-dole from generation to generation, the concept of illness and personalistic illness and healing remains at dole-dole rituals. This is corroborated based on information obtained during the study. In line with the opinion of Sudarma¹³, that human beings as multidimensional beings, potentially appear different health dimensions. Different perceptions may develop differences in healthy behavior of individuals, for those who are modern or rational have seen that modern medical services are the right choice in getting health care. For those who still perceive that sickness and illness are not only caused by physical factors (bacteria and viruses) alternative medicine is another option in obtaining health services outside of medical care.

CONCLUSION AND RECOMMENDATIONS

Although the Butonese people now live in the modern era, yet they agree to preserve the dole-dole tradition and pass on to their offspring. In the course of its execution, the dole-dole procession has undergone several modifications in its execution, but does not remove the sacredness and meaning of the tradition. The public belief in this tradition that dole-dole tradition has remained sustainable today.

Research on Strengthening Public health promotion in dole-dole tradition in Buton tribe is very important to be done so that Buton people always do promotive, preventive to maintain their health degree and entrust their health care problem to health service without leaving their tradition. It is expected that the public health instructor will always provide information that support towards the creation of healthy behavior of Buton people.

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REFERENCES

1. Notoatmodjo S. *Pendidikan dan Perilaku Kesehatan*. Jakarta: Rineka Cipta; 2003.
2. Notoatmodjo S. *Promosi Kesehatan, Teori dan Aplikasi*. Jakarta: Rineka Cipta; 2005.
3. Notoatmodjo S. *Promosi Kesehatan dan Ilmu Perilaku Vol Rineka Cipta*. Jakarta: 2007.
4. Abdul MLO. *Kebudayaan Buton*. Makassar: Bappeda Kota Baubau Bekerjasama dengan CV Optimal Nusa Engineering dan Penerbit Identitas UNHAS; 2015.
5. Abdul MLO, Tenri A. *Dinamika Tanah Wolio*. Makassar: Fahmis Pustaka; 2014.
6. Safitri SW. *Tradisi Dole-Dole sebagai Determinan Masalah Kesehatan Ibu dan Anak pada Masyarakat Buton Kota Baubau Provinsi Sulawesi Tenggara*. Skripsi, FKM UMI; 2016.
7. Dinkes Sultra. *Profile Kesehatan Sulawesi Tenggara Tahun 2015*. Kendari: Dinas Kesehatan Provinsi Sulawesi Tenggara; 2016.
8. Asrina A, Palutturi S. *Tradisi Dole-Dole Masyarakat Buton*. Makassar: Pena Indis; 2018.
9. Sugiyono. *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Bandung Alfabeta; 2011.
10. Prahastiwi. *Budaya Ceprotan Masyarakat Desa Sekar Kecamatan Donorojo Kabupaten Pacitan*. 2014.
11. Permatasari D. *Gambaran Perilaku Masyarakat Suku Jawa dalam Hal Pijat Bayi di Kelurahan Pinangsori Kabupaten Tapanuli Tengah*. 2012.
12. Syahrin. *Pengobatan Tradisional Orang Buton (Studi Tentang Pandangan Masyarakat Terhadap Penyakit di Kecamatan Betoambari Kota Bau-Bau Propinsi Sulawesi Tenggara)*. 2005.
13. Sudarma M. *Sosiologi Kesehatan*. Jakarta: Salemba Medika; 2009.

Quantity of Airborne Fungi in Resort Hotels, Thailand

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ABSTRACT

Background: The spreading of airborne fungi in an indoor building can lead to the respiratory tract infection (RTI). Resort hotels are found a high risk for airborne fungi contamination. The aim of this study was to evaluate the quantity of airborne fungi in resort hotels, Thailand.

Method: An analytical cross-sectional survey was conducted with a total of 1,008 samples in 6 resort hotels in Loei province, Thailand between March, 2017 and February, 2018. The samples were collected by using Bio stage Impactor.

Results: Most frequent airborne fungi found were yeast (80.44%), *Aspergillus spp.* (17.14%), and *Penicillium spp.* (1.42%), respectively. The airborne fungi mean of indoor (I) and outdoor (O) were 15.51 ± 16.17 cfu/m³ (range 1.01 – 184.38 cfu/m³) and 78.06 ± 35.24 cfu/m³ (range 2.03 – 629.80 cfu/m³), respectively. The I/O ratio was 0.33. Additionally, rainy season more likely increase the mean quantity of indoor airborne fungi (7.79 cfu/m³ and 5.12 cfu/m³) than summer and winter (95%CI: 6.07 to 9.52, 95%CI: 2.39 to 7.85, $p < 0.001$).

Conclusions: This study posts the significance for the planning of surveillance, policy makers and public health concern.

Keywords: airborne fungi; resort hotel

INTRODUCTION

A contamination of many pollutants in buildings (i.e. CO₂, dust, humidity, and microorganism) causes sick building syndrome (SBS) among the residents.¹⁻³ Most of airborne fungi (i.e. *Cladosporium spp.*, *Aspergillus spp.*, *Penicillium spp.*, *Alternaria spp.*, and yeast) are opportunistic organism which can affect to immunocompromised host including respiratory tract system of human and can cause allergy, chronic infection, rhinitis, asthma and aspergillosis.⁴⁻¹⁷

The allergy caused by the airborne fungi was widespread, especially immunodeficiency patients and children.^{15 16 18-24} Previously, the quantity of airborne fungi was reported in many countries. In the United States it was found that airborne fungi in indoor and outdoor of buildings of single family were found 88 and 102 cfu/m³.²⁵ In UK, the quantity of airborne fungi indoor and outdoor residences in winter and summer was 8,946 (4,372-18,306) cfu/m³, and 4,381(1,605-11,956) cfu/m³, respectively.²⁶ In Taiwan, airborne fungi indoor in the hotel were 197 – 753 cfu/m³.²⁷ In Thailand, the quantity of airborne fungi indoor, especially in the four or five star hotels was found over the standard recommended by Bureau of Environmental Health (2015).²⁸

However, there were a few reports regarding airborne fungi in resort hotel in Thailand. The aim of this study was to study investigate the quantity of airborne fungi in resort hotels. This could be encouraged for the policy makers, surveillance, and important for the environmental improvement guidebook for the resort hotel.

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MATERIALS AND METHOD

An analytical cross-sectional survey was conducted in the resort hotels in Loei province located in the Northeastern of Thailand between March 2017 and February 2018. Loei was reported being one of the provinces in “The 12 cities hidden gems Thailand” policy. The resort hotels were randomized by stratified sampling method from 3 districts: (1) Chiang Khan, (2) Mueang Loei, and (3) Phu Ruea that had many tourists visit. The totals of six resort hotels: two resort hotels in Mueang district represented the plain area, two resort hotels in Phu Ruea district represented mountain area and two resort hotels in Chiang Khan district represented area nearby water resources were included in this study.²⁹ The samples were collected in two rooms per hotel and each room was collected 3 points in duplicates at each point with the total of 1,008 samples with 864 samples of indoor and 144 samples of outdoor.³⁰

The airborne fungi were collected by Bio Stage Impactor (Thermo Electron, Corp.). Sabouraud Dextrose Agar (BBL Becton Dickinson, USA) was used with flow rates at 28.3 L/min for 5 minutes at 1 meter height from the ground.^{31 32} All plates were incubated at 35-37°C for 48 hours as recommended by the American Society for Microbiology and Bailey & Scott’s Diagnostic Microbiology. Then, the airborne fungi was counted colonies on agar, calculated, and reported in counted colony forming unit per cubic meter (cfu/m³). Airborne fungi were identified by performing slide culture. During each run, the instruments were cleaned with 70% ethyl alcohol to prevent any contamination.³³ Temperature and humidity were measured for both indoor and outdoor by Hygrotherm Thermo-/Hygrometer (Digicon TH-02). Wind speed indoor and outdoor was also measured by hot wire anemometer (Testo-425). Air change rate (ACH) was collected with the total of 144 samples (6 hotels, two rooms per hotel and once a month for 12 months) using a tracer gas technique (SF₆) by MIRAN SapphIRe

portable ambient air analyzer (Thermo Electron Corp., Model 205B). All samples were collected at the same time as all points.

RESULT

Most frequent airborne fungi indoor found was yeast (80.44%), *Aspergillus* spp. (17.14%), *Penicillium* spp. (1.42%), *Fusarium* spp. (0.56%), *Rhizopus* spp. (0.41%), and *Curvularia* spp. (0.03), respectively.

The mean quantity of airborne fungi was 15.51 ± 13.44 cfu/m³ (range 1.01–184.38 cfu/m³) and the hotel “F” was found the highest of airborne mean quantity 23.62 ± 31.65 cfu/m³ (range 1.01 – 184.38 cfu/m³). The quantity of airborne fungi outdoor mean was 49.86 ± 49.57 cfu/m³ (range 2.03 – 629.80 cfu/m³). The portion of airborne fungi in indoor and outdoor (I/O) was found at 0.31 ± 0.17 (Table-1). The baseline of the characteristic in resort hotel: temperature, relative humidity (RH), wind speed, and air change rate are shown in Table-2.

Table 1: The mean quantity of indoor and outdoor airborne fungi and the ratio of total indoor per total outdoor airborne fungi in resort hotels

Hotel	Mean ± SD		I/O ratio
	Indoor (cfu/m ³)	Outdoor (cfu/m ³)	
A	13.25 ± 10.24	35.48 ± 23.06	0.37
B	14.26 ± 9.18	44.48 ± 24.04	0.32
C	16.50 ± 11.11	39.78 ± 32.00	0.41
D	12.90 ± 10.30	41.47 ± 19.56	0.31
E	12.55 ± 8.16	38.62 ± 23.54	0.32
F	23.62 ± 31.65	99.32 ± 175.22	0.23
Mean	15.51 ± 13.44	49.86 ± 49.57	0.31 (0.17)

Table 2: Baseline of characteristic in resort hotel (n = 1,008)

Factors	Indoor (n = 864)		Outdoor (n = 144)	
	n (%)	Mean ± SD (Range)	n(%)	Mean ± SD (Range)
Temperature (°C)				
< 24	272 (31.48)	24.33 ± 1.81 (20.00-27.80)	46 (31.94)	25.81 ± 4.17 (14.70-33.50)
24-26	498 (57.64)		4 (2.78)	
> 26	94 (10.88)		94 (65.28)	

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Relative humidity (%)				
< 50	36 (4.17)	63.85 ± 8.28 (41.00-84.00)	4 (2.78)	68.45 ± 8.42 (40.00-85.00)
50-65	477 (55.21)		46 (31.94)	
> 65	351 (40.62)		94 (65.28)	
Wind speed (m/s)				
< 0.10	107 (12.38)	0.16 ± 0.05 (0.05-0.39)	0 (0.00)	0.44 ± 0.17 (0.17-1.23)
0.10 – 0.30	751 (86.92)		28 (19.44)	
> 0.30	6 (0.70)		116 (80.56)	
Air change rate (ACH) (n = 144)				
2	22 (15.28)	2.05 ± 0.15		
(1.65-2.30)	-	-		
≥ 2	122 (84.72)		-	

Remark: The temperature of indoor (24-26 °C), relative humidity of indoor (50-65 %RH), wind speeds of indoor (0.10 – 0.30 m/s), and air change rate (≥ 2 ACH) were followed the recommendation of Bureau of Environmental Health (2015).

The rainy season more likely increase the mean quantity of indoor airborne fungi than summer (7.79 cfu/m³, 95% CI: 4.98 to 10.60, p < 0.001) and winter (5.12 cfu/m³, 95%CI: 2.39 to 7.85, p < 0.001) (Table 3).

Table 3: Mean difference of quantitative airborne fungi between each category of season based on simple linear regression analysis

Season	n	Mean (SD)	Mean difference (cfu/m ³)	95% CI	p-value
Summer	216	11.80 (9.05)	0	6.07 to 9.52	< 0.001
Rainy	288	19.60 (10.25)	7.79		
Summer	216	11.80 (9.05)	0	- 0.38 to 5.72	0.086
Winter	360	14.47 (21.74)	2.67		
Rainy	288	19.60 (10.25)	0	- 7.85 to -2.39	< 0.001
Winter	360	14.47 (21.74)	- 5.12		

DISCUSSION

The most frequent airborne fungi in resort hotels, Thailand found were yeast, *Aspergillus spp.* and *Penicillium spp.* This result show similarly with the previous studies that most of airborne fungi found in USA, Australia, and China were *Cladosporium spp.*, *Penicillium spp.*, and *Aspergillus spp.*, respectively.^{19 26 34 35} In Taiwan, most of airborne fungi found were *Cladosporium spp.*, *Aspergillus spp.*, and *Penicillium spp.*⁸

The quantity of airborne fungi indoor in this study were not over 500 cfu/m³ and I/O 0.8 following the recommended by Bureau of Environmental Health (2015), which was similar to previous studies.^{27 36 37} In Thailand, 1.67% of four stars and five stars hotel

had the quantity of airborne fungi indoor were over recommended.^{28 38}This results similar to previous study. For examples, Taiwan was reported the quantity of fungi in winter 4,372–18,306 cfu/m³ higher than summer season 1,605–11,956 cfu/m³, which the average temperature in winter and summer were 20.70 °C and 30.20 °C, respectively as well as RH in winter and summer average were 69.3% and 70.6%, respectively.²⁶ In China, during spring and winter season the airborne fungi in residences were found the highest.³⁹ The temperature and humidity outdoor were associated with the seasons influenced to quantity of airborne fungi in resort hotels. However, the temperature and humidity indoor were not associated with quantity of airborne fungi in resort hotels. These factors were controlled by air condition, so the airborne

fungi could not growth at 25 °C and 50-65% RH, which similar to previous studies. Frankel et al. reported that seasons, temperature, RH, and ACH were related with the quantity of airborne fungi indoor of the residents.⁴⁰ However, summer season had the highest quantity of fungi 235 cfu/m³ (Range 42–1,781cfu/m³) than other seasons because temperature (22.4 °C) and RH (62%) in summer was suitable for fungi growth. In contrast, temperature (0.75 °C) and RH (97%) in winter that was not suitable for fungal growth.⁴⁰ Additionally, ACH in hotel and general houses were statistically significant related with the quantity of airborne fungi (r = 0.39, p value < 0.001 and r = 0.31, p value < 0.001).⁴⁰

CONCLUSION

The results of this study reveal the significant in public health concerns for surveillance planning, cleaning schedule and ventilation system management and can be suggested and encouraged the policy makers and an environmental improvement guidebook for the resort hotel.

Ethical Clearance: This study was an exception for the ethical review according to the fact that this was not a research involving human subjects.

Conflict of Interests: This study has no conflicts of interest.

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REFERENCES

1. Mentese S, Tasdibi D. Airborne bacteria levels in indoor urban environments: The influence of season and prevalence of sick building syndrome (SBS). *Indoor and Built Environmental* 2014;15(3):563-80.
2. Mirhoseini SH, Nikaeen M, Satoh K, et al. Assessment of Airborne Particles in Indoor Environments: Applicability of Particle Counting for Prediction of Bioaerosol Concentrations. *Aerosol and Air Quality Research* 2016;16(8):1903-10. doi: 10.4209/aaqr.2015.08.0528
3. Balasubramanian R, Nainar P, Rajasekar A. Airborne bacteria, fungi, and endotoxin levels in residential microenvironments: a case study.

- Aerobiologia* 2011;28(3):375-90. doi: 10.1007/s10453-011-9242-y
4. Lee JH, Jo WK. Characteristics of indoor and outdoor bioaerosols at Korean high-rise apartment buildings. *Environ Res* 2006;101(1):11-7. doi: 10.1016/j.envres.2005.08.009
 5. Liu Z, Li A, Hu Z, et al. Study on the potential relationships between indoor culturable fungi, particle load and children respiratory health in Xi'an, China. *Building and Environment* 2014;80:105-14. doi: 10.1016/j.buildenv.2014.05.029
 6. Nevalainen A, Taubel M, Hyvarinen A. Indoor fungi: companions and contaminants. *Indoor Air* 2015;25(2):125-56. doi: 10.1111/ina.12182
 7. Sribenjalux P. General Microbiology. Khon Khaen: Khon Khaen University 2000.
 8. Su HJ, Wu PC, Chen HL, et al. Exposure assessment of indoor allergens, endotoxin, and airborne fungi for homes in southern Taiwan. *Environ Res* 2001;85(2):135-44. doi: 10.1006/enrs.2000.4113
 9. Awad AH, Gibbs SG, Tarwater PM, et al. Coarse and fine culturable fungal air concentrations in urban and rural homes in Egypt. *Int J Environ Res Public Health* 2013;10(3):936-49. doi: 10.3390/ijerph10030936
 10. Cakmak S, Dales RE, Burnett RT, et al. Effect of airborne allergens on emergency visits by children for conjunctivitis and rhinitis. *The Lancet* 2002;359(9310):947-48. doi: 10.1016/s0140-6736(02)08045-5
 11. Horner WE, Helbling A, Salvaggio JE, et al. Fungal allergens. *Clin Microbiol Rev* 1995;8(2):161-79.
 12. Huang C, Liu W, Hu Y, et al. Updated prevalences of asthma, allergy, and airway symptoms, and a systematic review of trends over time for childhood asthma in Shanghai, China. *PLoS One* 2015;10(4):e0121577. doi: 10.1371/journal.pone.0121577
 13. Joao PSC. Can we use indoor fungi as bioindicators of indoor air quality, Historical perspectives and open questions. *Science of The Total Environment* 2010;408(2010):4285-95.

14. Jovanovic S, Felder-Kennel A, Gabrio T, et al. Indoor fungi levels in homes of children with and without allergy history. *Int J Hyg Environ Health* 2004;207(4):369-78. doi: 10.1078/1438-4639-00302
15. O'Connor G T, Walter M, Mitchell H, et al. Airborne fungi in the homes of children with asthma in low-income urban communities: The Inner-City Asthma Study. *J Allergy Clin Immunol* 2004;114(3):599-606. doi: 10.1016/j.jaci.2004.05.064
16. Stark PC, Celedón JC, Chew GL, et al. Fungal Levels in the Home and Allergic Rhinitis by 5 Years of Age. *Environmental Health Perspectives* 2005;113(10):1405-09. doi: 10.1289/ehp.7844
17. Tsao Y-C, Hwang Y-H. Impact of a water-damaged indoor environment on kindergarten student absences due to upper respiratory infection. *Building and Environment* 2013;64:1-6. doi: 10.1016/j.buildenv.2013.02.002
18. Agarwal S, Mandal P, Majumdar D, et al. Characterization of Bioaerosols and their Relation with OC, EC and Carbonyl VOCs at a Busy Roadside Restaurants-Cluster in New Delhi. *Aerosol and Air Quality Research* 2017;16(12):3198-211. doi: 10.4209/aaqr.2016.01.0043
19. Garrett MH, Rayment PR, Hooper MA, et al. Indoor airborne fungal spores, house dampness and associations with environmental factors and respiratory health in children. *Clin Exp Allergy* 1998;28(4):459-67.
20. Hsu Y-C, Kung P-Y, Wu T-N, et al. Characterization of Indoor-Air Bioaerosols in Southern Taiwan. *Aerosol and Air Quality Research* 2012;12:651-61. doi: 10.4209/aaqr.2012.03.0070
21. Rosenbaum PF, Crawford JA, Anagnost SE, et al. Indoor airborne fungi and wheeze in the first year of life among a cohort of infants at risk for asthma. *J Expo Sci Environ Epidemiol* 2010;20(6):503-15. doi: 10.1038/jes.2009.27
22. Liu G, Xiao M, Zhang X, et al. A review of air filtration technologies for sustainable and healthy building ventilation. *Sustainable Cities and Society* 2017;32:375-96. doi: 10.1016/j.scs.2017.04.011
23. Mentese S, Arisoy M, Rad AY, et al. Bacteria and Fungi Levels in Various Indoor and Outdoor Environments in Ankara, Turkey. *CLEAN - Soil, Air, Water* 2009;37(6):487-93. doi: 10.1002/clen.200800220
24. Zock J-P, Jarvis D, Luczynska C, et al. Housing characteristics, reported mold exposure, and asthma in the European Community Respiratory Health Survey. *Journal of Allergy and Clinical Immunology* 2002;110(2):285-92. doi: 10.1067/mai.2002.126383
25. Taekhee L, Grinshpuna SA, Dainius M, et al. Culturability and concentration of indoor and outdoor airborne fungi in six single-family homes. *Atmos Environ* 2006;40(16):2902-10.
26. Pei-Chih W, Huey-Jen S, Konuk M. Characteristics of indoor and outdoor airborne fungi at suburban and urban homes in two seasons. *The Science of the Total Environment* 2000;253:111-18.
27. Kuo NW, Chiang HC, Chiang CM. Development and application of an integrated indoor air quality audit to an international hotel building in Taiwan. *Environ Monit Assess* 2008;147(1-3):139-47. doi: 10.1007/s10661-007-0105-5
28. Chokewinyoo P, Pensuk C, Paveenkittiporn W. Indoor air quality in hospitals and hotels, Thailand. *Environmental health journal* 2014;16(2):51-68.
29. McDemott HJ. Handbook of ventilation for contamination control. Ohio: American conference of governmental industrial hygienists 2001.
30. Chotigawin R. Air sampling and analysis. Chon Buri: Department of environmental health, Faculty of Public Health, Burapha University 2016.
31. Hata M. Performance Evaluation of an Andersen Cascade Impactor with an Additional Stage for Nanoparticle Sampling. *Aerosol and Air Quality Research* 2012;12: 1041:1041-48. doi: 10.4209/aaqr.2012.08.0204
32. Jones W, Moring K, Morey P, et al. Evaluation of the Andersen viable impactor for single stage sampling. *American Industrial Hygiene Association Journal* 1985;46(5):294-98.
33. Chuaybamroong P, Choomseer P, Sribenjalux P. Comparison between hospital single air unit

- and central air unit for ventilation performances and airborne microbes. *Aerosol and Air Quality Research* 2008;8(1):28-36.
34. Crawford JA, Rosenbaum PF, Anagnost SE, et al. Indicators of airborne fungal concentrations in urban homes: understanding the conditions that affect indoor fungal exposures. *Sci Total Environ* 2015;517:113-24. doi: 10.1016/j.scitotenv.2015.02.060
35. Ren P, Jankun TM, Belanger K, et al. The relation between fungal propagules in indoor air and home characteristics. *Allergy* 2001;56(5):419-24. doi: DOI 10.1034/j.1398-9995.2001.056005419.x
36. Su J, Chiang M. Guidelines for Good Indoor Air Quality in Office Building in Taiwan. Taiwan: R.O.C. : Environmental Protection Administration 2004.
37. Asadi E, Costa JJ, Gameiro da Silva M. Indoor air quality audit implementation in a hotel building in Portugal. *Building and Environment* 2011;46(8):1617-23. doi: 10.1016/j.buildenv.2011.01.027
38. Bureau of Environmental Health, Health MoP. Environmental Health Guidelines. Nonthaburi: Department of Health, Ministry of Public Health 2015.
39. Wang X, Liu W, Huang C, et al. Associations of dwelling characteristics, home dampness, and lifestyle behaviors with indoor airborne culturable fungi: On-site inspection in 454 Shanghai residences. *Building and Environment* 2016;102:159-66. doi: 10.1016/j.buildenv.2016.03.010
40. Frankel M, Beko G, Timm M, et al. Seasonal variations of indoor microbial exposures and their relation to temperature, relative humidity, and air exchange rate. *Appl Environ Microbiol* 2012;78(23):8289-97. doi: 10.1128/AEM.02069-12

Identification of Serovar Leptospirosis in Flood-prone Areas Wajo District

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ABSTRACT

Floods occur every year in Wajo District and inundate flood prone areas for 2 months. However, there is no information related to the type of Leptospirosis' serovar that infects people in the flood-prone areas of Wajo District. The purpose of this study was to identify the type of serovar leptospirosis found in flood-prone areas of Wajo District.

The population in this study is the whole community and the flood-prone environment in Sabbangparu and Tempe sub-districts. The calculation of this sample is done by Lameshow formula with the sample in this study as many as 273 people and chosen by proportional random sampling. The serum samples taken were examined using the enzyme-linked immunosorbent assay (ELISA) method in the microbiology laboratory of Animal Prevention and Illness (P2B2) - Banjarnegara subsequently serovar type examined from 11 positive sera from Elisa examination with titer is examined with a Microscopic Agglutination Test (MAT) at the Center for Vector and Reservoir Disease Research and Development (B2P2VRP) Salatiga, Central Java Province.

The results of this study indicated that the serovar and host types found in the serum titers of the community in flood-prone areas in Wajo are Serovar *Bangkinang (Ban)*, *Grippotyphosa (Gri)*, *Canicola (Can)*, *Robinsoni (Rob)*, *Bataviae (Bat)*, *Mini (Min)*. Type of serovar is usually found in dogs, mice and cows. Therefore, it is recommended to the community in flood prone areas to increase efforts to prevent Leptospirosis incidence by reduce contact with animals that host the disease.

Keywords: Serovar, Leptospirosis, Flood-prone areas, Wajo District.

INTRODUCTION

Leptospirosis is a zoonotic disease that infects humans by direct contact with the urine of an infected animal or with a contaminated urine environment. Occurs in vulnerable populations such as rural farmers and urban slum dwellers, especially in countries with subtropical or tropical humid climates and potentially epidemic. Bacteria enter the body through cuts or abrasions on the skin, or through the mucous membranes of the mouth, nose and eyes. Human-to-human transmission is rare. In the early stages of this disease cause symptoms including high fever, severe headache, muscle aches, chills, redness of the eyes, abdominal pain, jaundice, skin bleeding and mucous membranes, vomiting, diarrhea, and rash.^{1,2}

Leptospirosis causes health problems in Indonesia. In 2001, 139 human serum samples tested 18.7% were

positive. The results of these tests indicate an infection of the Batavian serovar. In the event of floods in Indonesia in January 2002, the outbreak of Leptospirosis occurred, especially in Jakarta. In this incident, 12.0% of 418 seropositive samples of Bataviae or Hardjo serovars. Leptospira has ± 175 serovar, some even say Leptospira has more than 200 serovar. Infection can be caused by one or more serovar at once. When the infection occurs, then the body of the patient within 6-12 days will form an immune substance agglutination. Leptospirosis in dogs is caused by the infection of one or more serovar from Leptospira interrogans such as *L. australis*, *L. autumnalis*, *L. ballum*, *L. batislava*, *L. canicola*, *L. grippotyphosa*, *L. hardjo*, *L. ichterohemorrhagica*, *L. pomona*, and *L. tarassovi*. Serovar that can attack cows are *L. pomona* and *L. gryptosa*. Serovars known to be present in cats are *L. batislava*, *L. canicola*, *L. grippotyphosa*, and *L. Pomona* whereas mice can be attacked by *L. ballum*

and *L. ichterohaemorrhagicae*. There has been a national increase in the number of human cases reported since 2006. Of the 667 human cases reported in 2007, 93% were cases with laboratory confirmation. The mortality rate is 8%. In the first quarter of 2008, 269 cases have been detected Leptospirosis.³

Leptospirosis commonly affects farmers, plantation workers, miners/ sewers, slaughterhouse workers and the military.⁴ The environmental conditions of the settlements in the form of unhealthy homes and the presence of rats around the environment are statistically related to the incidence of leptospirosis. The existence of mice became the most influential factor on the transmission of this disease.⁵ Leptospirosis occurs incidentally and is generally transmitted through rat urine in the event of a flood. Leptospirosis manifestations of self-limited, mild to severe symptoms and even death if late to receive treatment.⁶

MATERIAL AND METHOD

The type of research conducted was observation with descriptive approach. The aim was to obtain information related to serovar leptospirosis in flood-prone areas in Tempe Sub-district, Wajo District, South Sulawesi. The research was conducted in several flood-prone areas that were chosen because they are considered to represent and are the main areas that always flood every year with a duration of 3-5 months of floods.

The population in this study was the whole community and the flood-prone environment in Sabbangparu and Tempe sub-districts, Wajo District. The calculation of this sample is done with the formula Lemeshow and Lwanga⁷ with the total sample in this study as many as 273 people and selected by *proportional random sampling*.

Data obtained by taking the serum to the community. Biomedical data in the form of blood serum samples taken on household members were examined by Enzyme-linked immunosorbent assay (ELISA) method in microbiology laboratory of Animal Disease Prevention and Illness (P2B2), Ministry of Health RI - Banjarnegara, and then examined serovar type examined from 11 positive sera from Elisa examination with highest titer were examined by Microscopic Agglutination Test (MAT) at Indonesian Veterinary Disease Research and Development Center (B2P2VRP) Ministry of Health Salatiga, Central Java Province.

MAT has been widely used as a reference test for detecting antibodies. The principle of the MAT test is that the patient's serum is reacted with the suspension of live serovar Leptospira antigen. After incubation, the antigen-serum mixture was observed with a microscope to look for agglutination, then the antibody titers were determined based on the last dilution that still showed agglutination.⁸ Antigen used is all types of serovar Leptospira are still alive. Antibodies to the infecting serovar will arise in the body of leptospirosis patients. In addition, antibodies are often found that react with other serovar, especially in the early stages.⁹

RESULT

The respondent in this research was 273 people. The characteristics of the respondent are in table 1.

Table 1: Socio-demography Distribution of the respondents in flood prone area of Wajo District

Variable	N	%
Sex		
Male	120	44,0
Female	153	56,0
Age (years)		
12-16	2	0,7
17-25	24	8,8
26-35	58	21,2
36-45	90	33,0
46-55	44	16,1
56-65	34	12,5
>65	21	7,7
Occupation		
Not working	28	10,3
School	2	0,7
Household mother	92	33,7
PNS/TNI/POLRI	7	2,6
BUMN officer	2	0,7
Private employers	9	3,3
Traders	61	22,3
Farmer	47	17,2
Fisherman	25	9,2
Total	273	100.0

The result of the analysis in Table 1 shows that female respondents are more than male respondents that

is 153 respondents (56%). Respondents were more 36-45 years old as many as 90 respondents (33.0%) and at least 12 years old as many as 2 respondents (0.7%). Housewives were the most respondents' occupations by 33.7%. Therefore, the highest education level of the respondents is primary school graduation/equal to 50.5% and the education level of the respondents is the least is never school and graduated from university, that is 5.9%.

All serum samples obtained were examined on the ELISA test, then obtained 11 serum with the highest titer for further examination of serovar type contained in the serum. The result of B2P2VRP Bacteriology Laboratory examination on 11 serum with MAT method. In fact, it obtained 4 agglutination result as in Table 2.

Table 2: Distribution of Serovar *Leptospira* in Wajo District

Sample Code	Ban	Gri	Can	Rob	Bat	Min
280	40	80	-	-	-	20
286	-	-	-	20	40	20
292	-	-	-	-	-	20
336	-	-	80	-	-	-

Note:

1. All samples are agglutinated with titers <320
2. Serovar used as many as 15 types and what happened agglutination is Serovar Bangkinang (Ban), Grippotyphosa (Gri), Canicola (Can), Robinsoni (Rob), Bataviae (Bat), Mini (Min).

Table 2 shows 11 samples examined, there were 4 samples of agglutination with titer <320 whereas 7 samples were not agglutinated. The code sample 280 shows agglutination with a 1:40 titer on *serovar Bangkinang* of Serogroup *Autumnalis*, 1:80 on *Grippotyphosa serovar* of *Grippotyphosa* serogroup and 1:20 titer on *Mini serovar* of Serogroup *Mini*.

The code sample 286 shows agglutination with a 1:20 titer on the *Robinsoni serovar* of Serogroup *Pyrogenesis* and *Mini serovar* of Serogroup *Mini* and shows agglutination with a 1:40 titer on *Batavian serovars* of Serogroup *Bataviae*. The code sample 292 shows agglutination with a 1:20 titer on the *Mini serovar* of Serogroup *Mini*. Sample code 336 with 1:80 titer on *Canicola serovar* from Serogroup *Canicola*.

DISCUSSION

Leptospirosis is classified as a “neglected tropical disease”. This disease is caused by pathogenic bacteria spirochete of the genus *Leptospira*. Many species of mammals can carry these bacteria in their bodies without contracting Leptospirosis.¹⁰ Leptospirosis is a disease with the complexity of associated ecological factors, including bacteria, animal reservoirs, humans and the surrounding nature. Pathogenically, leptospirosis is transmitted to humans by direct or indirect contact with infected urine, blood or body tissue from the urine in which the animal carries and the water, soil and food contaminated with urine.

Leptospirosis continues to be a major public health challenge in many countries. There is still much unknown about this disease. There is a need to raise awareness among physicians about this infection because there are still many unknown conditions. Improved laboratory tests should be developed to make infection confirmation faster and easier. There is also an effective vaccine requirement for humans.¹¹ Increased alertness to Leptospirosis disease is done with Early Precaution (SKD) system with surveillance activities in humans, particularly in areas with risk factors with priority in flooded areas and farming / plantation areas of many rat populations. In addition, it also conducts active surveillance of early discovery of cases and immediately conduct immediate treatment to patients and suspected people with leptospirosis.¹²

The main source of contamination comes from mice, but domestic and wild animals can also be carriers of these pathogenic bacteria.¹³ Symptoms of leptospirosis are similar to other infectious diseases such as influenza, meningitis, hepatitis, dengue fever, and other viral fevers. Transmission of leptospires in humans by direct contact with the urine of infected animals or through indirect contact. The incubation period of this bacterium ranges from 4 to 19 days.

The MAT check uses live antigen and it takes many serogroups as an antigen for optimum results. The sensitivity of this test may be better when using local isolates than the referens line, but referens lines are helpful in interpretation of laboratory results. The specificity of MAT is excellent, as there is no cross-reaction with other anti-bacterial antibodies. However, cross-reactions between *Leplospira* serovars often occur even at low

levels. For the record, animals vaccinated against certain serovars will have antibodies to the serovar.

Examination performed using the MAT method is a serological examination to establish the diagnosis of leptospirosis. According to Communicable Diseases Control (CDC), a titer of $\geq 1:200$ can be used as a basis for diagnosing probable cases with appropriate clinical symptoms. In this study agglutination occurs in titers < 320 . Titer $\geq 1:200$ can only be used in populations with rare leptospirosis exposure, whereas for countries with more exposure levels such as in tropical countries with high humidity, the value of this titre is higher. In areas where leptospirosis is endemic, the probable case of leptospirosis is determined from a single sample with a titer of $\geq 1:800$, but more preferably with titer $\geq 1:600$.^{14,15}

Assessment of MAT results is very complicated, as there are frequent cross-reactions between various serogroups and there are also found opposite reactions. In samples taken in the acute phase, frequent cross-reactions are extensive, while samples taken at the convalescent phase, the serogroup specificity are relatively higher. This is because the MAT can react with IgM antibodies, IgG and antibodies to some common antigen possessed by various serovar leptospire.⁸

Assessment may also be complicated by the presence of antibodies to other diseases, which may react with cross-linked antigen of leptospiral such as legionellosis, hepatitis, and autoimmune diseases.¹⁶ Based on Communicable Diseases Control (CDC), a titer of $\geq 1:200$ can be used as a basis for diagnosing probable cases with appropriate clinical symptoms. This titer can only be used in populations with rare leptospirosis exposure, whereas for countries with more exposure levels such as in tropical countries with high humidity, the value of this titre is higher. In areas where leptospirosis is endemic, the probable case of leptospirosis is determined from a single sample with a titer of $\geq 1:800$, but more preferably with titer $\geq 1:600$.⁸

Types of serovars found from 11 samples examined include Serovar Bangkinang (Ban), Grippotyphosa (Gri), Canicola (Can), Robinsoni (Rob), Bataviae (Bat), Mini (Min). These five types of serovars are *L. interrogans*. Serovar that has been known to attack dogs are *L. australis*, *L. autumnalis*, *L. ballum*, *L. batistava*, *L. canicola*, *L. grippotyphosa*, *L. hardjo*, *L. ichterohemoragica*, *L. pomona*, and *L. tarassovi*

(Widarso et al, 2005). Serovar that can attack cows are *L. pomona* and *L. gryptosa*. Serovars known to be present in cats are *L. bratislava*, *L. canicola*, *L. gryppothyphosa*, and *L. pomona*. Pigs may be attacked by *L. pomona* and *L. interrogans*, while rats may be attacked by *L. ballum* and *L. ichterohaemorhagicae*.¹⁷

Based on the examination of cattle serum sent to BALITVET from various regions in Indonesia during the period 2002 to 2004 (unpublished data), showed that the number of sera that reacted to *L. interrogans* of serovar *hardjo* was 64.39%, *tarassovi* 30.21%, *pomona* 6.70%, *australis* 3.14%, *rachmati* 3.13% and *bataviae* 2.73%. The degree of malignancy of leptospirosis attacks depends on *Leptospira* serovar and infected animal species.^{5,18}

Serovar Bangkinang is present in the Autumnalis serogroup found in species *L. Interogans*, *L. Noguchi*, and *L. Santarossai*. These infected animals are found in cattle, rats and mice. Serovar *Gryppotyphosa* is present in the *Grippotyphosa* serogroup found in species *L. interrogans* and *L. santarossai*. Serovar is mostly found in pigs. While Serovar *Canicola* reportedly infect many pets. found in *Canicola* serogroups found in species *L. interrogans*. This species is found in dogs and cats.

Serovar *Robinson* is present in serogroup *Pyrogenes* found in species *L. interrogans*, *L. noguchi*, and *L. Santarossai*. This species is commonly found in mice and house mice. Serovar *Bataviae* is found in the *Bataviae* serogroup found in species *L. Interogans*, *L. noguchi*, and *L. Santarossai*. This species is commonly found in livestock. Serovar *Mini* belongs to the *Mini* serogroup found mostly in species *L. Interogans*, *L. noguchi*, and *L. Santarossai*. This species infects many home rats.⁹

Serovar *Leptospira* is virulent to humans and found in this study is *Robinson* or *Autumnalis*. Rats are the reservoir host for the serovar. Serovar *Canicola* and *Bataviae* were also found in this study. In the reservoir host *Leptospira* has adapted and did not cause any harm. The reservoir host, especially mice, is a contaminant of *Leptospira* in the environment and a source of leptospirosis. In study serologically, people living in areas prone to flooding have been exposed to some types of serovar *Leptospira*.

CONCLUSION

Types of serovar and hosts found in community serum titers in flood-prone areas of Wajo are *Serovar Bangkinang (Ban)*, *Grippotyphosa (Gri)*, *Canicola (Can)*, *Robinsoni (Rob)*, *Bataviae (Bat)*, *Mini (Min)* and host (host) of the serovar species are found in dogs, mice and cows.

Its recommended that to the community in flood-prone areas in order to increase efforts to prevent the incidence of Leptospirosis in the form of environmental hygiene and good personal hygiene.

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Conflict of Interest: Nil.

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REFERENCES

- Costa F, Hagan JE, Calcagno J et al. Global Morbidity and Mortality of Leptospirosis: A Systematic Review. *PLoS Negl Trop Dis* 2015;9:e0003898.
- Agampodi SB, NDB, Thevanesam V. Determinants of Leptospirosis in Sri Lanka: Study Protocol. *BMC Infectious Diseases* 2010;10
- Victoriano AFB, SLD, Nina GB, Lolita LC, Takeshi K, Khanchit L, Bee LO. Leptospirosis in the Asia Pacific Region. *BMC Infectious Diseases*;2009;9.
- Johnson MA, Smith H, Joseph P, Gilman RH, Bautista CT, Campos KJ, Cespedes M, Klatsky P, Vidal C, Terry H. Environmental Exposure and Leptospirosis, Peru. *Emerging Infectious Diseases* 2004;10:1016
- Ramadhani T, Yuniato B. Kondisi Lingkungan Pemukiman Yang Tidak Sehat Berisiko Terhadap Kejadian Leptospirosis (Studi Kasus di Kota Semarang). *Media Penelitian dan Pengembangan Kesehatan* 2010;2
- Rampengan NH. Japanese Encephalitis. *Jurnal Biomedik* 2016;8
- Lemeshow S, Lwanga. *Sample Size Determination in Health Studies*, Geneva, WHO 1991
- Levett PN, Branch SL, Whittington CU, et al. Two Methods for Rapid Serological Diagnosis of Acute Leptospirosis. *Clinical and Diagnostic Laboratory Immunology* 2001;8:349-351
- Setiawan, I. Pemeriksaan Laboratorium Untuk Mendiagnosis Penyakit Leptospirosis. *Media Penelitian dan Pengembangan Kesehatan* 2008;18
- Mwachui MA., Crump L, Hartskeerl R, et al. Environmental and Behavioural Determinants of Leptospirosis Transmission: A Systematic Review. *PLoS Negl Trop Dis* 2015;9:e0003843
- Lim JK, Murugaiyah VA, Ramli AS, Rahman HA, Mohamed NS, Shamsudin NN, Tan JC. A case study: leptospirosis in Malaysia. 2011
- Kementrian Kesehatan RI. *Meski Belum Ada Laporan, Kemenkes Tetap Waspadai Leptospirosis Pasca Banjir*. 2015
- Vega-Corredor MC, Opadeyi J. Hydrology and Public Health: Linking Human Leptospirosis and Local Hydrological Dynamics in Trinidad, West Indies. *Earth Perspectives* 2014;1:1
- Cumberland P, Everard C, Levett PN. Assessment of the Efficacy of an Igm-Elisa and Microscopic Agglutination Test (Mat) in the Diagnosis of Acute Leptospirosis. *The American Journal of Tropical Medicine and Hygiene* 1999, 61, 731-734.
- Levett, P. N. Usefulness of Serologic Analysis as a Predictor of the Infecting Serovar in Patients with Severe Leptospirosis. *Clinical Infectious Diseases* 2003;36:447-452.
- WHO. *Human Leptospirosis: Guidance for Diagnosis, Surveillance and Control* 2010;92:154589.
- Ramadhani T, Widyastuti D, Priyanto D. Determinasi Serovar Bakteri Leptospira Pada Reservoir di Kabupaten Banyumas. *Jurnal Ekologi Kesehatan* 2015;14:8-16.
- Ramadhani T, Yuniato B. Reservoir Dan Kasus Leptospirosis Di Wilayah Kejadian Luar Biasa. *Kesmas: National Public Health Journal* 2012;7:162-168.

Identification of Serovar Leptospirosis in Flood-prone Areas Wajo District

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ABSTRACT

Floods occur every year in Wajo District and inundate flood prone areas for 2 months. However, there is no information related to the type of Leptospirosis' serovar that infects people in the flood-prone areas of Wajo District. The purpose of this study was to identify the type of serovar leptospirosis found in flood-prone areas of Wajo District.

The population in this study is the whole community and the flood-prone environment in Sabbangparu and Tempe sub-districts. The calculation of this sample is done by Lameshow formula with the sample in this study as many as 273 people and chosen by proportional random sampling. The serum samples taken were examined using the enzyme-linked immunosorbent assay (ELISA) method in the microbiology laboratory of Animal Prevention and Illness (P2B2) - Banjarnegara subsequently examined serovar type examined from 11 positive sera from Elisa examination with titer is examined with a Microscopic Agglutination Test (MAT) at the Center for Vector and Reservoir Disease Research and Development (B2P2VRP) Salatiga, Central Java Province.

The results of this study indicated that the serovar and host types found in the serum titers of the community in flood-prone areas in Wajo are Serovar *Bangkinang (Ban)*, *Grippotyphosa (Gri)*, *Canicola (Can)*, *Robinsoni (Rob)*, *Bataviae (Bat)*, *Mini (Min)*. Type of serovar is usually found in dogs, mice and cows. Therefore, it is recommended to the community in flood prone areas to increase efforts to prevent Leptospirosis incidence by reduce contact with animals that host the disease.

Keywords: Serovar, Leptospirosis, Flood-prone areas, Wajo District.

INTRODUCTION

Leptospirosis is a zoonotic disease that infects humans by direct contact with the urine of an infected animal or with a contaminated urine environment. Occurs in vulnerable populations such as rural farmers and urban slum dwellers, especially in countries with subtropical or tropical humid climates and potentially epidemic. Bacteria enter the body through cuts or abrasions on the skin, or through the mucous membranes of the mouth, nose and eyes. Human-to-human transmission is rare. In the early stages of this disease cause symptoms including high fever, severe headache, muscle aches, chills, redness of the eyes, abdominal pain, jaundice, skin bleeding and mucous membranes, vomiting, diarrhea, and rash.^{1,2}

Leptospirosis causes health problems in Indonesia. In 2001, 139 human serum samples tested 18.7% were

positive. The results of these tests indicate an infection of the Batavian serovar. In the event of floods in Indonesia in January 2002, the outbreak of Leptospirosis occurred, especially in Jakarta. In this incident, 12.0% of 418 seropositive samples of Bataviae or Hardjo serovars. Leptospira has ± 175 serovar, some even say Leptospira has more than 200 serovar. Infection can be caused by one or more serovar at once. When the infection occurs, then the body of the patient within 6-12 days will form an immune substance agglutination. Leptospirosis in dogs is caused by the infection of one or more serovar from Leptospira interrogans such as *L. australis*, *L. autumnalis*, *L. ballum*, *L. batislava*, *L. canicola*, *L. grippotyphosa*, *L. hardjo*, *L. ichterohemoragica*, *L. pomona*, and *L. tarassovi*. Serovar that can attack cows are *L. pamon* and *L. gryptosa*. Serovars known to be present in cats are *L. bratislava*, *L. canicola*, *L. gryppothyphosa*, and *L. Pomona* whereas mice can be attacked by *L. ballum*

and *L. ichterohaemorhagicae*. There has been a national increase in the number of human cases reported since 2006. Of the 667 human cases reported in 2007, 93% were cases with laboratory confirmation. The mortality rate is 8%. In the first quarter of 2008, 269 cases have been detected Leptospirosis.³

Leptospirosis commonly affects farmers, plantation workers, miners/ sewers, slaughterhouse workers and the military.⁴ The environmental conditions of the settlements in the form of unhealthy homes and the presence of rats around the environment are statistically related to the incidence of leptospirosis. The existence of mice became the most influential factor on the transmission of this disease.⁵ Leptospirosis occurs incidentally and is generally transmitted through rat urine in the event of a flood. Leptospirosis manifestations of self-limited, mild to severe symptoms and even death if late to receive treatment.⁶

MATERIAL AND METHOD

The type of research conducted was observation with descriptive approach. The aim was to obtain information related to serovar leptospirosis in flood-prone areas in Tempe Sub-district, Wajo District, South Sulawesi. The research was conducted in several flood-prone areas that were chosen because they are considered to represent and are the main areas that always flood every year with a duration of 3-5 months of floods.

The population in this study was the whole community and the flood-prone environment in Sabbangparu and Tempe sub-districts, Wajo District. The calculation of this sample is done with the formula Lemeshow and Lwanga⁷ with the total sample in this study as many as 273 people and selected by *proportional random sampling*.

Data obtained by taking the serum to the community. Biomedical data in the form of blood serum samples taken on household members were examined by Enzyme-linked immunosorbent assay (ELISA) method in microbiology laboratory of Animal Disease Prevention and Illness (P2B2), Ministry of Health RI - Banjarnegara, and then examined serovar type examined from 11 positive sera from Elisa examination with highest titer were examined by Microscopic Agglutination Test (MAT) at Indonesian Veterinary Disease Research and Development Center (B2P2VRP) Ministry of Health Salatiga, Central Java Province.

MAT has been widely used as a reference test for detecting antibodies. The principle of the MAT test is that the patient's serum is reacted with the suspension of live serovar Leptospira antigen. After incubation, the antigen-serum mixture was observed with a microscope to look for agglutination, then the antibody titers were determined based on the last dilution that still showed agglutination.⁸ Antigen used is all types of serovar Leptospira are still alive. Antibodies to the infecting serovar will arise in the body of leptospirosis patients. In addition, antibodies are often found that react with other serovar, especially in the early stages.⁹

RESULT

The respondent in this research was 273 people. The characteristics of the respondent are in table 1.

Table 1: Socio-demography Distribution of the respondents in flood prone area of Wajo District

Variable	N	%
Sex		
Male	120	44,0
Female	153	56,0
Age (years)		
12-16	2	0,7
17-25	24	8,8
26-35	58	21,2
36-45	90	33,0
46-55	44	16,1
56-65	34	12,5
>65	21	7,7
Occupation		
Not working	28	10,3
School	2	0,7
Household mother	92	33,7
PNS/TNI/POLRI	7	2,6
BUMN officer	2	0,7
Private employers	9	3,3
Traders	61	22,3
Farmer	47	17,2
Fisherman	25	9,2
Total	273	100.0

The result of the analysis in Table 1 shows that female respondents are more than male respondents that is 153 respondents (56%). Respondents were more

36-45 years old as many as 90 respondents (33.0%) and at least 12 years old as many as 2 respondents (0.7%). Housewives were the most respondents' occupations by 33.7%. Therefore, the highest education level of the respondents is primary school graduation/equal to 50.5% and the education level of the respondents is the least is never school and graduated from university, that is 5.9%.

All serum samples obtained were examined on the ELISA test, then obtained 11 serum with the highest titer for further examination of serovar type contained in the serum. The result of B2P2VRP Bacteriology Laboratory examination on 11 serum with MAT method. In fact, it obtained 4 agglutination result as in Table 2.

Table 2: Distribution of Serovar *Leptospira* in Wajo District

Sample Code	Ban	Gri	Can	Rob	Bat	Min.
280	40	80	-	-	-	20
286	-	-	-	20	40	20
292	-	-	-	-	-	20
336	-	-	80	-	-	-

Note:

1. All samples are agglutinated with titers <320
2. Serovar used as many as 15 types and what happened agglutination is Serovar Bangkinang (Ban), Grippotyphosa (Gri), Canicola (Can), Robinsoni (Rob), Bataviae (Bat), Mini (Min).

Table 2 shows 11 samples examined, there were 4 samples of agglutination with titer <320 whereas 7 samples were not agglutinated. The code sample 280 shows agglutination with a 1:40 titer on *serovar Bangkinang* of Serogroup *Autumnalis*, 1:80 on *Grippotyphosa serovar of Grippotyphosa* serogroup and 1:20 titer on *Mini serovar of Serogroup Mini*.

The code sample 286 shows agglutination with a 1:20 titer on the *Robinsoni serovar of Serogroup Pyrogenesis* and *Mini serovar of Serogroup Mini* and shows agglutination with a 1:40 titer on *Batavian serovars of Serogroup Bataviae*. The code sample 292 shows agglutination with a 1:20 titer on the *Mini serovar of Serogroup Mini*. Sample code 336 with 1:80 titer on *Canicola serovar from Serogroup Canicola*.

DISCUSSION

Leptospirosis is classified as a "neglected tropical disease". This disease is caused by pathogenic bacteria spirochete of the genus *Leptospira*. Many species of mammals can carry these bacteria in their bodies without contracting Leptospirosis.¹⁰ Leptospirosis is a disease with the complexity of associated ecological factors, including bacteria, animal reservoirs, humans and the surrounding nature. Pathogenically, leptospirosis is

transmitted to humans by direct or indirect contact with infected urine, blood or body tissue from the urine in which the animal carries and the water, soil and food contaminated with urine.

Leptospirosis continues to be a major public health challenge in many countries. There is still much unknown about this disease. There is a need to raise awareness among physicians about this infection because there are still many unknown conditions. Improved laboratory tests should be developed to make infection confirmation faster and easier. There is also an effective vaccine requirement for humans.¹¹ Increased alertness to Leptospirosis disease is done with Early Precaution (SKD) system with surveillance activities in humans, particularly in areas with risk factors with priority in flooded areas and farming/plantation areas of many rat populations. In addition, it also conducts active surveillance of early discovery of cases and immediately conduct immediate treatment to patients and suspected people with leptospirosis.¹²

The main source of contamination comes from mice, but domestic and wild animals can also be carriers of these pathogenic bacteria.¹³ Symptoms of leptospirosis are similar to other infectious diseases such as influenza, meningitis, hepatitis, dengue fever, and other viral fevers. Transmission of leptospires in humans by direct

contact with the urine of infected animals or through indirect contact. The incubation period of this bacterium ranges from 4 to 19 days.

The MAT check uses live antigen and it takes many serogroups as an antigen for optimum results. The sensitivity of this test may be better when using local isolates than the referens line, but referens lines are helpful in interpretation of laboratory results. The specificity of MAT is excellent, as there is no cross-reaction with other anti-bacterial antibodies. However, cross-reactions between *Leptospira* serovars often occur even at low levels. For the record, animals vaccinated against certain serovars will have antibodies to the serovar.

Examination performed using the MAT method is a serological examination to establish the diagnosis of leptospirosis. According to Communicable Diseases Control (CDC), a titer of $\geq 1:200$ can be used as a basis for diagnosing probable cases with appropriate clinical symptoms. In this study agglutination occurs in titers < 320 . Titer $\geq 1:200$ can only be used in populations with rare leptospirosis exposure, whereas for countries with more exposure levels such as in tropical countries with high humidity, the value of this titre is higher. In areas where leptospirosis is endemic, the probable case of leptospirosis is determined from a single sample with a titer of $\geq 1:800$, but more preferably with titer $\geq 1:600$.^{14,15}

Assessment of MAT results is very complicated, as there are frequent cross-reactions between various serogroups and there are also found opposite reactions. In samples taken in the acute phase, frequent cross-reactions are extensive, while samples taken at the convalescent phase, the serogroup specificity are relatively higher. This is because the MAT can react with IgM antibodies, IgG and antibodies to some common antigen possessed by various serovar leptospire.⁸

Assessment may also be complicated by the presence of antibodies to other diseases, which may react with cross-linked antigen of leptospiral such as legionellosis, hepatitis, and autoimmune diseases.¹⁶ Based on Communicable Diseases Control (CDC), a titer of $\geq 1:200$ can be used as a basis for diagnosing probable cases with appropriate clinical symptoms. This titer can only be used in populations with rare leptospirosis exposure, whereas for countries with more exposure levels such as in tropical countries with high humidity, the value of this titre is higher. In areas where leptospirosis is endemic,

the probable case of leptospirosis is determined from a single sample with a titer of $\geq 1:800$, but more preferably with titer $\geq 1:600$.⁸

Types of serovars found from 11 samples examined include *Serovar Bangkinang (Ban)*, *Grippotyphosa (Gri)*, *Canicola (Can)*, *Robinsoni (Rob)*, *Bataviae (Bat)*, *Mini (Min)*. These five types of serovars are *L. interrogans*. Serovar that has been known to attack dogs are *L. australis*, *L. autumnalis*, *L. ballum*, *L. batislava*, *L. canicola*, *L. grippotyphosa*, *L. hardjo*, *L. ichterohemoragica*, *L. pomona*, and *L. tarassovi* (Widarso et al, 2005). Serovar that can attack cows are *L. pamona* and *L. gryptosa*. Serovars known to be present in cats are *L. bratislava*, *L. canicola*, *L. gryppothyphosa*, and *L. pomona*. Pigs may be attacked by *L. pamona* and *L. interrogans*, while rats may be attacked by *L. ballum* and *L. ichterohaemorhagicae*.¹⁷

Based on the examination of cattle serum sent to BALITVET from various regions in Indonesia during the period 2002 to 2004 (unpublished data), showed that the number of sera that reacted to *L. interrogans* of serovar *hardjo* was 64.39%, *tarassovi* 30.21%, *pomona* 6.70%, *australis* 3.14%, *rachmati* 3.13% and *bataviae* 2.73%. The degree of malignancy of leptospirosis attacks depends on *Leptospira* serovar and infected animal species.^{5,18}

Serovar Bangkinang is present in the Autumnalis serogroup found in species *L. Interrogans*, *L. Noguchi*, and *L. Santarossai*. These infected animals are found in cattle, rats and mice. *Serovar Gryppothyphosa* is present in the *Grippotyphosa* serogroup found in species *L. interrogans* and *L. santarossai*. Serovar is mostly found in pigs. While Serovar *Canicola* reportedly infect many pets. found in *Canicola* serogroups found in species *L. interrogans*. This species is found in dogs and cats.

Serovar Robinson is present in serogroup *Pyrogenes* found in species *L. interrogans*, *L. noguchi*, and *L. Santarossai*. This species is commonly found in mice and house mice. *Serovar Bataviae* is found in the *Bataviae* serogroup found in species *L. Interrogans*, *L. noguchi*, and *L. Santarossai*. This species is commonly found in livestock. *Serovar Mini* belongs to the *Mini serogroup* found mostly in species *L. Interrogans*, *L. noguchi*, and *L. Santarossai*. This species infects many home rats.⁹

Serovar *Leptospira* is virulent to humans and found in this study is *Robinson* or *Autumnalis*. Rats are the

reservoir host for the serovar. Serovar *Canicola* and *Bataviae* were also found in this study. In the reservoir host *Leptospira* has adapted and did not cause any harm. The reservoir host, especially mice, is a contaminant of *Leptospira* in the environment and a source of leptospirosis. In study serologically, people living in areas prone to flooding have been exposed to some types of serovar *Leptospira*.

CONCLUSION

Types of serovar and hosts found in community serum titers in flood-prone areas of Wajo are *Serovar Bangkinang (Ban)*, *Grippotyphosa (Gri)*, *Canicola (Can)*, *Robinsoni (Rob)*, *Bataviae (Bat)*, *Mini (Min)* and host (host) of the serovar species are found in dogs, mice and cows.

It is recommended that to the community in flood-prone areas in order to increase efforts to prevent the incidence of Leptospirosis in the form of environmental hygiene and good personal hygiene.

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REFERENCES

- Costa F, Hagan JE, Calcagno J et al. Global Morbidity and Mortality of Leptospirosis: A Systematic Review. *PLoS Negl Trop Dis* 2015;9:e0003898.
- Agampodi SB, NDB, Thevanesam V. Determinants of Leptospirosis in Sri Lanka: Study Protocol. *BMC Infectious Diseases* 2010;10
- Victoriano AFB, SLD, Nina GB, Lolita LC, Takeshi K, Khanchit L, Bee LO. Leptospirosis in the Asia Pacific Region. *BMC Infectious Diseases*;2009;9.
- Johnson MA, Smith H, Joseph P, Gilman RH, Bautista CT, Campos KJ, Cespedes M, Klatsky P, Vidal C, Terry H. Environmental Exposure and Leptospirosis, Peru. *Emerging Infectious Diseases* 2004;10:1016
- Ramadhani T, Yuniyanto B. Kondisi Lingkungan Pemukiman Yang Tidak Sehat Berisiko Terhadap Kejadian Leptospirosis (Studi Kasus di Kota Semarang). *Media Penelitian dan Pengembangan Kesehatan* 2010;2
- Rampengan NH. Japanese Encephalitis. *Jurnal Biomedik* 2016;8
- Lemeshow S, Lwanga. *Sample Size Determination in Health Studies*, Geneva, WHO 1991
- Levett PN, Branch SL, Whittington CU, et al. Two Methods for Rapid Serological Diagnosis of Acute Leptospirosis. *Clinical and Diagnostic Laboratory Immunology* 2001;8:349-351
- Setiawan, I. Pemeriksaan Laboratorium Untuk Mendiagnosis Penyakit Leptospirosis. *Media Penelitian dan Pengembangan Kesehatan* 2008;18
- Mwachui MA., Crump L, Hartskeerl R, et al. Environmental and Behavioural Determinants of Leptospirosis Transmission: A Systematic Review. *PLoS Negl Trop Dis* 2015;9:e0003843
- Lim JK, Murugaiyah VA, Ramli AS, Rahman HA, Mohamed NS, Shamsudin NN, Tan JC. A case study: leptospirosis in Malaysia. 2011
- Kementrian Kesehatan RI. *Meski Belum Ada Laporan, Kemenkes Tetap Waspada Leptospirosis Pasca Banjir*. 2015
- Vega-Corredor MC, Opadeyi J. Hydrology and Public Health: Linking Human Leptospirosis and Local Hydrological Dynamics in Trinidad, West Indies. *Earth Perspectives* 2014;1:1
- Cumberland P, Everard C, Levett PN. Assessment of the Efficacy of an Igm-Elisa and Microscopic Agglutination Test (Mat) in the Diagnosis of Acute Leptospirosis. *The American Journal of Tropical Medicine and Hygiene* 1999, 61, 731-734.
- Levett, P. N. Usefulness of Serologic Analysis as a Predictor of the Infecting Serovar in Patients with Severe Leptospirosis. *Clinical Infectious Diseases* 2003;36:447-452.
- WHO. *Human Leptospirosis: Guidance for Diagnosis, Surveillance and Control* 2010;92:154589.
- Ramadhani T, Widyastuti D, Priyanto D. Determinasi Serovar Bakteri *Leptospira* Pada Reservoir di Kabupaten Banyumas. *Jurnal Ekologi Kesehatan* 2015;14:8-16.
- Ramadhani T, Yuniyanto B. Reservoir Dan Kasus Leptospirosis Di Wilayah Kejadian Luar Biasa. *Kesmas: National Public Health Journal* 2012;7:162-168.

Public Policy in Social Welfare of Elderly Faced with Natural Disaster in Vulnerable Area: A Case Study in Bangrakum District, Phitsanuloke Province, Thailand

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ABSTRACT

The objectives of this research were to: 1) study the well-being, health status and social welfare of the elderly 2) provide policy recommendations on the social welfare of the elderly in the area vulnerable affected from the natural disasters. The research methodology was mixed- method. The quantitative study, there were 657 elderly people who were systematic random sampling selected from utilization. The tools used in collecting data in the study were questionnaires. Data were analyzed by factors analysis. The qualitative study, there were 60 samples purposive selected based on their qualifications as social actors for public policy in social welfare of the elderly by Future Search Conference. The data were analyzed by content analysis.

The results showed that 1) the components of elderly's well-being in the research area had four main dimensions: Physical, Mental, Social, and Spiritual. Additionally, the social welfare of the elderly was found to be at a lower than their actual needs in all items. Whereas mean scores of social welfare and the elderly's actual needs were compared. 2) A social welfare guideline should be adopted that is relevant to the social changes and social context of the area such as income support to increase revenue, tax exemption, increase availability of and access to public service and recreation to improve the health of the elderly. The local government administration should be a federal agency and a functional care center responsible for the integration of plans and projects and for coordinating with other agencies for right protection and support of the elderly.

Keywords: *public policy, vulnerable, social welfare, elderly*

INTRODUCTION

The progress and advancement of technology and new knowledge in medical and public health has influenced the rapid increase of the proportion of the elderly population in Thailand¹. This is a demographic revolution because more elderly can live longer and consequently increasing their proportion in the society^{2,3,4,5}. This also means that there will be more people needing elderly care, especially the elderly who live in areas with high vulnerability to natural disasters⁶.

Disasters not only affect the lives and property of the citizens and the public but also the activities related to the development of all sectors such as agricultural activities, sanitation and health, education, and commerce and telecommunications. The effects are both in direct and indirect ways. Those who are affected, both the local

people and those from relevant sectors, must take the responsibility together to mitigate the effects of natural disasters. It has been seen in the experiences of others that effects of natural disasters may be made less harmful if there is effective disaster prevention management before they occur and if there is a public policy set to help minimize the overall risk of disasters^{7,8}.

In Phitsanulok, a province located in the lower-north of Thailand, one of the most vulnerable areas to natural disasters is Bangrakum District. This area is the most vulnerable to drought during the summer and flooding during the rainy season, especially since it is located at a lowland area, having major rivers flowing through it. The absence of an effective and complete ater management system⁹ and coverage of social welfare for the elderly in the area also add to the problem faced by the elderly as these could magnify the health problems experienced by the aged people.

It has been reported that there are both public and private organizations working on the social welfare for the elderly in the said area. The report found that the work is both at the policy and operational levels; nevertheless, it has been found lack of policy that is consistent with the needs of the elderly^{10,11}. Due to the deficiency of integration between various government projects and absence of a step by step or systematic process to encourage comprehensive participation of all concerned parties in defining the needs of the elderly, the existing policy does not fully satisfy the needs of the seniors in the area. As a result, the satisfaction of the elderly people on their welfare was at a low level although their overall needs in various aspects were at the high level^{12,13}.

MATERIAL AND METHOD

This research employed mixed method approach as state below:

- 1. Quantitative Research:** Data were collected from the elderly people of Bangrakum District and were used for evaluating the health conditions and social welfare of the elderly. In getting the samples, the researcher obtained the sample number by using the formula of 10 times the predictor variable. In this study, the total predictor variable is 43 indicators, so the number of the sample size is $43 \times 10 = 430$, and to complete the sample size data collection needs more than 500 samples¹⁴. The researcher then decided to collect data from 675 samples selected by systematic random sampling. The data was analyzed by mean, standard deviation and factor analysis.
- 2. Qualitative Research:** Data collected for this part of the research were used to study the potential of the public and private sectors in supporting the social welfare system and for the policy feedback in social welfare management for the elderly in areas vulnerable to natural disasters. The tools used to gather data were in-depth interviews, empirical data, and information by future search conference.

60 people were selected as social actors based on their qualifications and involvement in the public policy for the social welfare of the elderly in the research area. The selected social actors were the following: four executive directors of the local government in Bangrakum District, six directors of health promotion of the district hospital, 31 of the elderly in the area, 16 local people who are responsible for the welfare of the elderly in the local administration and four people from the private organization. Data was analyzed by using content analysis.

RESULTS

- 1. The well-being, health status and social welfare of the elderly:** From the questions about well-being, factor analysis was used to group the variables that were related to the same elements. The variables of the same element had more relationship, and the ones of the different element had less or no relationship at all. The analysis found a Kaiser-Meyer-Olkin (KMO) value of 0.746, and the Bartlett's Test of Sphericity which was used in hypothesis testing had a Chi-Square value of 3698.006 and a P-value of 0.000. The meaning that the 15 variables were related. It was also found that the data was suitable to be used for factor analysis, with a Kaiser-Meyer-Olkin (KMO) value of higher than 0.06 and a Bartlett's Test of Sphericity value which was statistically significant.

After confirming the suitability of the data about the health of the elderly questionnaire, the said data were used to perform the exploratory factor analysis by using the principle component and orthogonal rotation method. It was found that all the 15 questions about well-being could be grouped into four elements. When considering the factor loadings after rotating, it was found that the detail of the question list in each element had more than 1 Eigen value. The four elements are as follows (Table 1).

Table 1: Analysis of the health condition of the elderly

Elements	List	Loading factor	Eigen Value
Physical Health	underlying disease.	.675	1.028
	ability to perform daily activities	.830	

Conted...

Mental Health	peace of mind.	.797	2.763
	joyful mind.	.763	
	mental distress	.667	
	psychological oppression.	.594	
Social Health	pollution threat of life	.565	1.346
	safety within the family.	.741	
	safety within the community.	.753	
	environment complementary	.643	
	Recognizing the value of themselves.	.859	
	Recognizing the value of others.	.822	
Spiritual Health	Though	.936	3.573
	Recognition.	.946	
	resolution	.870	

The result of the factor analysis above shows that the Health condition of the elderly consisted of four key dimensions which are Physical Health, Mental Health, Social Health and Spiritual Health.

The Evaluation of elderly opinion show that, The social welfare of the elderly has been low. While the overall welfare needs were high The highest demand is the social welfare income of the elderly and the demand for social security, health care and recreation is still high. Secondly, support services and networks and housing were at a moderate level.

2. Policy recommendation in social welfare of the elderly:

1. The social welfare of the elderly in disaster-vulnerable areas could be operated to build the capacity (Capacity Building Impacts) of those involved in public policy through various means such as by 1) building a network to work together in making positive impact of public policy on social welfare of the elderly, 2) using data/information of the elderly who have health problems to give an assistance to the elderly and their families, so they could live together with less burden, 3) using data/information to support the preparation of plans and policies with the cooperation of relevant agencies in order to support the elderly, and 4) continuously improving policies to develop the potentials of the elderly development and to make them achieve positive self-esteem and in turn make them respect and regard others also

2. The social welfare for the elderly should be adjusted based on the social changes and needs of the senior people such as the promotion of the revenue for the elderly, tax exemptions for the products they produce, increase in public services, recreation to keep seniors healthy both physically and mentally, establishment of clubs to seriously take care of the rights of the elderly and encouragement of the elderly to live in a good condition. The District Administration should be the federal agency that acts in the integration plan or project, including the cooperation of other agencies, both public and private sectors to achieve the highest benefit of the social welfare.

CONCLUSION

The health of the elderly in the area of vulnerable to disasters consisted of four dimensions, and they are the following: physical health, mental health, social health and intellectual health. It was found that the health was at a lower level than the actual needs of the elderly in all dimensions. This is consistent with the research of Ebi KL. et. al.⁸ and Haines A. et. al.⁶ due to the difficulties experienced in the application of policies for supporting the welfare of senior people in the community

Adaptation activities must involve the full range of stakeholders, including community leaders, organizations, the public, and governments ²⁶. Survey data indicate that the elderly is willing to engage in social welfare issues^{15,16,17,18,19}; thus, stakeholder input is

needed to make the difficult choices facing public health programs, in terms of how much of their scarce resources to spend to increase monitoring and surveillance for climate-sensitive health outcomes ^{20,21,22}. Investing human and financial resources in these prevention activities could mean fewer resources to address other problems ^{23,24}.

The effects of climate change Disruptions in access to public services, including health care and food assistance programs, and increased stress are all magnified by their preexisting conditions or situations. The Elderly are likely to experience increased vulnerability to climate-induced environmental changes resulting from flooding and extreme weather events^{21,22,23}.

Advancing community adaptation capacity to Public policy is challenging but achievable. Cooperation and participation among different groups advances common goals, and the benefits of public participation extend beyond the individual to the society at large. The framework for community-based adaptation presented here can increase local adaptive and social capacity, and, as a result, help communities better prepare for and respond to the health risks of natural disaster^{24,25,26}.

One key aspect to mitigating the effects of climate change is a better understanding of diseases and the unique risks of various exposed or affected populations so that strategies may be developed that take such risks into account and are tailored to address them^{27,28,29}.

Conflict of Interest: It as nil

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REFERENCES

1. Knodel J, TEERAWICHITCHAINAN BP, Prachuabmoh V, Pothisiri W. The situation of Thailand's older population: An update based on the 2014 Survey of Older Persons in Thailand.
2. World Health Organization. World report on ageing and health. World Health Organization; 2015 Oct 22.
3. Beard HP, Bloom DE. Towards a comprehensive public health response to population ageing. *Lancet* (London, England). 2015 Feb 14;385(9968):658. [https://doi.org/10.1016/S0140-6736\(14\)61461-6](https://doi.org/10.1016/S0140-6736(14)61461-6)
4. Barnes M, Harrison E, Murray L. Ageing activists: who gets involved in older people's forums?. *Ageing & Society*. 2012 Feb;32(2):261-80. <https://doi.org/10.1017/S0144686X11000328>
5. Black K, Lipscomb VB. The promise of documentary theatre to counter ageism in age-friendly communities. *Journal of aging studies*. 2017 Aug 1;42:32-7. <https://doi.org/10.1016/j.jaging.2017.06.001>
6. Haines A, Kovats RS, Campbell-Lendrum D, Corvalán C. Climate change and human health: impacts, vulnerability and public health. *Public health*. 2006 Jul 1;120(7):585-96. <https://doi.org/10.1016/j.puhe.2006.01.002>
7. McMichael AJ, Woodruff RE, Hales S. Climate change and human health: present and future risks. *The Lancet*. 2006 Mar 11;367(9513):859-69. [https://doi.org/10.1016/S0140-6736\(06\)68079-3](https://doi.org/10.1016/S0140-6736(06)68079-3)
8. Ebi KL, Kovats RS, Menne B. An approach for assessing human health vulnerability and public health interventions to adapt to climate change. *Environmental health perspectives*. 2006 Dec;114(12):1930. <https://doi.org/10.1289/ehp.8430>
9. Komori D, Nakamura S, Kiguchi M, Nishijima A, Yamazaki D, Suzuki S, Kawasaki A, Oki K, Oki T. Characteristics of the 2011 Chao Phraya River flood in central Thailand. *Hydrological Research Letters*. 2012;6:41-6. <https://doi.org/10.3178/hrl.6.41>
10. De Vroom B, Øverbye E. Ageing and the transition to retirement: A comparative analysis of European welfare states. Taylor & Francis; 2017 Jul 5.
11. Gorman M. Development and the rights of older people. In *The ageing and development report 2017* Jul 28 (pp. 21-39). Routledge.
12. Comrey AL, Lee HB. Interpretation and application of factor analytic results. Comrey AL, Lee HB. *A first course in factor analysis*. 1992;2.

13. Kaambwa B, Gill L, McCaffrey N, Lancsar E, Cameron ID, Crotty M, Gray L, Ratcliffe J. An empirical comparison of the OPQoL-Brief, EQ-5D-3 L and ASCOT in a community dwelling population of older people. *Health and quality of life outcomes*. 2015 Dec;13(1):164. <https://doi.org/10.1186/s12955-015-0357-7>
14. Alderman K, Turner LR, Tong S. Floods and human health: a systematic review. *Environment international*. 2012 Oct 15;47:37-47. <https://doi.org/10.1016/j.envint.2012.06.003>
15. Ebi KL, Semenza JC. Community-based adaptation to the health impacts of climate change. *American journal of preventive medicine*. 2008 Nov 1;35(5):501-7. <https://doi.org/10.1016/j.amepre.2008.08.018>
16. Thornton PK, Ericksen PJ, Herrero M, Challinor AJ. Climate variability and vulnerability to climate change: a review. *Global change biology*. 2014 Nov 1;20(11):3313-28. <https://doi.org/10.1111/gcb.125810>
17. Portier CJ, Tart KT, Carter SR, Dilworth CH, Grambsch AE, Gohlke J, Hess J, Howard SN, Luber G, Lutz JT, Maslak T. A human health perspective on climate change: a report outlining the research needs on the human health effects of climate change. *Journal of Current Issues in Globalization*. 2013 Oct 1;6(4):621. <https://doi.org/10.1289/ehp.1002272>
18. Frumkin H, Hess J, Luber G, Malilay J, McGeehin M. Climate change: the public health response. *American journal of public health*. 2008 Mar;98(3):435-45. <https://doi.org/10.2105/AJPH.2007.119362>
19. Jia Z, Tian W, Liu W, Cao Y, Yan J, Shun Z. Are the elderly more vulnerable to psychological impact of natural disaster? A population-based survey of adult survivors of the 2008 Sichuan earthquake. *BMC public health*. 2010 Dec;10(1):172. <https://doi.org/10.1186/1471-2458-10-172>
20. Kohn R, Levav I, Garcia ID, Machuca ME, Tamashiro R. Prevalence, risk factors and aging vulnerability for psychopathology following a natural disaster in a developing country. *International Journal of Geriatric Psychiatry*. 2005 Sep 1;20(9):835-41. <https://doi.org/10.1002/gps.1369>
21. Sanz I, Velázquez FJ. The role of ageing in the growth of government and social welfare spending in the OECD. *European Journal of Political Economy*. 2007 Dec 1;23(4):917-31. <https://doi.org/10.1016/j.ejpoleco.2007.01.003>
22. Dong XQ. Elder abuse: systematic review and implications for practice. *Journal of the American Geriatrics Society*. 2015 Jun 1;63(6):1214-38. <https://doi.org/10.1111/jgs.13454>
23. Randall WL. Aging, irony, and wisdom: On the narrative psychology of later life. *Theory & Psychology*. 2013 Apr;23(2):164-83. <https://doi.org/10.1177/0959354312470754>
24. Cherniack EP. The impact of natural disasters on the elderly. *American journal of disaster medicine*. 2008;3(3):133-9.
25. Massey E, Smith J, Roberts B. Health needs of older populations affected by humanitarian crises in low-and middle-income countries: a systematic review. *Conflict and health*. 2017 Dec;11(1):29. <https://doi.org/10.1186/s13031-017-0133-x>
26. Wiles JL, Leibing A, Guberman N, Reeve J, Allen RE. The meaning of "aging in place" to older people. *The gerontologist*. 2012 Jun 1;52(3):357-66. <http://doi.org/10.1093/geront/gnr098>.
27. Van Malderen L, De Vriendt P, Mets T, Gorus E. Active ageing in the nursing home: Could participatory action research provide the answer?. *Action Research*. 2017 Sep;15(3):239-57. <https://doi.org/10.1177/1476750316636668>.
28. Ward L, Barnes M. Transforming practice with older people through an ethic of care. *The British Journal of Social Work*. 2015 Apr 7;46(4):906-22. <https://doi.org/10.1093/bjsw/bcv029>
29. Walker A, Maltby T. Active ageing: A strategic policy solution to demographic ageing in the European Union. *International Journal of Social Welfare*. 2012 Oct 1;21(s1). <https://doi.org/10.1111/j.1468-2397.2012.00871>.

Qualifications of Emergency Nurse in Caring the Acute Coronary Syndrome Patient: The Perspective of Rural Hospitals in Indonesia

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ABSTRACT

Background: Nurses play a role in providing nursing care for emergency patients with acute coronary syndrome. Emergency nurses have different challenges with nurses in another hospital room because they are required to master some competencies in handling the urgency cases.

Method: This research employed a qualitative research with the phenomenology design approach. Participants in this study involved 40 nurses working in the Emergency Units of Rural Hospital East Java - Indonesia. In this study, nurses shared their experience in improving their quality services in taking care of patients with ACS during in-depth semi-structured interviews.

Result: Based on the interviews with the participants, two major themes in the research were obtained. The first theme was the qualifications of emergency nurses was divided into three sub-themes i.e. the requirements, the care capabilities, and the ward management capabilities. The second theme was the nurse development for competence improvement, consisted of two sub-themes: continuing education and nursing service development.

Conclusion: The qualifications of emergency nurses in the treatment of patients with acute coronary syndrome included education and training, as well as experience, the care capabilities including nursing care components, and the ward management capabilities comprising planning, organizing, actuating, and evaluating. In addition, the nurse development for competence improvement which included continuing nursing education, as well as nursing service development were also the qualifications in the treatment of patients with ACS.

Keywords: *Rural Health, Acute Coronary Syndrom, Nursing, Nurse Qualifications, Emergency*

INTRODUCTION

Emergency services are one of the most important health services because they play a role in saving people's lives and reducing mortality and morbidity.^[1] Acute Coronary Syndrome (ACS) is the leading cause of morbidity and mortality worldwide. Acute coronary

syndrome (ACS) includes a wide range of heart disease conditions, including acute myocardial infarction and angina.^[2] Nurses play an important role in safe and effective management for the care of patients with acute chest pain as the main symptom of Acute Coronary Syndrome (ACS).^[3]

Nurse qualifications are an important aspect of hospital management. To plan the work process in health which includes nursing, it is important to meet the health system challenges. Human resources are the foundation of health services.^[4] Efforts to improve the human resources quality can be fulfilled by setting the qualifications. In health organizations, training and activities for professionals should be monitored to meet the criteria and

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ensure quality in the provision of care.^[5] Nurse quality will determine the hospital performance. With qualified nurses, hospitals will get optimal work result.^[6]

Emergency nurse qualifications are important in the treatment of patients with acute coronary syndrome. The purpose of this research is to investigate the perception of nurses concerning the emergency nurse qualifications for the treatment of patients with acute coronary syndrome. While the significances of this research are expected to be an input for emergency nursing management regarding the nurse qualifications needed for the treatment of patients with acute coronary syndrome.

METHOD

This research employed a qualitative research with the phenomenology design approach. This study conducted by a team of researchers led by a nurse whose expertise is in cardiovascular issues. Researchers had to visit the emergency units in Rural Hospitals Indonesia to approach the participants to provide trustworthy data related to their nursing experience, and their acceptance to participate in this research was proven by consent letters they signed.

Participants in this study involved 40 nurses working in the Emergency Units of Rural Hospital East Java - Indonesia. The samples of this research were chosen using the purposive sampling technique.^[7] based on the criteria: having a minimum 1 year experience working in emergency units and having some experiences in taking care of patients with ACS.

In this study, nurses shared their experience during in-depth semi-structured interviews. Each interview lasted for 30-60 minutes. The interviews were recorded in MP3 audio files. The results were manually analyzed using a thematic method.^[8] Analysing qualitative data manually provides more precise result because the data contain information on attitudes, values, and feelings that cannot be detected by software.^[9] The steps of the data analysis were: a) familiarization with the data; b) coding, c) searching for themes; d) reviewing theme; e) defining and naming themes and f) writing up, in which researchers wrote down the research report by referring to previous literature.

RESULT

Based on the interviews with the participants, two major themes in the research were obtained. The

first theme was the qualifications of emergency nurses and the second theme was the nurse development for competence improvement.

Qualifications for emergency nurses: This theme was divided into three sub-themes i.e. the requirements, the care capabilities, and the ward management capabilities. For the first subtheme, requirements included education and training. The participant statements below stated that:

.....I think the first is the educational background and the second is skills or experience. The skill can be supported by training such as PPGD training in the ER. ^(P3)

The most important thing is the service standard. Human resources must 100% have the training certificate..... ^(P7)

The second requirement was the experience. The following was the participant statements about the experience needed for emergency nurses:

Probably it is because of a lot of considered factors. Not only from the certificate but may also be from experience ... ^(P31)

The second sub-theme was the care capabilities which included all components of nursing care i.e. the assessment, diagnosis, intervention, implementation, and evaluation abilities. The following was the participant statement:

.....We do anamnesis outside and ask the beginning of the tightness sensation and whether s/he has left chest pain or chest pain in other parts. After that, we refer the patient to the ER. ^(P3)

Next was the nurses' diagnosis ability. Nurses should be able to establish the nursing diagnosis. The statement below showed how nurses determined the scope of nursing diagnoses in the emergency department for patients with ACS:

.....Yes, we just see the diagnosis, the limitation, the risk pattern, and the nursing diagnoses. We have prepared all. ^(P30)

Next was the nurse's intervention and implementation ability. Below was the participant statement which demonstrated the intervention and implementation process in emergency nursing care for patients with ACS:

We just check the intervention list, for example the collaboration. (P1, P10, P12)

.. After the patient is given morphine, nurses do observation while waiting for further instruction from the doctor in charge. (P9)

The final sub-theme of emergency nurse qualifications was ward management capabilities. Ward management capabilities included planning, organizing, actuating, and evaluating all the activities on the ward. The first was the planning ability. The following was the participant statement of the planning process:

.. So not necessarily have bachelor degree because I consider the ability. Although s/he has diploma degree, s/he is proficient to lead in every shift. So, I appoint him/her as the head of the nurse team... (P7)

The above statement was the ability of the nurse head in planning human resource needs in the ER. Next was the organizing ability. The following was the participant statement that indicates the organize ability:

We may have the patient as the operands (hand-offs), for example the patient who has not been cared for in the ER or has a problem with the payment and insurance. (P2, P10).

The next ability was the actuating ability in ward management. The actuating ability included nurses' critical decisions making. Below was the participant statement regarding the ward management implementation:

....I kept calling the doctor, but there was no answer. Finally, my solution was the doctor's replacement..... (P5)

The last was the nurse's evaluate ability in ward management activities. The following was the participant statement about the evaluation:

We have briefings every morning. The first warning is the nurse will be reprimanded directly in front of the friends. The second one, the nurse will be asked why s/he cannot perform well. The third one, s/he will be asked to leave the ER, if s/he is not willing to obey the rules in the ER or feel uncomfortable in the ER... (P7)

Nurse development for competence improvement:
The second theme was the nurse development for

competence improvement. The nurse development illustrated the nurse's process to continuously improve the ability. This theme consisted of two sub-themes: continuing education and nursing service development.

The first sub-theme was continuing nursing education which included training and seminars. Below was the participant statement on the training:

I Regarding the training, the basic cardiology training is based on the appointment also.... (P26)

Next was the nursing seminars which included the emergency nursing seminar and the cardiology seminar. The participant statement below indicated that nurses also followed the seminars:

Yes, we always plan the development of human resources. One of them is the competence improvement through training, seminars, workshops, etc. (P11, P32)

The second sub-theme was nursing service development which included: nurse involvement in making Standard Operational Procedure (SOP) and the requirement for nurses to learn the SOP, and evaluation of nurse performance periodically. The participant statement below showed the involvement in making, required to learn SOP:

The team from accreditation makes SOP with the input from the nurses and the hospital rooms as the reference. (P2, P10).

But the nurses must know after the SOP is finished, it must be studied with the other nurses... (P1)

The last was the nurse's performance evaluation periodically. The following was the participant statement on periodic evaluation:

Yes, the evaluation is conducted annually,... (P10, P26, P31)

DISCUSSION

The results of this research illustrated the nurse qualifications were a concern for the treatment of patients with acute coronary syndromes. Nurses should have evidence-based knowledge on how to assess and treat patients.^[3] The first theme in this research was the qualifications of emergency nurses. Qualifications play an important role in employee acceptance decisions. It is

because qualifications indicate intelligence, persistence, or achievement of an individual.^[10] Therefore, qualifications can be established and considered in determining the acceptance of emergency nurses.

The qualifications of the nurses in this research included education and training, as well as experience. Nurses must have the skills and knowledge to be able to implement the comprehensive nursing care. It is in accordance with the scope of the nurse competencies which include the knowledge, attitude and communication, as well as the skills of the nurses.^[11]

Furthermore, knowledge also plays an important role in the provision of health care, and nurses are personnel with knowledge.^[12] Therefore, education as the emergency nurse qualification is expected to improve the care quality for patients with ACS. The research also found that to become a nurse in the ER was determined by previous experience. Experience can be used as a reference to implement nursing care and take critical decisions in the emergency conditions of patients with acute coronary syndrome.

The care capabilities which included a series of nursing care processes such as assessment, nursing diagnosis, intervention, implementation, and evaluation also became the qualifications to be emergency nurses in the treatment of patients with ACS. According to the College of Emergency Nursing Australasia (2013), competent and qualified emergency nursing services requires the knowledge, skills, and special abilities of nurses.^[13]

The nursing process began to be used as a method to improve the quality of nursing care, allowing nurses to organize their actions and delegate tasks to the nursing team clearly and efficiently with the real needs of their patients as the center. Because it is connected to the scientific technical and philosophical foundations of the profession, the nursing process can be used by all nurses in professional practice, demonstrating the opening of thought and assessment during care.^[14] Consequently, the emergency nursing care for patients with ACS could be done comprehensively according to the nurse competence.

The ward management capabilities were also the qualification emergency nurses must be met in the treatment of patients with ACS. Nurse Leader is a nursing role developed to address quality and safety issues and healthcare providers as well as being a team member.^[15]

The next theme was the nurse development for competence improvement. It illustrated that the Hospital or health system had the emergency nurse development program in the planning to increase the nurse's competence so that nursing services can proceed according to the established standards. Competences become the important part in the self-development of nurses in performing their to achieve the goal of health service given by hospital.^[16]

The nurse development for competence improvement in the ER was conducted by providing emergency training and related seminars or workshops for nurses who never attended a seminar and for nurses with the expired certificates. A qualified nurse with training certification is a specific skill to provide timely and competent emergency care.

High demand for health care and overwork makes it increasingly necessary for the organization to produce models that fit the abilities and skills of nurses.^[5] Thus, training and education are also considered as the essential components of any nurse development strategy.^[17] Consequently, there is a need for policy and facilitation from healthcare providers, especially in the treatment of patients with acute coronary syndrome.

Furthermore, nurse involvement in making SOP, SOP improvement, the requirement for nurses to learn the SOP, and evaluation of nurse performance periodically was also conducted in emergency nursing service development for the treatment of patients with ACS. The emphasis on the care quality improvement provided by hospitals has increased significantly. Nurses are an integral part of patient care and also very important in hospitals to improve the quality. As hospitals face increasing demands to participate in various quality improvement activities, they rely on nurses to help address these demands.^[18] Monitoring the nurse's performance is an activity of continuous data collection and interpretation on the standard implementation aimed to know the success of nurses in performing nursing care.^[19] The current nurse quality improvement is needed not only for the benefit of hospital service improvement but also needed in facing the incessant era of ASEAN Economic Community (AEC), in the era of AEC nurses demanded to have qualifications comparable with other countries nurse in order to compete in ASEAN market^[20]

CONCLUSION

The qualifications of emergency nurses in the treatment of patients with acute coronary syndrome included: the requirements consisting of education and training, as well as experience, the care capabilities including nursing care components, and the ward management capabilities comprising planning, organizing, actuating, and evaluating. In addition, the nurse development for competence improvement which included continuing nursing education, as well as nursing service development were also the qualifications in the treatment of patients with ACS.

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REFERENCES

1. Aringhieri R, Bruni ME, Khodaparasti S, van Essen JT. Emergency medical services and beyond: Addressing new challenges through a wide literature review. *Comput Oper Res* [Internet]. 2017;78(August 2016):349–68. Available from: <http://dx.doi.org/10.1016/j.cor.2016.09.016>
2. Wachtel TM, Kucia AM, Greenhill JA, T.M. W, A.M. K, J.A. G. Secondary prevention for acute coronary syndrome in rural South Australia: are drugs best? What about the rest?. *Rural Remote Health* [Internet]. 2008;8(4):967.
3. Marshall K. Acute coronary syndrome : diagnosis , risk assessment and management. *Nurs Stand*. 2011;25(23):47–58.
4. Schmoeller R, Lima Gelbcke F. Indicators for the Measurement of Emergency Nursing Personnel. *Texto Context Enferm* [Internet]. 2013;22(4):971–9. Available from: <http://search.ebscohost.com/login.aspx?direct=true&db=ccm&AN=104051348&site=ehost-live>
5. Ortega M del CB, Cecagno D, Llor AMS, Siqueira HCH de, Montesinos MJL, Soler LM. Academic training of nursing professionals and its relevance to the workplace. *Rev Lat Am Enfermagem*. 2015;23(3):404-10
6. Rahman AW, Marzolina, Taufiqurrahman. Pengaruh Kompetensi Dan Lingkungan Kerja Terhadap Kinerja Perawat Bagian Rawat Inap Pada Rumah Sakit Umum Petala Bumi Pekanbaru. *Jom FEKON*. 2015;2(1):1–13.
7. Streubert HJ, Carpenter DR. *Qualitative Research In Nursing*. fifth. Lippincott Williams & Wilkins; 2011.
8. Clarke V, Braun V. Teaching thematic analysis: Over-coming challenges and developing strategies for effective learning. *Psychologist* [Internet]. 2013;26(2):120–3.
9. Kumboyono K, Sukotjo cathrine T, Lestari yulia C, Wijayanti DP. Resilience of People Living with HIV/ AIDS in Indoensia: a phenomenological study. *HIV Nurs*. 2018;18(1):4–7.
10. Hawke G. Qualifications : where do we stand ? *Train Dev Aust*. 2007;34(6).
11. PPNI, APNI, AIPDIKI. *Standar Kompetensi : Standar Kompetensi : Standar Kompetensi : 2013*.
12. Finkelman A, Kenner C. *The Essence of Nursing: Knowledge and Caring*. *Prof Nurs Concepts Competencies Qual Leadersh* [Internet]. 2016;53–83. Available from: <http://books.google.com/books?id=kGrsXNgaYuMC&pgis=1>
13. College of Emergency Nursing Australasia. *Practice Standards* [Internet]. 2013. 18 p. Available from: www.aasw.asn.au
14. Barra DCC, dal Sasso GTM. *The Nursing Process According To The International Classification For Nuring Practice: An Integrative Review*. *Texto e Context Enferm*. 2012;21(2):440–7.
15. Jukkala A, Greenwood R, Ladner K, Hopkins L. *The Clinical Nurse Leader and Rural HOspital Safety And Quality*. 10(2):38–44.
16. Darmayanti NNT, Oktamianti P. Analisis Kompetensi Perawat Ruang Intensif(Intensive Care Unit) Rumah Sakit Umum Tabanan Tahun 2013. *J Sumber Daya Mns Kesehat*. 2014;1(1):77–104.
17. Price S, Reichert C. *The Importance of Continuing Professional Development to Career Satisfaction*

- and Patient Care: Meeting the Needs of Novice to Mid- to Late-Career Nurses throughout Their Career Span. *Adm Sci* [Internet]. 2017;7(2):17. Available from: <http://www.mdpi.com/2076-3387/7/2/17>
18. Garcia SD, Gil RB, Haddad M do CL, Vannuchi MTO, Costa DB da. The role of a nurse in the management of medical-hospital material: an integrative review. *Online Brazilian J Nurs* [Internet]. 2013;12(2). Available from: [http://](http://www.objnursing.uff.br/index.php/nursing/article/view/274/53)
19. Nyoman N, Susanti T. *Monitoring Kinerja Dalam Meningkatkan Standar Operasional Prosedur*. 2001;
20. Efendi F, Nursalam N, Kurniati A, Gunawan J. Nursing qualification and workforce for the Association of Southeast Asian Nations Economic Community. *Nurs Forum*. 2018;1-6,<http://doi.org/10.1111/nurf.12243>

Prevalence and Risk Factors of HCV Infection in a Prison Setting in Uttar Pradesh, India

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ABSTRACT

Hepatitis C virus (HCV) is the main cause of progressive liver diseases and has become a global public health problem. HCV infection is more frequently detected in inmates and the main risk factor associated with HCV infection in the prison populations is intravenous drug use (IVDU).

There is a high risk of transmission among the general population after the release of the infected inmates. Therefore, a survey-based analysis was designed to understand the prevalence of HCV in the prison population and analyze the risk factors associated with it.

A questionnaire-based survey of 1611 prisoners was conducted in a district jail in West Uttar Pradesh (UP), India. Patients were screened for HCV infection and survey information was collated based on personal history and jail medical officer's information.

In this population the prevalence was found to be significantly higher in the inmates below 20 years and those unmarried. Those incarcerated one or more times earlier were more likely to be HCV positive. Although marriage was not a related factor, 72 of 168 positive cases were married. The level of awareness about HCV among the inmates were dismal with 98% of them knowing nothing about the disease. Other factors were not significantly associated with the spread of infection.

The outcomes of the analysis highlighted the need to spread awareness about safe sex specifically among the youth. Testing spouses of the infected inmates and offering therapy to positive cases would help in controlling further transmission.

Therefore, awareness and selective evaluation of spouses and sexual partners is the key along with availability of medicines. This data provokes some thoughts about benefits of remedial measures along with availability of drugs.

Keywords: Hepatitis C virus, HCV management, inmates, prisoners, prevalence, treatment, IVDU, India

INTRODUCTION

Global burden study, places viral hepatitis among the top ten infectious disease killer in the world ^[1] and as per the recent Global Hepatitis Report (2017), WHO estimates that 71 million persons were living with HCV infection in the world, accounting for 1% of the population at the end of 2015^[2]. HCV is the main cause of progressive liver diseases and has become a global public health problem ^[3].

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The main risk factor associated with HCV infection in the prison populations is intravenous drug use (IVDU) [4]. This population is also exposed to several other risk factors like high prevalence of HCV infection due to high risk-behaviors before incarceration, overcrowding, sharing of sharpened objects such as razors, transmission through homosexual intercourse and use of unsterilized instruments for tattoos within the prisons [5].

HCV infection is more frequently detected in inmates than in the general population. In a study analyzing the global prevalence of infections among prisoners and detainees from 2005 to 2015, HCV infection was observed to be highest. The estimated prevalence of HCV was 15.1% among the estimated 10.2 million people incarcerated worldwide on any given day in 2014, as compared to 3.8% of HIV, 4.8% of chronic HBV, and 2.8% have active tuberculosis infections [6].

There is a high risk of transmission of the virus among the general population after the release of the infected inmates. Therefore, prisons represent a high-risk environment and becomes an essential target for managing infections especially HCV, not only for treating the patient himself but also to restrict the diffusion of the disease among other prisoners and among the general population once the infected patient is discharged [5,7,8].

There have been various studies reporting the high prevalence and risk factors of HCV infection among prison population worldwide, but data from India is meagre. Singh et al. published an analysis of a pilot study performed on around 300 inmates in a district jail near Delhi in 1999. HCV prevalence was observed to be around 5% in this population [9].

Due to lack of data on HCV infection among prisoners in the Indian population, a survey-based analysis was designed with an objective to understand the prevalence and also to analyze the risk factors associated with it. A secondary objective was to evaluate the possibility of offering free HCV therapy to infected persons in the prison.

METHOD

We developed a questionnaire-based survey for prisoners in a district jail in West Uttar Pradesh (UP), India. After taking necessary permissions from jail authorities and Ethics committee clearance, the survey was conducted between 7th August to 18th September 2016.

The questionnaire comprised of questions on demographics, incarceration history, family history, educational background, marital status and a focus on risk factors including sexual history, heterosexual or homosexual, any contact with sex workers, any history of blood transfusion, surgery, tattooing, injecting drug use, drug addiction, and presence of comorbidities/co-infections. Their basic knowledge and understanding about hepatitis C and preference for therapy was also probed.

Screening of HCV was done using SD Bioline HCV Rapid Test kits, having a sensitivity of 100% (157/157 x 100) and specificity of 99.4% (1,035/1,041 x 100).

Information about current morbidities and HIV, HBV status was collated from personal history and jail medical officer's information.

RESULTS

1611 prisoners participated in the survey. Of these 1506 (93.48%) were males and the remaining 105 (6.32%), females. Consequently only 5 female prisoners were HCV positive. Since sub-analysis of this data would not be meaningful, we pooled the sexes for further analysis of both demographics and prevalence.

Table 1 summarises the demographics and also indicates the prevalence amongst that category of population. 163 men and 5 women made up the total of 168 HCV positive individuals

Prevalence is significantly higher in the inmates < 20 years and those unmarried. There was no relationship to education or prior profession. There was no relationship between whether a prison inmate is a convict or undertrial and their HCV status. There is a highly significant relationship between first imprisonment, subsequent imprisonments and HCV status. Those incarcerated one or more times earlier were more likely to be HCV positive

Prevalence rates differ significantly depending on how long one has been incarcerated. The numbers being maximum for 6-12 months incarceration

Risk factors: Table 2 depicts the relationship between HCV status and risk factors. Various risk factors ranging from family history, surgeries, addictions, sexual habits were evaluated. The only significant risk factors were IVDU, addiction to ganja and thinners, and those HIV positive were also likely to have HCV

The level of awareness about HCV among the inmates were dismal with 98% of them knowing nothing about the disease.

Treatment preferences: Table 3 lists the treatment preferences of the inmates. On being told about the disease and the availability of free medicine, 61% desired free treatment in hospital and 38% were willing to continue the same at home

DISCUSSION

Prevalence of HCV infection in India has been variously estimated as 0.9 and 1.9% [10]. Hepatitis C virus (HCV) is transmitted predominantly among people who inject drugs (PWID)^[11], with a prevalence in India ranging from from 37.2% [12] to 76.8% in a Mumbai study [13].

Drug use has been considered a crime in most countries, and PWID are often detained. Consequently the prevalence of HCV is high in incarcerated population. Incarceration is a common and independent risk factor of HCV acquisition [11].

The prevalence of HCV was 10.43 % in our sample, almost double the number obtained in 1999 by Singh et al^[9]. Zampino et al, 2015 [4] have summarised more than 20 studies about prevalence of HCV in prisons in various countries. It ranges from as low as 3% to as high as 80%. HCV prevalence increases with age [14], something not seen in our cohort, possibly because more than half our sample was below 30 yrs and 70% below 40 yrs.

There were significantly more cases of HCV in younger inmates. The absolute number of cases was 108 of 168 for inmates below 30. Unmarried persons had a higher prevalence of HCV. Surprisingly this factor has been evaluated only in Indian studies. There was no relation to education but 157 of 168 cases had either no education, basic education or upto class X.

There was no relation to profession, but jobless, agricultural labourers and unskilled workers formed bulk of the HCV positive inmates, 125 of 168.

On combining the above factors for analysis we noticed that if an inmate was < 20, unmarried and unskilled he had a higher chance of being HCV positive (Chi square= 29.47, df=2, p=0.00001)

Zampino et al [4] have recorded that the HCV prevalence progressively increased with the increase in age, from 7.9% in the age group younger than 25 to 58.5% in that over 45 years [4]. In our study inmates <20

years of age had a prevalence of 18.26% followed by the 60-70 yrs group at 12.77%. Singh et al in their study in Indian jails have gathered data on above parameters but not assessed their relationship to HCV, HBV or HIV [9].

If an inmate had already been to jail earlier the chances of his being HCV positive were high, as also with duration of incarceration. There was positive correlation for incarceration upto one year. Singh et al in 1999 estimated risk factors for HBV, HCV and HIV in prison population and had similar observations. The prevalence rate of all the 3 blood borne viral infections was significantly higher in those who were confined in the jail for more than 6- 12 months, HCV prevalence being 13.7% [9]. In two studies in Iran and Lebanon too, repeated incarceration was significantly associated with HCV infection among prisoners [15].

Other risk factors: Intravenous Drug usage (IVDU), tattooing, sharing toiletries, HBV, HIV, dental procedures, surgeries, MSM have been listed as risk factors for the high prevalence of HCV in prison inmates [4]. Keten et al (2016) found a relation between HCV and IVDU in prisons (20.3%) as well as outside [16]. Prevalence of HCV among drug users in prisons ranges from 8 to 95% [6]. In our study only 3 of 168 (1.79%) admitted to drug use and the relationship was positive.

MSM was reported by 1.6% of male prisoners in Iran, 19.3% in Pakistan, and 28.8% in Sudan [15]. In our study 99 (6.1%) individuals admitted to having had sex with men, of which only 6 were HCV positive.

Due to small numbers no relationship was found for MSM, sex with prostitutes, surgeries, blood transfusions, alcohol. The only items showing relation to HCV were ganja and thinner addiction, possibly as both are more readily available.

Awareness levels for HCV are miniscule, >95% prisoners knowing nothing about it. About 60% would like free therapy in prison and 40% would like to pay for it on being released.

CONCLUSION

Inmates who are PWIDs continue their activities in prison, often sharing needles syringes that are not adequately sterilized. They are also known to have sex with men or indulge in tattooing with unsterile equipment. This is a mobile population. They are moved between prisons, they are released into society and could be re-incarcerated for a new offence. This helps propagate the disease in the confines of the prison and outside [9,17,15].

Since it is now possible to cure HCV using a course of Direct Acting Antivirals, one might be able to limit the spread of HCV from prisons to society and within the confines of the prison. Use of interferon-free HCV therapies using direct-acting antiviral agents for HCV treatment as prevention strategies, particularly in the prison setting, can produce 90–95% rates of HCV eradication [6].

The aim of this survey was to assess the burden of HCV so as to be able to arrange free treatment in prisons. Prisoners are willing to take therapy in prison as well as outside but that alone will not help prevent spread in the community.

Our data does provoke some thoughts about remedial measures other than making drugs available.

Prevalence was highest amongst the young and unmarried group, indicating the need for sex education and awareness about safe sex at a young age. Although marriage was not a related factor, 72 of 168 positive cases were married. This brings forth the need to test their spouses and offer therapy to positive cases if one has to control the spread of HCV. So awareness and selective evaluation of spouses and sexual partners is the key along with availability of medicines.

Table 1: Demographics and HCV Prevalence

Category	No. of individuals	Percentage of total	Number HCV positive	Prevalence % in this category subgroup	Chi Square values
Sex					
Males	1506	93.48	163	10.82	$\chi^2 = 3.87, df = 1, p = 0.04$
Females	105	6.52	5	4.76	
Total	1611		168		
Data missing	0		0		
Age					
Below 20 years	241	14.96	44	18.26	$\chi^2 = 23, df = 6, p = 0.001$
21-30 years	663	41.15	64	9.65	
31-40 years	335	20.79	32	9.55	
41-50 years	176	10.92	9	5.11	
51-60 years	114	7.08	11	9.65	
61-70 years	47	2.92	6	12.77	
71 years and above	35	2.18	2	5.71	
Total	1611		168		
Data missing	0		0		
Marital status					
Unmarried	683	42.4	88	12.88	$\chi^2 = 21.52, df = 3, p = 0.000082$
Married	847	52.58	72	8.5	
Widowed	68	4.22	5	7.36	
Divorced/separated	5	0.31	3	60	
Total	1603		168		
Data missing	8		0		
Education					
None	399	24.77	50	12.53	$\chi^2 = 9.762, df = 4, p = 0.44, n.s.$
Basic	477	29.61	50	10.48	
Upto class 10	511	31.72	57	11.15	
Undergraduate	159	9.87	6	3.77	
Post graduate	55	3.41	5	9.09	
Total	1601		168		
Data missing	10		0		

Conted...

Prior profession					
None	269	16.7	24	8.91	$\chi^2 = 9.714$, df = 5, p = 0.08, n.s.
Agriculture	296	18.37	38	12.84	
Unskilled	424	26.32	63	14.86	
Skilled	72	4.47	5	6.94	
Salaried	193	11.98	19	9.84	
Professional	85	5.28	7	8.24	
<i>Total</i>	1339		156		
<i>Data missing</i>	272		12		
Trial status					
Convict	208	12.91	27	12.98	$\chi^2 = 0.1504$, df = 1, p = 0.698, n.s.
Undertrial	817	50.71	98	12	
<i>Total</i>	1025		125		
<i>Data missing</i>	586		43		
Incarceration history					
First imprisonment	896	55.62	112	12.5	$\chi^2 = 27.017$, df = 1, p = 0.00001
Prior imprisonment	38	2.36	16	42.11	
<i>Total</i>	934		128		
<i>Data missing</i>	677		40		
Duration of incarceration					
Less than 6 months	697	43.27	88	12.63	$\chi^2 = 57.399$, df = 5, p = 0.00000262
6- 12 months	166	10.30	31	18.67	
13-24 months	235	14.59	26	11.06	
25-60 months	268	16.64	23	8.58	
61-120 months	114	7.08	0	0	
More than 121 months	50	3.1	0	0	
<i>Total</i>	1530		168		
<i>Data missing</i>	81		0		

df - degree of freedom, n.s. - not significant

Note: Chi-square test of independence was the preferred inferential statistical technique given the nature of the data**Table 2: Risk factors and comorbid conditions**

Risk Factor	No and % of HCV + prisoners showing the risk factor	No and % of HCV - prisoners showing the risk factor	Chi square, df, p
Family History of HCV	1 (0.6)	3 (0.21)	0.9115, 1, p = 0.339, n.s.
Procedures			
Blood Transfusions	23 (13.69)	322 (22)	6.6504, 1, p = 0.009
Surgeries	17 (10.12)	256 (18)	6.211, 1, p = 0.012
Dental Surgeries	28 (16.67)	275 (19)	0.563, 1, p = 0.453, n.s.
Tattoos	73 (43.45)	558 (39)	1.448, 1, p = 0.229, n.s.
Sexual Risk Factors			
Prostitutes	62 (36.9)	480 (33.26)	0.894, 1, p = 0.344, n.s.
Men Having Sex with Men (MSM)	6 (3.57)	93 (6.44)	2.154, 1, p = 0.14, n.s.

Conted...

Substance Abuse			
Alcohol	91 (54.17)	710 (49)	1.483, 1, p = 0.223, n.s.
Sleeping Pills	7 (4.17)	14 (8.33)	0.0577, 1, p = 0.81, n.s.
Afeem	14 (8.33)	86 (5.96)	1.456, 1, p = 0.81, n.s.
Ganja	23 (13.69)	100 (6.93)	9.75, 1, p = 0.0017
Thinner	8 (4.76)	25 (1.73)	6.88, 1, p = 0.008
Prescription Drugs	2 (1.19)	31 (2.15)	0.688, 1, p = 0.406, n.s.
Co-morbid Conditions			
Drug Use	3 (1.79)	6 (0.42)	5.083, 1, p = 0.024
HIV	3 (1.79)	2 (0.14)	13.104, 1, p = 0.00029
Jaundice	4 (2.38)	18 (1.25)	1.43, 1, p = 0.231, n.s.
Chronic Pancreatitis	0 (0)	14 (0.97)	1.64, 1, p = 0.199, n.s.
Diabetes Mellitus	1 (0.6)	19 (1.32)	0.64, 1, p = 0.424, n.s.
Blood Pressure	1 (0.6)	50 (3.47)	4.04, 1, p = 0.04 n.s.
Tuberculosis	0 (0)	16 (1.11)	1.88, 1, p = 0.298, n.s.

Table 3: Treatment preferences

Category	Number overall (HCV+, HCV-)	Percentage out of those who answered the question (% of responding HCV+, %HCV-)
No treatment desired	7 (0, 7)	0.73 (0, 0.84)
Prefer free treatment in jail	588 (77, 511)	61.19 (62.6, 60.97)
Prefer paid treatment at home	366 (46, 320)	38.09 (37.4, 38.19)
$\chi^2 = 181.96, df = 2, p < 0.0001$		

Ethical Clearance: Taken from the District jail, UP to conduct surveys on the prisoners and publish the findings.

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Conflict of Interest: Ms. Natasha Dias (corresponding author) is currently associated with Hetero Healthcare Ltd. as Manager of Medical Services.

REFERENCES

1. Stanaway JD, Flaxman AD, Naghavi M, et al. The global burden of viral hepatitis from 1990 to 2013: findings from the Global Burden of Disease Study 2013. *Lancet*. 2016; 388:1081-1088.
2. Global Hepatitis Report 2017. Geneva: World Health Organization; 2017
3. Bertino G, Ardiri A, Proiti M, et al. Chronic hepatitis C: This and the new era of treatment. *World Journal of Hepatology*. 2016;8(2):92-106.
4. Zampino R, Coppola N, Sagnelli C, Di Caprio G, Sagnelli E. Hepatitis C virus infection and prisoners: Epidemiology, outcome and treatment. *World Journal of Hepatology*. 2015;7(21):2323-2330.
5. Ranieri R, Starnini G, Carbonara S, et al. Management of HCV infection in the penitentiary setting in the direct-acting antiviral sera: practical recommendations from an expert panel. *Infection*. 2017;45(2):131-138.
6. Dolan K, Wirtz AL, Moazen B, et al. Global burden of HIV, viral hepatitis, and tuberculosis in prisoners and detainees. *Lancet*. 2016; 388(10049):1089-1102.
7. Sander G, Scandurra A, Kamenska A, et al. Overview of harm reduction in prisons in seven

- European countries. *Harm Reduction Journal*. 2016;13:28.
8. Aspinall EJ, Mitchell W, Schofield J, et al. A matched comparison study of hepatitis C treatment outcomes in the prison and community setting, and an analysis of the impact of prison release or transfer during therapy. *J Viral Hepat*. 2016 Dec;23(12):1009-1016.
 9. Singh S1, Prasad R, Mohanty A. High prevalence of sexually transmitted and blood-borne infections amongst the inmates of a district jail in Northern India. *Int J STD AIDS*. 1999;10(7):475-8.
 10. Puri P, Anand AC, Saraswat VA, et al. Consensus Statement of HCV Task Force of the Indian National Association for Study of the Liver (INASL). Part I: Status Report of HCV Infection in India. *Journal of Clinical and Experimental Hepatology*. 2014;4(2):106-116.
 11. Bretaña NA, Boelen L, Bull R, et al. Transmission of Hepatitis C Virus among Prisoners, Australia, 2005–2012. *Emerging Infectious Diseases*. 2015;21(5):765-774.
 12. Solomon SS, Mehta SH, Srikrishnan AK, et al. High burden of HCV disease and poor access to HCV services among people who inject drugs in India: A cross-sectional study among 14,481 drug users across India. *The Lancet Infectious diseases*. 2015;15(1):36-45.
 13. Shukla A, Sharma A. Seroprevalence of Hepatitis B, Hepatitis C and Human Immunodeficiency viruses amongst Injecting Drug Users in Mumbai, India. *Journal of Clinical and Diagnostic Research : JCDR*. 2014;8(6):DL01-DL02.
 14. Jaquet A, Wandeler G, Tine J, et al. HIV infection, viral hepatitis and liver fibrosis among prison inmates in West Africa. *BMC Infectious Diseases*. 2016;16:249.
 15. Heijnen M, Mumtaz GR, Abu-Raddad LJ. Status of HIV and hepatitis C virus infections among prisoners in the Middle East and North Africa: review and synthesis. *Journal of the International AIDS Society*. 2016;19(1):20873.
 16. Keten D, Emin Ova M, Sirri Keten H, et al. The Prevalence of Hepatitis B and C Among Prisoners in Kahramanmaras, Turkey. *Jundishapur Journal of Microbiology*. 2016;9(2):e31598. doi:10.5812/jjm.31598.
 17. He T, Li K, Roberts MS, et al. Prevention of Hepatitis C by Screening and Treatment in U.S. Prisons. *Ann Intern Med*. 2016 Jan 19;164(2):84-92.

The Role of Management Function to the Achievement of Puskesmas Indicator as a Gatekeeper of National Health Guarantee in Bengkulu City

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ABSTRACT

The financing of national health insurance for referral health services is amounted to 45.47 trillion, while the cost of primary health care is amounted to 11.5 trillion. The largest capitation cost was received by the Public Health Center 73.6% with the number of cases referred to the hospital as much as 11.9 million and non-specialist referral 1.54 million cases. Capitation policy based on service commitment fulfillment is a performance indicator in first-level health facility/FLHF (FKTP), so it can be measured periodically. Public Health Center as one of the government-owned in first level health facility that provides the most services for the national health insurance participants (JKN) should be sought controlling referral. The purpose of the study is to analyze the role of management function on the control of referral from Public Health Center in Bengkulu City.

The research design is exploratory analytical or non experimental with quantitative and qualitative method approaches. In quantitative method, the unit of analysis is Public Health Center in Bengkulu City as many as 20 units. In qualitative method, the analysis variables are including aspects of places, actors and activities that interact synergistically. Limitation of problems in qualitative research focus on management functions.

Planning, implementing, controlling, and evaluating contribute to the achieving service commitment indicators. Public Health Center management performs tasks and functions in an integrated manner of all promotional, preventive and curative programs. The role of management functions indicates a moderate and positive effect, the better the management function the higher the indicator of service commitment. The mini workshop conducted by the Puskesmas every month discusses the achievement of programs, causes and solutions for disease prevention with high number of visits and the effort to improve the quality of services.

Planning, implementing, controlling, and evaluating are management functions of Public Health Center that are undertaken in integration and interconnection. It is needed to improve the management functions by making the planning based on situation/needs analysis, optimizing the role of stakeholders across sectors, strong commitment, professionalism, and integrated supervision evaluated monthly through its mini workshop to prepare solutions.

Keywords: *Management Function, Gatekeeper, Promotional and preventive.*

INTRODUCTION

National health insurance funding for referral health services amounted to 45.47 trillion, while the primary health care cost was 11.5 trillion which consisted of: capitation fee of 10.38 trillion and non capitation cost 710.8 billion. The largest capitation cost was received by the Public Health Center 73.6% with the number of cases referred to the hospital as much as 11.9 million and non-specialist referral 1.54 million cases. Referral from Public

Health Center is still higher than 10% and non-specialist referrals are still high. Bengkulu city in 2017 has 20 units of Public Health Center or 31.25% of total first-level health facility/FLHF and 42.61 registered participants in Puskesmas, with referral number 14.25%, ill visits 8.33% and healthy visit 1.69% of participants registered.

The Social Health Insurance Provider (BPJS) strives to improve the efficiency and effectiveness of health insurance by developing health service system,

developing quality control system of service and payment system of health service through capitation payment pattern to FKTP. This Service Commitment is a performance indicator in first-level health facility/FLHF so it can be measured periodically. The Public Health Center, one of the government's FLHF that provides the most services for JKN participants, needs to be directed to control the referral. The purpose of research is to know the role of management function on the control of referral from Public Health Center in Bengkulu City.

MATERIAL AND METHOD

The research design is exploratory analytical or non experimental with quantitative and qualitative method approaches. Quantitative method is used to know the role of Public Health Center management function to achieve the indicators. In the second phase, the analysis is on the policy of the role of the Puskesmas function as a national health insurance gatekeeper. The unit of analysis is Public Health Center in Bengkulu city as many as 20 units. Respondents include 4 (four) people per Public Health Center consists of Public Health Center heads, program managers and implementers. Qualitative methods will be used to analyze social situations that include aspects of places, actors and activities that interact synergistically. Limitations in qualitative research focuses on the function of Public Health Center management,

RESULTS

Implementation of Management Function: Management functions consisting of planning, implementing, controlling and evaluating has been done to achieve the performance of Public Health Center in the form of service commitment that is contact number (CN), non-specialist outpatient referral ratio (NSRR) ratio, and ratio of routine prolans participants to Public Health Center/first-level health facility (RRPP). A review of the role of management function to performance can be seen table 1.

Table 1: The Role of Management Function Analysis Towards the Public Health Center Performance

Variables	R	P value
Planning (P1)	0.515	0.000
Implementing (P2)	0.564	0.000
Controlling and evaluating (P3)	0.574	0.000
Planning, Implementing, Controlling and evaluating (P1,P2, P3)	0.621	0.000

Based on the result of stratiditik test, the planning variable is 0.515 with the p value 0.0005. Role of planning with performance shows the relationship is moderate and patterned positive. Variabel movement of the implementation is 0.564 with p value 0.0005. The role of movement of implementation with indicator of service commitment shows the effect of moderate and the pattern is positive. Monitoring variables, assessment control is 0.574 with p value 0.0005. The role of supervision, control and assessment with performance shows moderate and positive effect. The all variables are 0.621 with p value 0.0005. The role of management function to indicator of service commitment shows the effect of moderate and patterned positive, the better the function of management the higher indicator of service commitment.

The Public Health Center managers perform tasks and functions in an integrated manner in all promotive, preventive and curative programs. Puskesmas as a first-rate health facility (FKTP) has the function of improving public health status through promotive and preventive services. The results of interviews with the head of Puskesmas, all informants said the planning was prepared based on the analysis of the situation, national targets, and local policies, compiled integrated with a healthy Indonesian family approach (PIS-PK) program, and performance commitment indicator. Informant 1 said:

Preparation of planning based on situation analysis, National and Local programs and structured integrated with all indicators that become performance achievement

Public Health Center did the functions integrately starting from internal mini workshop program conducted Public Health Center every month and across sectors conducted every three months to discuss the achievement of the program, the cause of the problem and the solution. In accordance with the results interviewed with the head of the Public Health Center said:

In the implementation of mini workshop conducted socialization activities, problem-based evaluation results, identify solutions together with all staff, to develop a specific plan (Specific) in order to achieve targets that have not been achieved based on the evaluation results, scaling across the sector for Healthy city forum in mobilizing the community. If it is not achieved, then a home visit will be done.

Supervision of assessment control is done in general to all indicators. If the target is not reached at the scheduled time, the Public Health Center (Puskesmas) will make special efforts and re-planning discussed in the monthly mini workshop. This is in accordance with the results of interviews with informants:

Supervision of assessment control (evaluating) is carried out on a regular basis at the time of the monthly mini workshop. Indicators that have not been achieved are formulated to be evaluated, improved and followed up by Plan and Do, Check, Action (PDCA) prepared together with related officers and stakeholders (Informant 4).

The Role of Planning: The Public Health Center management is a series of activities that work systematically to produce effective and efficient performance. The systematic sequence implemented optimizes the management functions that are carried out in a sustainable and related manner. The function of planning can improve the achievement of Public Health Center performance. According to Ashton (2015), developing an integrated performance and incentive framework by providing a new performance measurement for health systems in New Zealand consists of; a) build and incorporate existing performance measures; b) national policy and shift towards integrated services; c) incorporating incentives for quality improvement, and (d) centering on performance¹. Integrated planning of all existing and new Public Health Center indicators improves performance outcomes. The polio program in Nigeria has achieved unprecedented benefits, despite the security and operational challenges. WHO's office in Nigeria recommends strengthening the mobilization of local resources and expanding the donor base to support polio strategies. Such efforts should also be adopted by strengthening health systems in the country as part of polio planning². Good planning will guide the evaluation to be more accurate and it is conducted by evaluation teams including the development of communication plan that outline stakeholder engagement, dissemination of results and reporting. According to ACI (2013) The program design outlines the steps and identifies the time frame, key roles, responsibilities and evaluation controls will assist in achieving the indicators³.

Planning by analyzing the situation, national policy, local policy and public health conditions affecting the

indicators, outlining the roles of all stakeholders, and informing the planning of all the elements involved can help to achieve the performance of the Public Health Center.

The Role of Implementation Activity: The mobilization of the Public Health Center work plan begins with informing the activity plan and outlining the roles to all health workers and to stakeholders in the program of cross-sector mini workshop. The evaluation of primary health care involves participatory an inclusive that collects reliable data sets target and intervention to improve outcomes. Reliable evidence facilitates planning and determines the relevance, progress, efficiency, effectiveness, impact, and sustainability of interventions. Monitoring and evaluation of primary health care cannot be separated. Monitoring ensures that healthcare programs are primed according to plan, while evaluation ensures they are on the right track according to plan, and impacts are established. Evaluation in primary health services provides reliable information to guide current and future decisions and actions of planning, and implementation processes of activities that may or may not be possible⁴. The development of health organizations is directly proportional to leadership processes, professional management, incentives and sufficient resources are progressively achieving service outcomes⁵. The mobilization and implementation of the Public Health Center plan begins with the situational, professional and incentive leadership applied. Optimal resource empowerment will improve performance outcomes.

The management of health organizations aims to contribute more efficiently and effectively to the process of health care being a priority and an established standard of quality. Opportunities for reorganization are established to address or face the social diversity and complexity that emerge in healthcare services. The organization of health services must be understood as a dynamic system by complexity capable of generating professional strategies and health managers, so as to combat constraints and promote diversity, to generate new ideas that can help improve the process of health care⁶.

The Role of Monitoring of Evaluation Control: Data collected regularly by health services can be used to operationalize the proposed health based on service evaluation. Use of an evaluation framework that links healthcare policy and performance to improve performance as part of continuous quality improvement. The main principles of health service evaluation and indicators can be successfully modified for purposes,

based on demographic and public health needs by ensuring flexibility and adaptation to the context. Integrated evaluation framework allows healthcare services to make decisions to modify the provision of services in response to community needs to improve public health⁷. Monitoring and evaluation when done correctly, on time and in place are the two most important aspects to ensure successful performance in monitoring design and performance systems. A performance monitoring system is the process of comparing the use of planned inputs and outputs from performance monitoring objectives providing information³. Supervision of Public Health Center assessment control can monitor and control obstacles and monitor performance achievement.

Planning, implementing, controlling and evaluating of Public Health Center are management functions that are undertaken in integrated and interconnection. Implementation of Functions Planning, implementation mobilization, supervision, control of the assessment contribute to the achievement of the indicator of service commitment. The Public Health Center as a health service facility that organizes public health efforts and individual health efforts of the first level, with priority promotional and preventive efforts, can reduce the number of sick brides and referrals to hospital. Stakeholders will be able to play a role after knowing and understanding the purpose of the program. It is need to improve the Function of Planning, mobilizing the implementation, supervision, controlling the assessment of health centers at the Health Center in Bengkulu City. Strong commitment and high professionalism should be involved so that the implementation runs optimally to achieve an indicator of service commitment⁷.

Policy of Service Commitment: The Compliance-based Capitation Service Commitment Policy is a performance indicator in FKTP so it can be measured periodically. Public Health Center implements the policy by implementing integrated management with indicators of healthy Indonesian program of family approach (PIS-PK), and other program indicator. The effort of achievement of contact rate indicator by conducting counseling to go to Public Health Center, home visit, Pick up Pain Healthy Back Home (JSPS). Efforts to capture indicators of prolancic visits by collecting participants who seek treatment, conduct counseling, all Friday morning, picked up, evaluated and picked up. Attempts to achieve non-specialist referral indicators by analyzing the results of sick visits to be discussed in mini workshops where activities have not been achieved for

re-planning, forming special teams, monthly evaluations are conducted on mini workshops.

Correlation of policy based on service commitment and health service efforts to evaluate target, together with BPJS officer, home visit, school health effort, and elucidation. The relationship of policy of quantity to the public health service. The concept of primary health care is still relevant to achieving a fair and quality healthcare service for everyone in Nigeria. Implementation efforts at all levels are needed to maximize the benefits of people who are oriented towards a health service approach⁸. The system-level measurement framework certainly has the potential to encourage improved health systems. Development of framework measures and implementation is the work to improve performance. The introduction of policies provides significant opportunities for health sector organizations to be involved on how best to achieve the desired health of system results, and to develop more effective processes between organizational collaborations⁹.

House visits conducted by Public Health Center in the effort to achieve the performance can affect the health of individuals and families, and improve the performance of service commitments. A healthy home is a personalized, team-based, primary health care model that promotes access to timely, coordinated, comprehensive, and sustainable primary health services. This model serves as a mechanism for managing primary care delivered by family practice teams for improving public health outcomes, patient satisfaction, and reducing per capita costs¹⁰.

The Government Social Health Insurance Organization (BPJS) strives to improve the efficiency and effectiveness of health insurance by developing health service system, developing quality control system of service and payment system of health service through capitation payment pattern to FKTP. The Compliance-based Capitation Policy This Service Commitment is a performance indicator in FKTP so it can be measured periodically. The Public Health Center is one of FKTP that can optimize management functions to give service and control the referral from Public Health Center.

CONCLUSION

Planning, implementing, controlling, and evaluating are management functions of Public Health Center that are undertaken in integrated and interconnection. The implementation of the function of Public Health Center

management plays a role in the achievement of the indicator of service commitment. Public health centers organize health promotion prioritizing promotional and preventive, in order to reduce the number of sick bronze and referral to the hospital. It is needed to improve the Management Functions by planning based on situation/needs analysis, optimizing the role of cross-sector stakeholders, strong commitment, professionalism, and integrated supervision evaluated monthly through its mini workshop to develop solutions.

Conflict of Interest: The authors declare that there is no conflict of interest

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REFERENCES

1. Ashton T. Measuring health system performance: A new approach to accountability and quality improvement in New Zealand. *Health Policy*. 2015; 119.
2. Yehualashet YG, Horton J, Mkanda P, Vaz RG, Afolabi O, Gashu SG, Banda R, Malley HO, Nsubuga P. Intensified Local Resource Mobilization for the Polio Eradication Initiative: The Experience of World Health Organization in Nigeria During 2008–2015, *The Journal of Infectious Diseases*. 2016;213.(Suppl 3).
3. Agency For Clinical Innovation (ACI). Understanding Program Evaluation An ACI Framework. Agency for Clinical Innovation. 2013. website at:www.aci.health.nsw.gov.au
4. Adindu A. Effective Monitoring and Evaluation of Primary Health Care Interventions Requires Participatory Approach. *Journal of Advancement in Medical and Pharmaceutical Sciences*. 2010; 4(1):93-97:2006-1153.
5. Lapao LV, Arcencio RA, Popolin MP, Ludmila Rodrigues BB. The role of Primary Healthcare in the coordination of Health Care Networks in Rio de Janeiro, Brazil, and Lisbon region, Portugal. *Ciencia & Saude Coletiva*. 2017;22(3):713-723.
6. Lapao LV. The role of complexity dynamics in the innovation process within the new primary-care governance model in Portugal. *Innov J*. 2008;13:1-12.
7. Humphreys CRJ, Wakerman J. A comprehensive health service evaluation and monitoring framework . *Evaluation and Program Planning*.2015;53:91–98.
8. Aigbiremolen, A.O., Alenoghena, I., Eboime, E, Abejegah C. Primary Health Care in Nigeria: From Conceptualization to Implementation. *Journal of Medical and Applied Biosciences* ISSN. 2014:6(2):2277-0054.
9. Chalmers LM, Ashton T, Tenbensen T. Measuring and managing health system performance: An update from New Zealand. *Health Policy*. 2017;121:831–835
10. Neilsen M, Buelt L, Patel K, Nichols LM.. The Patient-Centred Medical Home's Impact on Cost and Quality. *Annual Review of Evidence* 2014-2015. Washington, DC: Patient- Centered Primary Care Collaborative. 2016.

Factors Associated with Sexual Behavior of College Students in Palangkaraya

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ABSTRACT

Adolescent reproductive health is strongly influenced by the reproductive and sexual behavior of adolescents. This study aims to analyze the influence of knowledge, residence, leisure time, peer endorsement, parental monitoring, information access, attitudes, perception, and intention to influence the sexual behavior of college student in Palangkaraya. The research used was analytic observational with a cross-sectional study design conducted at student college, Palangkaraya, Kalimantan Tengah Province. The population in this study were unmarried and 18-24-year-old students with a sample size of 240 people. The correlation test results showed no influence of knowledge, leisure time, parental monitoring, attitudes and perceptions on sexual behavior $p > 0.05$, meanwhile, peer support, information access, and intention have an effect on sexual behavior $p < 0.05$. The most influential factor is intention ($p=0.001$; $Exp.B=17.102$) where the respondent with strong intention in sexual behavior, 17.102 times will conduct risky sexual behavior. This study shows that there is a significant influence between peer support, information access, and intent on the sexual behavior of college students in Palangka Raya.

Keywords: *knowledge, residence, leisure time, peer support, parental monitoring, information access, attitudes, perception, intention, sexual behavior*

INTRODUCTION

Sexually transmitted infections (STIs) and HIV/AIDS are increasing from year to year and become a public health problem throughout the world, one of them is a developing country like Indonesia. In Indonesia, HIV/AIDS cases are dominated by productive age groups of 20-24 years old by 12,537 people¹, 82.8% transmission through heterosexual relations.² Increasing of STI cases are indicative of high-risk sexual behavior, which can facilitate the transmission of HIV and increase the risk of HIV transmission by 3-5 times greater than without STIs.³

The case of HIV/AIDS in Kalimantan Tengah in the last six years has increased from 64 HIV cases in

2011 to 674 cases in 2016 and AIDS cases from 21 cases to 223 cases.⁴ Based on data from Central of Health Centers 2016, HIV in the age group of 20-24 years about 12.26%, AIDS by 5.94%.⁵ While the case of HIV year 2016 in Palangkaraya, aged 20-24 years by 29.63% , HIV/AIDS by 15.79% , STI group age 20-24 years old 87.50%.⁶ Abortus case in 2013 until 2017, age 15-24 as many as 19 cases of 34 people who became pregnant.⁷

One type of behavior that is harmful to health is likely to increase in adolescence is a risk behavior that premarital sexual behavior among unmarried adolescents aged 15-24 years.⁸ Starting from an unhealthy courting behavior brings the consequences of an unwanted pregnancy. A healthy dating will avoid the risk of diseases such as STIs (STDs), unwanted pregnancy, cervical cancer, sexual violence⁹, negative mental health¹⁰ which can lead to not only physical and psychological disorders.^{11, 12}

There are 35 of the students in Palangkaraya who became respondents were 27 people (77.14%) had had pre-marital sex with their girlfriend.¹³ In 2014, respondents aged 15 years to 24 years as many as 113

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samples showed 35% of the first-time sexual activity in the dormitory, 52% sexual intercourse did at home.¹⁴ *Conted...*

MATERIALS AND METHOD

This research is a quantitative research with cross-sectional design. The research was conducted on students at one of the universities in Palangkaraya. The population in this study was 5981 people from the age of 18 to 24 years with a total sample of 240 people in the select based on the formulated hypothesis for two proportion two directions.¹⁵ Sampling by proportional stratified random sampling conducted among 240 students. Criteria age 18-24 years, ever or being courting, willing to engage in research, and not married. Data collection using questionnaire and honesty test using L-MMPI scale.

FINDINGS

Table 1: Univariate Analysis of Variables

No.	Variable	Total (N = 240)	%
1.	Residence		
	At risk	133	55.4
	Not at risk	107	44.6
2.	Knowledge average		
	Below	89	37.1
	Above	151	62.9

3.	Opportunity or leisure time		
	High	57	23.8
	Low	183	76.3
4.	Peer endorsement about negative things		
	Strong	24	10.0
	Weak	216	90.0
5.	Parental monitoring		
	Low	58	24.2
	High	182	75.8
6.	Access to a negative information		
	High	15	6.3
	Low	225	93.8
7.	Attitude		
	Negative	2	0.8
	Positive	238	99.2
8.	Perception of behavior control		
	Bad	7	2.9
	Good	233	97.1
9.	Intention		
	Strong	16	6.7
	Weak	224	93.3
10.	Sexual behavior		
	High risk	69	28.8
	Low risk	171	71.3

Table 2: Bivariate Analysis of Variables

No.	Independent Variabel	Sexual Behavior				P value	OR 95% CI	
		At risk		Not at risk				
		n	%	n	%			
1.	Residence						0.221 ^a	1.488 (0.840-2.637)
	At risk	43	32.3	90	67.7			
	Not at risk	26	24.3	81	76.2			
2.	Knowledge average						0.081 ^a	1.730 (0.978-3.059)
	Below	32	36.0	57	64.0			
	Above	37	24.5	114	75.5			
3.	Opportunity or leisure time						0.709 ^a	1.195 (0.627-2.777)
	High	18	31.6	39	68.4			
	Low	51	27.9	132	72.1			
4.	Peer endorsement about negative things						0.002 ^a	4.098 (1.722-9.756)
	Strong	14	58.3	10	41.7			
	Weak	55	25.5	161	74.5			
5.	Parental monitoring						0.108 ^a	1.755 (0.939-3.282)
	Low	22	37.9	36	62.1			
	High	47	25.8	135	74.2			

Conted...

6.	Access to a negative information						
	High	12	80.0	3	20.0	0.000 ^b	11.789 (3.212-3.274)
	Low	57	25.3	168	74.7		
7.	Attitude						
	Negative	1	50.0	1	50.0	0.493 ^b	0.400 (0.025-6.487)
	Positive	68	28.6	170	71.4		
8.	Perception of behavior control						
	Bad	1	14.3	6	85.7	0.677 ^b	0.404 (0.048-2.423)
	Good	68	29.2	165	70.8		
9.	Intention						
	Strong	14	87.5	2	12.5	0.000 ^b	21.509 (4.740-97.611)
	Weak	55	24.6	169	75.4		

Table 3: Multivariate Analysis of Variables

Variable	P value	Odds Ratio (OR)	95% CI
Peer endorsement about negative things	0.036	2.921	1.071-7.967
Live in the same residence (dormitory)	0.061	1.883	.971-3.649
Intention	0.001	17.102	3.449-84.792
Access to a negative information	0.000	11.512	2.957-44.816

From the table 3, the most influential factor is intention ($p=0.001$; $Exp.B=17.102$) where the respondent with strong intention in sexual behavior, 17.102 times will conduct risky sexual behavior.

DISCUSSION

The findings of this study reveal while the student often accesses and increase source of negative information then behavior sexual of college student tends to be increasingly. Period of teens is a development period where individual thirsty for adventure, likes risk, as well as want something new and challenge for them on natural could reach turbulent conditions.¹⁶ The information media also has a negative impact on the psychological development of children and adolescents, unwittingly affects knowledge and attitudes that can lead to behavioral changes toward lifestyles that are at risk of premarital sexual behavior because teenagers easily try and imitate what they hear and see from the mass media because they do not yet know the full sexual problems of their parents.^{17,18,19,20} Youth exposure to the pornographic material without proper guidance is associated with an increased tendency to engage in sexual activity.²¹ Students more closely watched pornography were

associated with potentially riskier sexual behavior and increased pornographic exposure was associated with hooking up events.²² Uncontrolled mass media and internet exposure can negatively affect youth sexual behavior.²³ Television media affects adolescent beliefs about sex.²⁴ Internet use affects knowledge of sexuality and student sexual behavior.²⁵

The findings of this study reveal support for the negative affecting the occurrence of risky sexual behavior in college students, this is because most students experimented with greater independence where at this time students spend more time with friends than with parents, and peer relationships become increasingly influential in socio-social development and strongly influence adolescent sexual behavior to replace family bonds^{20,26} greater during early adolescence until adulthood²⁷ acceptance of peer groups increases excitability creates a sense of pride and security.²⁸ Habits of discussion, exchanging information about sexuality issues and the number of friends who have had premarital sexual intercourse become a factor that causes teenagers to have pre-marital sex with their partners.²⁹ Young people have freedom when they are away from family, talk to peers and sexual partners about sex more

than sexual health problems and friends are considered a source of important advice and information about sex, conversations about sex among young people tend to produce norms that affecting positive or negative pressure on individuals to adapt to group standards.³⁰ The negative influence of peers is the style of promiscuity in the form of courtship when ordinary friends kiss with their girlfriend, it is justified that he kissed also this is because teenagers tend to develop their own norms that conflict with prevailing norms.³¹ Classmates are the most important source of information and knowledge about sex from college friends versus internet, novels and porn movies to learn about sex. Peer influence strongly associated with the risky sexual behavior of Bahamian youth, peer involvement at risk of having a strong influence on adolescent risky sexual behavior.³²

The findings in this study reveal the intention to influence the occurrence of risky sexual behavior in college students. When a person has full control, the intention is the most proximal determinant of behavior, and in the context of sexual activity, sexual intent refers to a person's desire to plan sexual activity and based on the sexual intention theory precedes the activity sexual. Students who have the intention to engage in risky sexual behavior result from having a partner and experience in the past. The experience is driven by the knowledge of students who still think that premarital sex is intercourse. The loosening of social norms that exist in the environment around adolescents, causing them to be free to do premarital sex without any limitations or prohibitions.³³ From the data of this study there are 18.3% of respondents said they have a desire to express feelings of love requires physical intimacy with a partner and 15.9% have the desire to express love through sexual relationships with girlfriends. The commitment of relationship has a positive effect on the conduct of premarital sex behavior on Seja students.

CONCLUSION

The risky sexual behavior in college students who have dating influenced by the support of their friends about negative things, access to information and the intention of the students themselves. Sexual behavior intentions, negative peer support, negative information access can play a role in increasing the occurrence of risky sexual behavior in college students. The most influential variable in the occurrence of risky sexual

behavior in the student is the intention of sexual behavior (OR=17.102).

Ethical Clearance: Before conducting the data retrieval, the researchers conducted a decent test of ethics conducted at the Faculty of Medicine, Lambung Mangkurat University to determine that this study has met the feasibility. Information on an ethical test that the study is eligible to continue. The feasibility of the research was conducted in an effort to protect the human rights and security of research subjects.

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REFERENCES

1. Infodatin. *The situation of AIDS Disease in Indonesia*. Data and Information: Information KKRPDd, editor. Jakarta: Ministry of Health. 2016.
2. Ministry of Health. *Indonesia Health Profile*. Jakarta: Ministry of the Health Republic of Indonesia. 2015.
3. CDC. *The Role of STD Prevention and Treatment in HIV Prevention*. 2010
4. Kalimantan Tengah Health Office. *Health Profile 2016 of Kalimantan Tengah Province*. Palangka Raya: Central Kalimantan Health Office. 2017.
5. Health Office. *Health Profile 2015 of Kalimantan Tengah Province Palangka Raya*: Central Kalimantan Provincial Health Office. 2016
6. Health Office. *Health Profile of Palangkaraya City 2016*. Palangka Raya: City Health Office Palangka Raya. 2017.
7. Doris Sylvanus Hospital. *Reporting of Medical Record Data of 2016*. Palangkaraya: Doris Sylvanus Hospital. 2016.
8. Meilani N, Shahuliyah Z, Suryoputro A. Mother's Behavior in Early Teens of Sexuality Education. *Journal of National Public Health*. 2014 8(8): 411-7.
9. Sari DP. The Relationship Between Parent Perception Against Sexuality And Quality

- Communication Parents Children With Sexual Behavior Pranikah Teens in Serengan District Surakarta. *Jurnal Ilmiah Rekam Medis dan Informatika Kesehatan*. 2013 3(2): 47-60.
10. Morgan E. Outcomes of Sexual Behavior Among Sexual Minority Youth. *Journal of New Direction for Child and Adolescent Development*. 2014 (144):21-36.
 11. Mubarokah K, Veria VA. *Difference Knowledge, Attitudes, And Sexual Behavior of Students Semester 2 and 6 at Dian Nuswantoro University Semarang*. Research Report. 2012.
 12. Musthofa SB, Winarti P. Factors Affecting Premarital Sex Behavior Students In Pekalongan Year 2009-2010. *Journal of Reproductive Health*. 2010. 1(1):33-41.
 13. Mikdar UZ. *Student Social Behavior in Place of Conditions*. Surabaya: Jenggala Pustaka Utama; 2016.
 14. Indonesian Family Planning Association. *Report on the Survey of Palangkaraya*. Indonesian Family Planning Association of Kalimantan Tengah, National Family Planning Agency of Kalimantan Tengah. 2014.
 15. Lameshow S, David H. *Large sample in Health Research (translation)*. Yogyakarta: Gadjah Mada University Press; 1997.
 16. Santrock JW. *Adolescents*. Adolescence. 2. 11 ed. Jakarta: Erlangga Publishers; 2007.
 17. Marmi. *Reproduction Health*. Yogyakarta: Publisher Pustaka Pelajar; 2013.
 18. Banun F, Setyorogo S. Factors Associated With Sexual Behavior Pranikah Student Semester V STIKes X East Jakarta 2012. *Jurnal Ilmu Kesehatan* 2013 5(1):12-8.
 19. Rusmiati D, Hastono SP. Teen Attitudes toward Virginity and Sexual Behavior in Dating. *Jurnal Kesehatan Masyarakat Nasional* 2015 1(1): 29-36.
 20. Sarwono SW. *Adolescent Psychology*. Jakarta: PT Raja Grafindo Persada; 2016.
 21. Awaluddin M, Ahmad N, Saleh N, Aris T, Kasim N, Sapri N, et al. Prevalence of Sexual Activity In Older Malaysian Adolescents And Associated Factors. *Journal of Public Health Aspects* 2015 2.
 22. Braithwaite S, Coulson G, Keddington K, Fincham FD. The Influence of Pornography on Sexual Scripts and Hooking Up Among Emerging Adults in College. *Journal Archives of Sexual Behavior*. 2015 44(1): 111-23.
 23. Olarinmoye OS, Olarinmoye EO, Adebimpe WO, Omisore AG. Effect of Mass Media and Internet on Sexual Behavior of Undergraduates in Osogbo Metropolis, Southwestern Nigeria. *Journal of Adolescent Health, Medicine and Therapeutics*. 2014 5:15-23.
 24. Chillisa B, Mohiemang I, Mpeta K, Musamba T, Ntshwarang P, Heeren A. Why Wait 'til Marriage? The Determinants of Premarital Sex among Adolescents in a Country in Sub-Saharan Africa: Botswana. *Journal of Human Behavior in the Social Environment* 2013 23(8): 972-979.
 25. Agbede, Kio, Ajetunmobi. Analysis of the Influence of The Internet On Sexual Education and Sexual Behavior among Adolescents in Nigeria Universities: The Case Of The University Of Lagos. *Journal of Biology, Agriculture, and Healthcare*. 2016 6(16): 74-83.
 26. Suwarni L, Selviana. The Initiation of Prenuptial Sex of Adolescents In Pontianak City and Its Affecting Factors. *Jurnal Kesehatan Masyarakat*. 2015 10(2): 169-177.
 27. Coley R, Medeiros B, Schindler H. Using Sibling Differences to Estimate Effects of Parenting on Adolescent Sexual Risk Behaviors. *Journal of Adolescent Health*. 2008 43(2): 133-40.
 28. Karyati S, *Editor of the Social Environment, Peers, Spirituality and Sexual Behavior of Street Children*. The 5 Th Urecol Proceeding; 2017; UAD, Yogyakarta.
 29. Yudia S, Cahyo K, Kusumawati A. Premarital Sexual Behavior in Kost's Students (Case Study In Higher Education "X" In West Jakarta Area). *Jurnal Kesehatan Masyarakat* 2012 6(1): 819-25.
 30. Gezahegn T, Birhanu Z, Safe M, Dessalegn M, Abera A, Nyagero J. Peer Communication On Sex And Sexual Health Among Youths: A Case Of Debre Berhan University, Ethiopia. *The Pan African Medical Journal*. 2016 25(2).

31. Mesra E. Peer Influence Against Youth Sexual Behavior. *Jurnal Ilmiah Bidan*.2016 1(2): 34-41.
32. Wang B, Stanton B, Deveaux L, Li X, Lunn S. Dynamic Relationships Between Parental Monitoring, Peer Risk Involvement and Sexual Risk Behavior Among Bahamian Mid-Adolescents. *Journal International Perspectives on Sexual and Reproductive Health*. 2015 41(2): 89-98.
33. Ahiyanasari CE, Nurmala I. Intention of High School Students to Prevent Premarital Sex. *Jurnal Promosi Kesehatan*. 2017 5(1): 36-47.
34. Nuandri VT, Widayat IW. The Relationship Between Attitudes Toward Religiosity with Attitudes Toward The Tendency of Premarital Sex Behavior in Late Adolescents Who Are Dating at Airlangga University Surabaya. *Jurnal Psikologi Kepribadian dan Sosial*. 2014 3(2): 67.
35. Suwarni L. Parental Monitoring and Peer Behavior Against Sexual Behavior of Senior High School in Pontianak City. *Jurnal Promosi Kesehatan Indonesia*. 2009 4(2): 128.

Increasing Midwifery Skill for Pregnancy Health Care with Ammuntuli Bija Tianang Na Beja-Beja Model

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ABSTRACT

Background: Maternal mortality rate is the assessment indicator of a country's public health status and welfare. In addition, high maternal mortality rates in an area indicate that the maternal health care system is still poor. The study aim to describe midwife skill for pregnancy health care in Jeneponto district.

Method: Qualitative study was conducted among 26 respondent, consisting sub head of District health office (DHO), midwife coordinator of DHO, head office of primary health care (PHC), midwife coordinator of PHC, Midwife, and pregnant woman.

Result: Study result shown that midwifery skill in pregnancy health care was still low. Internal factors of a midwife were low knowledge level, not good attitude, low motivation, and access obstacle to workplace. External factors of midwife were less number of midwife, less number of health care facility, low knowledge level of pregnant woman, culture not supporting pregnancy health care system, family's economy, and access to health care facility. Although, government's funding has been adequate and training for midwife has been implemented, but the implementation of these activities has not been able increased maternal health services and reduced maternal mortality rate. The coverage of maternal health services was still low and the maternal mortality was still high.

Conclusion: Pregnancy health care program in Jeneponto district has not been implemented optimally. It was influenced by low midwifery skill in pregnancy health care. Increasing number of midwife, improving skill of midwife, and *Ammuntuli bija tianang na beja-beja* model are recommended to increase pregnancy health care.

Keywords: *Ammuntuli (Home visit), Pregnancy Health Care, Midwifery*

INTRODUCTION

There are 287,000 mothers die every year in the world. Most maternal deaths are caused by direct obstetric causes.¹ Maternal deaths Sub Saharan Africa was 510 per 100,000 live births and maternal deaths in South Asia was 90 per 100,000 live births. Previous

study reported that only 42% of pregnant women birth delivery at health services and only 34% of women received postnatal care from a trained medical provider within 48 hours after delivery.²

Indonesia Demographic and Health Survey 2012 shown that maternal mortality rate (related to pregnancy, delivery, and childbirth) amounted to 359 per 100,000 live births. Maternal deaths in South Sulawesi Province 2014 Mortality is 138 people or 93.20 per 100,000 live births. Jeneponto district (193/100,000 live births) are ranked fourth after Bone (240/100,000 live births), Gowa (240/100,000 live births), and Luwu (293/100,000 live births).³

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The World Health Organization has identified several ways in reducing and preventing pregnancy-related morbidity and mortality by exercising: 1) access to antenatal care during pregnancy, 2) skilled birth midwives, and 3) postnatal care after birth.⁴ Home visit program was recommended to improve maternal and child health services. Home visits a program was conducted in Uganda, Bangladesh, India and Pakistan by public health cadres or Village Health Teams. They are designed to bridge the public health problem.⁵

Midwives play an important role in reducing maternal and infant morbidity and mortality.⁶ Previous studies found that home visits are able to identify various problems that cause of low health care among pregnant women.^{4,7,8}

The high maternal mortality rate in Jeneponto district is due to bleeding, eclampsia, infectious diseases, and late referral as well as low midwives' competence. This is seen from the number of midwife services, health services in Jeneponto district is still low.⁹ The weak ability of the midwife becomes one of the important keys to the success of health services including the increase of midwife's ability in pregnant women health service. This study aim to describe pregnant woman health service by the *ammunutli bija tianang na beja-beja* in Jeneponto Regency.

MATERIALS AND METHOD

This research was conducted six primary health care (Puskesmas) at Jeneponto district. They were community health centers: Rumbia, Tolo, Bulu Sibatang, Bonto Matene, Bululoe, Bontoramba.

This study used qualitative research methods. Criteria informants in this study were midwives working in Community Health Centers where research conducted. The number of informants as many as 26 people consist of head section of maternal and child health and Nutrition, head of The Community Health Centers, midwife coordinators, midwives, and pregnant mothers.

Data collection techniques in this qualitative research. The research question is based on the operational definition of the variables described by sub-variables and indicators in the research instrument. The final stage is documentation study by performing profile, midwife ability, result of service survey of pregnant mother, Standard operational procedure in service. Analyze data using content analysis.

RESULTS

Characteristics of informants: Number of informants as many as 26 people. There are 2 male and 24 female informants. one Head Section Maternal and Child Health and Nutrition Department of Health, one midwife coordinator, six Head of Community Health Centre, six midwife Community Health Center coordinator, six village midwife, and six pregnant mother. Level of informant education as many as 4 people of high school, 7 persons 3-year diploma, 6 persons 4-year diploma, 3 persons undergraduate and 4 persons Graduate. Most of informants have age 20 to 30 years and majority of informants have work duration over 5 years. Informants who have married as many as 13 people and 9 people not married.

In this research, the themes are based on research objectives. From the results of the researcher's analysis of the results of interviews with the informants, formulated two themes, namely: coverage of pregnant women and midwife's ability.

Understanding of Midwives Against Maternal Health Services:

From the interview results obtained various causes of low services maternal health. But in general the informants are still less understanding about the definition of services health pregnant women is the process of performing services to pregnant women from the time of pregnancy, childbirth until childbirth. Most informants understand the causes of low maternal health services. The informants said that the facilities are still lacking, the quality of service, the number of workers, the knowledge of pregnant women, the cultural factors, access to health facilities and socioeconomic factors of pregnant women and the role of cross-sector are still low.

"Midwife in Jeneponto still lack knowledge, their skill, Sir... because in college less dealing with patients, not trained hard, they are also lazy, their attitude is also not good for patients, so they need to be trained so that the ministry be increased" (Midwife, Coordinator Midwife)

"Knowledge and skill midwife still low so that the ability of pregnant maids is still low, it is necessary to have refresher training such as, Ante Natal Care, Normal delivery care, and handling complications, especially the problem of attitude training in the service, including facilities are still less such as equipment, drugs, have Village

health Pos (poskesdes) and ride in people's homes for service, beside that there is still society culture about massage at 'appassili' event, in tumpu, and there are still not eating certain food like kelor, papaya, squid etc **“(Midwife, Head of Community Health Center)**

Ammuntuli (Home visit): Home visit: understanding of maternity health services in health facilities and health services of pregnant women with *ammuntuli* (home visit). In general, the understanding of informants about the services health of pregnant women is still not good. Informants have done various activities that are considered as a form of services health of pregnant women in the form of services in Village Health Post, pregnant women class, referral system and Integrated Health Post activities.

There are complaints from informants due to the limited number midwives and lack of health facilities, culture and customs of the people that still exist and the role of cross-sector is still less that greatly affect the effort of health service of pregnant woman.

“I work alone, Sir.. I also serve general patients so hard to carry out the job well..... especially I ride in school, Sir Facilities are also not complete, the drug is also lacking, the community is also low knowledge, there are normal pregnant women check up but go with her husband out of the area and come back after giving birth, sometimes if we tell them not to get too tired, but they will not understand, pregnant women also help her husband in the fields, gardens so that there is usually a miscarriage, which is difficult, pregnant women who will trouble, later arrive later birth so there is no service ANC, SOP also not exist in poskesdes **“(Midwife, Village Midwife)**

Ability midwives in maternal health care: The observation result identified that the activity appeared not optimal and that shows conditions of in the service poor living conditions health pregnant women overall. Only pregnant women who come alone are served by midwives in puskesmas, poskesdes, and posyandu. In addition, the atmosphere and condition of supporting facilities of health services has not been sufficient, so there are still activities in health centers, poskesdes, Posyandu and sometimes there are services performed under the local residents, which can certainly hamper activities that should be done well.

“Midwife in jeneponto still lack knowledge, their skill, Sir because in college less dealing with patients, not trained hard, they are also lazy, their attitude is also not good for patients, so they need to be trained so that the ministry be increased **“(Midwife, Coordinator Midwife)**

“Ouch I am dizzy to see the village midwife now is not as it used to be, now it can not be counted on, the midwife is still less They can not work, the report is flighty, their knowledge is still low, the attitude is also not good proofed by many pregnant women are not served well, there are still many deaths of pregnant women, **“(II – Ib, Ns, Ks)**

Documenting at the district level or primary health care on maternal health services also is not be found in the Regional Health System of Jeneponto Regency Year 2016 and Regulation of Jeneponto Regent Number 22 year 2016 about position, organizational structure, duty and function and work procedure of district health office of Jeneponto. Those documents, none of which contain the important and technical implementation of home visits. Although the results of Focus Group Discussion activities obtained information that at the national level there is on Health Services pregnant women and guidelines for the implementation of a healthy Indonesia program with a family approach.

DISCUSSION

This study shows that in general the midwife has understood the main duty and function and knows the effort in health services of pregnant women. But in the implementation has not done optimally and thoroughly. This condition is caused by the supporting facilities and infrastructure of pregnant women is still limited and the lack of midwives. Support from various cross-sector level of District level also not maximized. So that it can inhibit the implementation of maternal health services optimally.

Analysis of research results related to understanding of maternal health services by midwives is good⁹. Integrating health worker to learn and appreciate the culture of society are so many benefits and challenges. These skills can be diverted to many areas where people make home visits to find the condition of pregnant women more thorough.¹⁰ Home visits have proven to be an effective approach to developing maternal

health services.¹¹ This study found that monitoring, understanding of duties and the absence of regulation on home visit becomes an obstacle in its implementation. Even though, good home visits require administrative support in the form of written regulations.¹² Visits home that works is a process that requires the willingness and expertise of a midwife. Individual attributes are not enough. As advised by policy makers, governments should encourage the scope and utilization of such labor by updating policies.¹³ So that condition is still lack of midwife and facility by implementing program of addition of manpower and facility.

In this study revealed that there are many activities that show the form of health services pregnant women on daily health services. Activities in the form of posyandu services, healthy families, pregnant women's classes. Future home visit programs should use a strategy where Household visits can reduce premature births and prevent low birth weight births, improve maternal knowledge, reduce access to facilities and speed up the referral process.^{14,15}

Home visits in some studies suggest that it is difficult to deal with social issues presented by the family. This feedback highlights the importance of ongoing training, where home visitors will be trained to address the challenges arising from intervention, home visits capable of detecting knowledge, problem solving, physical changes in pregnancy, and psychological problems and social environment support. Discusses immigration, unstable work and finances, family relationships and the dynamics and delivery services, keeping up during pregnancy.^{16,17}

Situation factors that affect the behavior of utilization (income, home visits by officers and frequency of visits). Officers need to use health care services based on their perceived and / or clinically evaluated disease (type and stage of disease). The results showed that the utilization of health services with home visits a positive relationship with family income. Thus, continuous home visits need to be done to strengthen information, education and communication to improve basic health care and service utilization, improve environmental health.¹⁸

This research still has various limitations, namely the number of Puskesmas which become less research location, informant which is still not evenly distributed all the Puskesmas research location, the informant is

sometimes hard to find when the researcher is in the research location because doing a lot of work either inside building or outside the building.

CONCLUSIONS

In Jeneponto district various health care programs in the community have been run by the government through the National Health Service programs but maternal Health Care has not run optimally.

RECOMMENDATION

Ammuntuli bija tianang na beja-beja model is recommended to become a reference for midwife in improving health service of pregnant mother in Jeneponto district.

Conflict of Interest: There is no any conflict of interest within this study and publication

Ethical Clearence: This study was obtained ethical clearance from Hasanuddin University ethics committee with number: 965/H4.8.4.5.31 /PP36-KOMETIK / 2017.

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REFERENCES

1. Singh S, Doyle P, Campbell OM, Mathew M, Murthy GV. Referrals between Public Sector Health Institutions for Women with Obstetric High Risk, Complications, or Emergencies in India - A Systematic Review. *PLoS One*. 2016;11(8):e0159793.
2. Gebhardt G, Rahman M, Yunus FM, et al. A Controlled Before-and-After Perspective on the Improving Maternal, Neonatal, and Child Survival Program in Rural Bangladesh: An Impact Analysis. *Plos One*. 2016;11(9):e0161647.
3. Bishai DM, Cohen R, Alfonso YN, Adam T, Kuruvilla S, Schweitzer J. Factors Contributing to Maternal and Child Mortality Reductions in 146 Low- and Middle-Income Countries between 1990 and 2010. *PLoS One*. 2016;11(1):e0144908.
4. Mangwi Ayiasi RK, P.Batwala, V.Criel, B.Orach, C. G. Effect of Village Health Team Home Visits and Mobile Phone Consultations on Maternal and Newborn Care Practices in Masindi and

- Kiryandongo, Uganda: A Community-Intervention Trial. *PLoS One*. 2016;11(4):e0153051.
5. Sulawesi-Selatan DKP. Profil Kesehatan Dinas Kesehatan Profinsi Sulawesi-Selatan 2014. 2015.
 6. Eyasu Tamru Bekru1 AC, Antehun Alemayehu Anjulo3*. Job satisfaction and determinant factors among midwives working at health facilities in Addis Ababa city, Ethiopia. *Plos one*. 2017.
 7. Denise Kendrick RE, Michael Hewitt, Michael Dewey, Mitch Blair, Jane Robinson, Debbie Williams, Kathy Brummell. Does home visiting improve parenting and the quality of the home environment? A systematic review and meta analysis. *group.bmj.com*. 2016.
 8. Kaba M, Bulto T, Tafesse Z, Lingerh W, Ali I. Sociocultural determinants of home delivery in Ethiopia: a qualitative study. *International journal of women's health*. 2016;8:93-102.
 9. Green BN, Johnson CD. Interprofessional collaboration in research, education, and clinical practice: working together for a better future. *The Journal of chiropractic education*. Mar 2015;29(1):1-10.
 10. J. B. Interprofessional collaboration an introduction. 2014.
 11. MacDowell M, Glasser M, Weidenbacher-Hoper V, Peters K. Impact of a rural interprofessional health professions summer preceptorship educational experience on participants' attitudes and knowledge. *Education for health*. May-Aug 2014;27(2):177-182.
 12. Wong HJ MF, Nair S. . Risk factors of malnutrition among preschool children in Terengganu, Malaysia: a case control study. *BMC public health*. 2014.
 13. Mangwi Ayiasi R, Atuyambe LM, Kiguli J, Garimoi Orach C, Kolsteren P, Criel B. Use of mobile phone consultations during home visits by Community Health Workers for maternal and newborn care: community experiences from Masindi and Kiryandongo districts, Uganda. *BMC public health*. Jun 18 2015;15:560.
 14. Ferguson JM, Vanderpool RC. Impact of a Kentucky Maternal, Infant, and Early Childhood Home-Visitation Program on Parental Risk Factors. *Journal of Child and Family Studies*. 2012;22(4):551-558.
 15. Ichikawa KF, T.Nakayama, T. Effectiveness of Home Visits in Pregnancy as a Public Health Measure to Improve Birth Outcomes. *PLoS One*. 2015;10(9):e0137307.
 16. Julie Bull GM, Catherine Swann, Caroline Mulvihill. Health Development Agency Ante- and post-natal home-visiting programmes: a review of reviews Evidence briefing. *Health Development Agency*. 2004.
 17. Mezgebu Yitayal1, Yemane Berhane2, Alemayehu Worku3 and Yigzaw Kebede1. Health extension program factors, frequency of household visits and being model households, improved utilization of basic health services in Ethiopia. *BMC Health Services Research*. 2014.
 18. Nievar MA, Van Egeren LA, Pollard S. A meta-analysis of home visiting programs: Moderators of improvements in maternal behavior. *Infant Mental Health Journal*. 2010;31(5):499-520.

Effect of Educational Intervention Followed by Reminders Regarding Participation of Women in the Cervical Screening Programme

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ABSTRACT

Background: In India, the cervical cancer cases had increased from 0.11 million in 2000 to 0.16 million in 2010. The proportion of the range is increased from 15 % to 55 % female cancers from different parts of India. Over 80% of the cervical cancer cases reported in the hospitals in advanced stage and annually 80,000 deaths are reported in India

Objective: To assess the participation of women for cervical screening after reminders through telephone calls, written letters and Mails

Methodology: Pre experimental design; one- group pretest post- test design was used and study was conducted in selected Urban Health Centers. The sample size was 167 and multistage sampling technique was used. The information booklet was administered which had the information on secondary prevention and early detection of cervical cancer. In the pretest structured interview was conducted, after intervention post test was conducted. Reminders were given those who have not participated in the screening on the day of intervention

Results: Results shows that, on the day of intervention 19.10%, after giving reminder by written letters 42.70%, Reminder by written letters 42.70%, reminder by telephone calls 38.20 % of the participants have participated in cervical screening and none of the women was participated by SMS reminder.

Conclusion: It is concluded that reminder by written letters has more effective than other reminders.

Keywords: Educational intervention, reminders, participation of women, cervical screening programme.

INTRODUCTION

Cervical cancer is the second most common cancer among women worldwide, with an estimated 528,000 new cases and 266,000 deaths among women each year [1]. A disproportionate number of these cases (85 %) and deaths (87 %) occur among women living in low and middle income countries. Women living with HIV are at increased risk of developing cervical cancer [2,3,4] and experience more rapid progression of the disease [5, 6, 7]. Since 1993, cervical cancer was classified as an AIDS-defining illness [8].

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The World Health Organization (WHO) advocates a comprehensive approach to cervical cancer prevention and control to identify opportunities to deliver effective interventions [9]. Cervical cancer-related research has increased significantly over the past decade, representing biomedical, behavioral, and policy level findings. Existing review papers synthesize knowledge and advancements for multiple areas of focus within the larger effort of cervical cancer prevention and treatment, e.g., biomarkers for cervical cancer [10, 11], HPV vaccination for young adolescent women [12, 13, 14, 15], and feasible approaches to screen and treat adult women in low resource settings [16, 17, 18, 19, 20]. The purpose of this systematic review is to assess and characterize recent research within a broader public health framework, utilizing well-known public health terminology to organize and assess the range of

efforts to respond to cervical cancer. In this context, these include: Primary Prevention (preventing the initial onset of cervical cancer), Secondary Prevention (early detection by screening and treatment of precancerous cervical lesions), Tertiary Prevention (treatment of cervical cancer to reduce morbidity and mortality), and Quality of Life (post-treatment care or palliative care for those without treatment options) among women in African countries. Literature highlighting feasibility considerations (accessibility, affordability, health care infrastructure, and provider training) and findings specific to HIV-infected women are integrated as appropriate in each public health category.

The most effective secondary preventive strategy for cervical cancer is systematic screening of women through an organized program along with treatment and follow-up of the screen detected precursor lesions. Cervical screening should be advocated for all ever sexually active women within a certain age group irrespective of whether they have any complaints, because there are often no signs and symptoms of cervical precancers. The national guideline for cervical cancer screening in India advocates screening of women between 30 years to 59 years of age. The focus on detection and prevention of cervical cancer must be emphasized in a highly populated country like India.

METHODOLOGY

In this study researcher has used Research Design: Pre experimental design; one- group pretest post- test design. This study was conducted in selected urban health centres. Samples were age group between 30-60 years attending Gynec OPD were selected as sample for the present the study. Multi sampling technique was used and four hospitals were selected using simple Radom Sampling technique, two hospital s were selected by adopting lottery technique. For selecting the samples systematic sampling technique was used. The total sample size was 167.

Structured questionnaire was used to collect the data by using interview techniques. Tool was consisting of three sections, Section I of the tool consisted of information related to socio demographic variables, section II consisted of identification of women by considering the risk factors. Section III consisted of participation women in the cervical screening after intervention and reminders. The tool was developed

by the researcher in context to the women age group between 30-60 years attending Gynec OPD.

The value of Cronbach's Alpha (α) as evaluated for the scored questions pertaining to aforesaid factors of this study is **0.98**, which can be interpreted as 'Excellent' as per predefined value ranges and their interpretations. The data collection process began from 29-01-2017 to 31-3-2017.

Formal administrative permission was obtained from the ethical committee of the institution for conducting the final the study. Then investigator approached the concerned authorities for obtaining the necessary permission and cooperation. Written Consent was taken from the participants, explained about the pre test, post test questionnaire, time duration needed; scoring system was explained to the subjects.

Investigator approached the subjects when attending Gynec OPD. Using interview technique questionnaire was filled followed by distribution of information booklet (written). Invitation letters were given to all the participants for cervical screening programme and the reminders by written , SMS and telephone calls given to the participants , who has not participated

RESULTS

Table 1: Distribution of participants based on demographic characteristics

n = 167

Demographic variables	f	%
Age in years		
30 – 35	63	37.72
36 – 40	32	19.16
41 – 45	34	20.35
46 – 50	15	8.98
51 – 55	12	7.18
56 – 60	11	6.58
Educational status		
Graduate & PG	63	1.79
Intermediate or diploma	32	6.58
High school	34	24.55
Middle school	15	56.28
Primary school	12	10.77

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Occupation		
Profession	0	0
Semi-profession	0	0
Clerical, shop owner, Farmer	12	7.18
Skilled worker	6	3.59
Semi skilled worker	27	16.16
Unskilled worker	59	35.32
Unemployed	63	37.72

Majority of the participants were observed in the age group between 30-45 years. Least percentage of participants are seen the age group 51-60 years.

Most of participants have completed middle school, high school, and primary school education. Least percentage of participants have completed graduation and intermediate.

Majority of participants were unemployed, across all three groups, we see that there is a significant proportion of participants who are unskilled workers and unemployed and however there is least percentages of participants corresponding to profession, semi profession, Clerical, shop owner and skilled worker occupation category and the least percentage of the participants fall in the income group of less than 1802 INR, more than 36017 INR and 18000-36016 INR

Table 2: Distribution of participants based on marital history

n = 167

Variables	f	%
Marital status		
Single	4	2.39
Married	138	82.63
Married separated	10	5.98
Widowed	15	8.98
Age in years at the time of marriage		
≤15	45	26.94
>15	122	73.05
Duration of marriage in years		
1 – 5	15	8.98
6 – 10	31	18.56
11 – 15	34	20.35
16 – 20	28	16.76
>20	59	35.32

Majority of the participants were married after 15 years and around 26 to 35 % of participants got married before 15 years of age and most of the participants have completed more than 20 years married life,

Table 3: Distribution of participants based on sexual and obstetrical history

n = 167

Variables	f	%
Age in years for onset of sex		
≤ 15	38	22.75
16 – 20	99	59.28
21 – 25	20	11.97
26 – 30	6	3.59
>30	4	2.39
Age in years for first child birth		
≤15	8	4.79
16 – 20	111	66.46
21 – 25	43	25.74
26 – 30	5	2.99
Parity(No. of births beyond 24 weeks of gestation)		
1 – 2	87	52.09
3 – 5	76	45.50
6 – 8	4	2.39
>8	0	0
No of children		
0 – 2	99	59.28
3 – 4	62	37.12
≥5	6	3.59
No. of life time sexual partners		
1	155	92.81
2 – 3	12	7.185
4 – 5	0	0
Use of temporary Family planning		
Yes	29	17.36
No	138	82.63

In Written education group, 19.10% underwent screening immediately after education, and 42.70% underwent screening after reminders given by written letters, none of them have participated in screening procedure after the reminders given by Reminder by SMS after written letter and 38.20 %underwent for screening after given by reminder by telephone

Most of the participants had sexual exposure between 16 to 20 years, gave birth to their first child at the age between 16-20 years , para was 1-2 and 3-5, most of the

participants had 1-4 children and a very high proportion of the participants had only one partner and majority of participants had never used family planning methods

■ Have you ever screened for cancer of the cervix ■ Yes ■ No



Fig. 1: Responses of participants with regard to screening for cervical cancer

Majority of the participants 97 % of participants have never screened for cervical cancer. Only 3% of participants, have participated in cervical screening programme

Table 4: Participation of women in cervical screening after interventions and reminders

n = 167

No of participants (n) in cervical screening	89	
Parameters	f	%
On the day of intervention	17	19.10
Reminder by written letters (within 15 days)	38	42.70
Reminder by SMS (within 15 days)	0	0
Reminder by telephone call (within 15 days)	34	38.20

19.10% underwent screening immediately after education, and 42.70% underwent screening after reminders given by written letters, none of them have participated in screening procedure after the reminders given by Reminder by SMS after written letter and 38.20 % underwent for screening after given by reminder by telephone calls.

DISCUSSION

In our study, majority of the participants, about 97 % have never screened for cervical cancer. Only 3% of participants, have participated in cervical screening programme. Similar results found in other study (Ami R. Moore, Nichola Driver , 2014) about 92 % of women have never participated . In this study researcher found

that about 7.18% of women had more than 2-3 sexual partners which is highly risk factor for cervical cancer. Similar finding are seen in other study (Ami R. Moore, Nichola Driver , 2014) ie, about 17 % of women had more than two sexual partners [21].

In this study on the day of intervention 19.1% of women had participated in cervical cancer. Reminders by written letters got increased about 42.7% and there is good response by telephonic calls. But reminders by SMS, none of the participants have participated in cervical screening programme. Eight studies were included in letters reminders versus standard care (Buehler 1997; Heranney 2011; Jibaja-Weiss 2003; Miller 2013; Radde 2016; Tavasoli 2016 Torres-Mejia 2000 ; de Jonge 2008). Letter reminders did not improve cervical cancer screening (OR 1.20 95% CI 0.93, 1.55, 345835 participants, 8 studies, Heterogeneity: Tau² = 0.11; Chi² = 563.75, df = 7 (P < 0.00001); I² = 99%, random effects). Test for overall effect: Z = 1.43 (P = 0.15) [22]

In other study (Seeta Devi , Dr. Prabha Dasila,) , the results showed that, poor participation in cervical screening was noticed in written information booklet group²³. One study analyzed the effect of SMS reminders on cervical cancer (Abdul 2013). SMS reminders increased cervical cancer screening (OR 1.19 95%CI 0.77 to 1.84, 500 participants, 1 study, test for heterogeneity not applicable, fixed effects). One study examined the effect of call reminders on diagnosing CN 2+ (Broberg 2013). The result has shown the call reminders improved CN 2+ diagnostic (OR 2.00 95% CI 0.81 to 4.97, 8000 participants, 1 study, test for heterogeneity not applicable, fixed effects[22]).

However this study proved that multiple reminders for motivating women to participate in cervical screening programme.

CONCLUSION

Cervical cancer continues to be a one of the major public health problem in India, but screening using Pap test or VIA is practical and feasible even in rural settings. Risk factors for cervical cancer in this study (age of participants, age of the first pregnancy, sexual behavior, and number of children, number of sexual partners, awareness on cervical cancer) were similar to those previously described. Implementation of cervical cancer screening programme on all eligible women is

compulsory to find out the precancerous cells and start the treatment. Creating awareness on cervical screening programme is one of the major responsibilities for all health care professionals as in our study majority of the participants do not have the knowledge on cervical screening procedures and its importance.

Conflict of Interest: Nil declared

Source Funding: Self

Ethical Clearance: This study is ethically approved by MGM university of health sciences

REFERENCES

1. Globocan. Cervical Cancer: Estimated Incidence, Mortality and Prevalence Worldwide in 2012 [Internet]. International Agency for Research on Cancer (IARC); 2012.
2. Frisch M. Human Papillomavirus-Associated Cancers in Patients With Human Immunodeficiency Virus Infection and Acquired Immunodeficiency Syndrome. *J Natl Cancer Inst.* 2000;92(18):1500–10.
3. Hawes SE, Critchlow CW, Faye Niang MA, Diouf MB, Diop A, Touré P, et al. Increased Risk of High-Grade Cervical Squamous Intraepithelial Lesions and Invasive Cervical Cancer among African Women with Human Immunodeficiency Virus Type 1 and 2 Infections. *J Infect Dis.* 2003;188(4):555–63.
4. Hawes SE, Critchlow CW, Sow PS, Touré P, N'Doye I, Diop A, et al. Incident high-grade squamous intraepithelial lesions in Senegalese women with and without human immunodeficiency virus type 1 (HIV-1) and HIV-2. *J Natl Cancer Inst.* 2006;98(2):100–9.
5. Clarke B, Chetty R. Postmodern cancer: the role of human immunodeficiency virus in uterine cervical cancer. *Mol Pathol MP.* 2002;55(1):19–24.
6. Maiman M, Fruchter RG, Serur E, Remy JC, Feuer G, Boyce J. Human immunodeficiency virus infection and cervical neoplasia. *Gynecol Oncol.* 1990;38(3):377–82.
7. Petry KU, Scheffel D, Bode U, Gabrysiak T, Köchel H, Kupsch E, et al. Cellular immunodeficiency enhances the progression of human papillomavirus-associated cervical lesions. *Int J Cancer J Int Cancer.* 1994;57(6):836–40.
8. Centers for Disease Control and Prevention; National Center for Infectious Diseases Division of HIV/AIDS. 1993 Revised Classification System for HIV Infection and Expanded Surveillance Case Definition for AIDS Among Adolescents and Adults [Internet]. [cited 2014 Dec 12].
9. World Health Organization (WHO). Comprehensive cervical cancer prevention and control: a healthier future for girls and women [Internet]. 2013.
10. Freitas AC, Coimbra EC, Leitão Mda CG. Molecular targets of HPV oncoproteins: potential biomarkers for cervical carcinogenesis. *Biochim Biophys Acta.* 2014;1845(2):91–103.
11. Flepisi BT, Bouic P, Sissolak G, Rosenkranz B. Biomarkers of HIV-associated Cancer. *Biomark Cancer.* 2014;3:11–20.
12. Cunningham MS, Davison C, Aronson KJ. HPV vaccine acceptability in Africa: a systematic review. *Prev Med.* 2014;69:274–9.
13. Hopkins TG, Wood N. Female human papillomavirus (HPV) vaccination: Global uptake and the impact of attitudes. *Vaccine.* 2013;31(13):1673–9.
14. Levin A, Wang SA, Levin C, Tsu V, Hutubessy R. Costs of Introducing and Delivering HPV Vaccines in Low and Lower Middle Income Countries: Inputs for GAVI Policy on Introduction Grant Support to Countries. *PLoS ONE.* 2014;9(6):e101114. Metcalfe JZ, editor.
15. Perlman S, Wamai RG, Bain PA, Welty T, Welty E, Ogembo JG. Knowledge and Awareness of HPV Vaccine and Acceptability to Vaccinate in Sub-Saharan Africa: A Systematic Review. *PLoS ONE.* 2014;9(3):e90912. Hozbor DF, editor.
16. Anorlu RI, Ola ER, Abudu OO. Low cost methods for secondary prevention of cervical cancer in developing countries. *Niger Postgrad Med J.* 2007;14(3):242–6.

17. Boisen M, Diedrich JT, Lonky NM, Guido R. Secondary prevention of cervical cancer part 1: screening for cervical cancer and its precursors. *Clin Obstet Gynecol.* 2014;57(2):279–91.
18. Guido R. Secondary prevention of cervical cancer part 2: initial management of abnormal cervical cancer screening test. *Clin Obstet Gynecol.* 2014;57(2):292–301.
19. Guido R, Lonky NM, Diedrich J. Secondary prevention of cervical cancer part 3: evidence-based management of women with cervical intraepithelial neoplasia. *Clin Obstet Gynecol.* 2014;57(2):302–15.
20. Roque DR, Wysham WZ, Soper JT. The surgical management of cervical cancer: an overview and literature review. *Obstet Gynecol Surv.* 2014;69(7):426–41.
21. Ami R. Moore, Nichola Driver. Knowledge of Cervical Cancer Risk Factors Among Educated Women in Lomé, Togo: Half-Truths and Misconceptions. *Sage journal.* 2014;1-8
22. Tamuzi Lukenze Jacques. Effectiveness of mHealth to Increase Cervical Cancer Screening: Systematic Review of Interventions. *International Journal of Research.* 2017;4(3):909-954
23. Seeta Devi , Dr. Prabha Dasila. Effect of Education Bundle on Prevention and Early Detection of Cervical Cancer and Participation of Women in Cervical Screening Procedures. *International Journal of Health Sciences and Research.* 2017;7(11):167-175.

A Study on Customer Experience in E-Tailing and Retailing

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ABSTRACT

The purpose of this paper is to explore the relationships between the various determinants and customer experience in the retail and e-tail markets which is widely seen in the Indian market place. A survey of 100 respondents was carried out with the help of a questionnaire. Descriptive (frequency and percentage) and cross tabulation chi-square statistical techniques were used to check the hypothesis and to analyse the data. Shopping atmosphere of the hyper market and quality of the service of the hyper market are considered to be the most significant predictor for the hyper market. Choice of variety, price and the accessibility factors are the major determinants and attracting factors of the online shopping. The results included in this research about the demographic variables and the determinants of customer experience are focused on hyper and retail markets respectively. This paper provides retailers with specific knowledge of the determinants that the customer considers being most important and significant contributor to an enhanced customer experience. It is suggested that the retailers take note of the significant predictors while developing retail format strategies. It also identifies the demographic characteristics of these customers. Understanding the customer and the key determinants of his experience are critical to the retailer in order to withstand the competition in the Indian market. This paper is original because only few studies of this nature have been attempted in Indian context. This descriptive study makes use of demographics and determinants which contribute to a superior customer experience for the retail and e-tail markets.

Keywords: e-tailing, re-tailing, hyper market.

INTRODUCTION

Retailing in India is one of the pillars of its economy and accounts for 14 to 15 percent of its GDP (Mc Kinsey,2007).In 2010, larger format convenience stores and supermarkets accounted for about 4 percent of the industry, and these are present only in large urban centers. Any retail outlet chain (not a one shop outlet) that is professionally managed (even if it is family run) can be termed as organized retailing in India if it has the following features accounting transparency (with proper usage of MIS and accounting standards), organized supply chain management with centralized quality control and sourcing.(Zameer and Mukherjee,2011).This accounts for 7 percent of India's roughly \$435 billion retail market and is expected to reach 20 percent by 2020.

In order to achieve long-term financial benefits, companies must design and deliver a service that satisfies customers so that they have a positive experience during the service encounter (Lovelock et al., 2004).Managers need to recognize the importance of creating value for their customers in the form of experiences (Berry et

al., 2002). Offering products or services alone is not enough organization must provide their customers with satisfactory experience. It is said that companies should be urged to create market experiences by creating places (real or virtual) where they can try out offerings as they indulge themselves in the experience.

Dramatic technology changes have contributed vastly to improve the shopping experience of customers (Corbett, 2006).The customer experience is defined as the combination of everything you do or fail to do for that matter, that underpins any interaction with a customer or potential customer.(Shaw, 2005).According to Shaw (2005) the customer experience is the next competitive battle ground and it will provide a source of sustainable differentiation.

This study zooms the factors that induces the consumer to make purchase in online and retail stores. Research is limited to large scale operation in the retail sector(Hyper market).As both the options are easily available, what factors induces a customer to make a purchase in online and retail stores. To know about the satisfaction the customer derives online and retail stores.

REVIEW OF LITERATURE REVIEW ON RETAILING

Keith E. Thompson, Yat Ling Chen, (1998) “Retail store image: a means end approach”; The study was made to move explore the link between perceived store image and the personal values. Hedonic values of “enjoyment and happiness” and “quality of life” were found to be the terminal values most sought by consumers in association with store image. These were linked through the consequence “nice feeling” to the tangible attributes of “price”, “quality” and “reputation”. The study illustrates an application Of means-end methodology in a retail environment, and the results provide a platform for fashion store image and positioning strategies⁴.

Solgaard, H. S., & Hansen, T. (2003). A hierarchical Bayes model of choice between supermarket formats: Several store attributes that were considered important for the consumer’s evaluation of stores. These attributes included merchandise, assortment, merchandise quality, personnel, store layout, accessibility, cleanliness and atmosphere⁶.

Ailawadi and Keller, 2004: The atmosphere of the retailer can have a significant impact on the purchase behaviour and perception of the customer. Color, music, and design can all influence whether or not a customer chooses to patronize a retail store and how much time and money is spent in the retail unit. The in-store atmosphere of a retailer can also have an affect on how the customer perceives the quality of merchandise as well¹.

Zee Sun Yun, Linda K. Good, (2007) “Developing customer loyalty from etail store image attributes” Journal of service theory and practice: The purpose of this paper is to enquire e-tail store attributes that develop customers’ positive perceptions of e-tail store image, and determines whether or not they develop a sense of loyalty to an e-tailer.. The study indicate that e-tail store image is derived from e-merchandise, e-service, and e-shopping atmosphere influences e-patronage intentions, which thus leads to e-loyalty. The research identifies attributes, unique to online shopping that serve as the basis for conceptualizing e-tail image as a second order factor.

Verhoef et al., 2009: Service interface refers to the interaction between the customer and the service person throughout their entire experience with the retailer. Assortment can be described as the ability of the retailer to offer a wide array of products to the customer with variety, uniqueness, and quality. The retail brand is an important element to consider when attempts are made

to understand the creation of the ultimate customer experience. There are two types of brands considered by the customer, the retail brand (e.g. Wal-Mart) and the brand sold within the store (e.g. Coca-Cola). In turn, the customer’s behaviour can be influenced by their perception of the specific brand and the type of brand

Ladhari (2009) found that service quality is regarded as the top priority of firms at the present time because it gives the company a competitive advantage. It also helps for future growth and increases efficiency.

REVIEW ON E-TAILING

Wolhandler (1999): Internet provides a big convenience for shopper as the main reason for the shopping online has been agreed by most of researcher and customers. Due to the feature of Internet, it allows customer to shopping online anytime and anywhere, which means customer can browse and shopping online 24-hours a day, 7 days a week from home or office, which attracts some time-starved shoppers come to Internet for save time to searching products in physical store.

Jongeun Kim (2004) Understanding Consumers Online Shopping and Purchasing Behaviors explored the differences between four potential groups of web users, the current non-web user, the user who only visits web stores with no intention to buy, the Internet browser who has an intention to purchase online but has never done so, and the person who has made an online purchase. The research focused on understanding the differences among the four groups in terms of demographics, current technology use and access, and current attitudes towards making an online purchase. The research identified two factors, a consumer factor and a marketing factor, among the four groups. Differences in demographics and technology use were also noted between the groups. Based on the findings such as the relationship between time spent online and online buying and the significant of the consumer factor, suggestions were offered to retailers interested in selling via internet.³

Chen (2009) online consumer behavior: An empirical study based on the theory of planned behavior extends the theory of planned behavior (TPB) by including ten important antecedents as external beliefs to online consumer behavior. The results of data analysis confirm perceived ease of use (PEOU) and trust are essential antecedents in determining online consumer behavior through behavioral attitude and perceived behavioral control. The findings also indicate that cost reduction helps the consumer create a positive attitude toward the purchase.²

Parikh Darshan (2011) Customer acceptance of internet shopping in India: Impact of shopping orientations, knowledge and security” revealed that demographic indicators such as age, gender, marital status, and income have been traditionally used in the study of consumer behavior and market segmentation, shopping orientations have also emerged as reliable discriminators for classifying different types of shoppers based on their approach to shopping activities Researchers have tapped into shopper orientations to study patronage behavior among elderly consumers, catalog shoppers, out-shoppers, and mall shoppers Further, shopping orientation could be used to segment customers and formulate different strategies based on each segment’s relative propensity to adopt and use online shopping⁵.

Sunita Guru (2013) : A study of trust and perceived risk in Online Shopping found that online shopping is predominately male, young, single and educated. Internet usage pattern in terms of average time spent, place of accessing internet, main tasks accomplished and types of sites visited using internet between both buyers, and non-buyers were almost same. The majority of the online buyers ask for product return/money refund in case of dissatisfaction with the product. It is found that around 42% of the respondents were not sure whether they want to buy or not in the next 2/3 months. The three most important factors contributing to trust on online merchants were keep promises and commitments, will care for my welfare and when in problem will help me. Only significance difference between benevolence and qualification was found. No significance difference between income and ability, benevolence and integrity was found⁷.

OBJECTIVES OF THE STUDY

The main objective of the study is to bring out the experience of the customer in Retail and E-Tail shopping

1. To bring out the demographic profile customers of the online stores & retail stores.
2. To bring out factors influencing customers towards buying in online stores and retail stores.
3. To determine the factors of the customer satisfaction

HYPOTHESIS

1. There is no significant relation between occupation and the method of shopping.

2. There is no significant relation between price of the product afford in online and satisfaction level of the online customer.
3. There is no significant relationship between service quality of hyper market and satisfaction level in online shopping

RESEARCH METHODOLOGY

Descriptive research design is adopted to describe the characteristics of retail and E-tail customers, to identify the factors which satisfy the customer .The target population of my study is South Chennai and Purposive simple random sampling method was employed to collect data from the respondents. All the retail customers and the online customers above the age of 18 in the south Chennai city were considered for the study. Respondent for the study is the person who does shopping in supermarket/hypermarket and the online market within the limits of the south Chennai city. The geographical scope of the study is confined to south Chennai – which is one of the most vibrant markets in south India. Thus Chennai is one of the most happening places of south India. The city has several popular organized large scale retail outlets most of them domestic retail giants running chain stores in India. People are getting highly educated and the standard of living is comparatively higher when compared to other state in Tamil Nadu. People tend to purchase from the online stores. Thus the city was chosen as it had almost all major store formats and more people using online market which make the environment suitable for testing the model.

ANALYSIS AND RESULTS

The survey questionnaire consists of two parts: part-1 and part-2. The part-1 consists of questions connected to respondent’s demographic profile. The responses are measured using nominal scales. The second part-2 consists of items for customer experience.

Table 1: Sample characteristics

Variable	Level	Frequency	Percent
Age	18-24	8	8.0
	24-45	46	46.0
	45-60	43	43.0
	Above 60	3	3.0
Gender	Male	50	50.0
	Female	50	50.0

Conted...

Occupation	Self Employed	18	18.0
	Employed	42	42.0
	Student	26	26.0
	Retired	2	2.0
	Others	12	12.0
Income Group	Less Than 10,000	9	9.0
	10,001-20,000	16	12.0
	20,001-30,000	2	2.0
	30,001-40,000	9	9.0
	40,001-50,000	26	26.0
	Above 50,000	38	42.0

Table 1 provides sample characteristics for E-tail and Retail customers. Recently people using both the methods of shopping to make a purchase. Some products are being purchased in online due to some of the convenient factor and some of the products are being purchased in retail market due to tangibility option.

The questionnaire has been distributed equally to male 50 and the female 50. since the male and female make use of online and retail shopping method.

Approximately, 42 percent of the respondents are employed, 26 percent of the respondents were students, 18 percent of the respondents are self employed, 12 percent of the respondents are from the other categories' (House wives) and 2 percent of the respondents are retired.

Table 2: Showing Service Quality of Hyper Market

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	13	12.9	13.0	13.0
	Good	83	82.2	83.0	96.0
	Bad	3	3.0	3.0	99.0
	Worst	1	1.0	1.0	100.0
	Total	100	99.0	100.0	
Missing	System	1	1.0		
Total		101	100.0		

Table 2 shows 83 percent of the respondents declared quality of market service is good this is because the marketers always wanted to meet the requirements of the customer even after the purchase. post purchase service are also been made and home delivery service are also made to the customers even while having their purchase various coupons and vouchers are been provided to the customer as a complimented service and also they maintain customer service desk to look after the need and expectation of the customers and also in weekends during the rush times separate billing counters are arranged by the hyper marketers to avoid such long queues. Followed by 13 percent of the respondents reported as Excellent and 3 percent of the respondents reported bad and 1 percent of the respondents reported as Worst.

Table 3: Showing Online Purchase Frequency

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	weekly	8	7.9	8.0	8.0
	once per two weeks	14	13.9	14.0	22.0
	monthly	22	21.8	22.0	44.0
	occasionally	56	55.4	56.0	100.0
	Total	100	99.0	100.0	
Missing	System	1	1.0		
Total		101	100.0		

Table 3 shows 22 percent of the respondents make their purchase monthly in online shopping, this is due to the salaried class employees they get their salaries either one the first beginning of the month or on the month end, so

they obviously make their purchase on the monthly basis factor, followed by 14 percent of the respondents purchase in once per two weeks.8 percent of the respondents make purchase in online Weekly basis, is because some customers like to get purchase often when they do get bored or for their necessity purpose .Majority of the respondents that is 56 percent of respondents purchase online occasionally.

Table 4: Showing Overall Satisfaction in Online Shopping

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Satisfied	84	83.2	84.0	84.0
	Dissatisfied	16	15.8	16.0	100.0
	Total	100	99.0	100.0	
Missing	System	1	1.0		
Total		101	100.0		

Table 4 shows 84 percent of the respondents are satisfied with online shopping, whereas 16 percent of the respondents are dissatisfied.

Ethical Clearance: Taken from UGC Committee

Source of Funding: SELF

CONCLUSION

The present study had given knowledge about various factors that influence the customers to purchase a product and also the determinants of the customer satisfaction factors in online and retail market. This helps the managers to draw appropriate strategies to attract and hang on customers by providing the better-quality experience.

Shopping atmosphere of the hyper market and quality of the service of the hyper market are considered to be the most significant predictor for the hyper market. Choice of variety, price and the accessibility factors are the major determinants and attracting factors of the online shopping. It is suggested that the retailers to take note of these determinants while framing the retail strategy.

The study has also some limitation. The data collected are from south Chennai and the sample is restricted to 100 for both users of online and retail market. The questionnaire have been issued to the customers who are using both retail and online market. In addition to this the sample procedure was simple random sampling and thus it inherently brings all limitation of it. Finally this findings may not be applicable to other geographical area outside India due to various formats.

It is assumed that the study would be useful to retailers and researchers as it provides a insight into various phase to a customer experience which in turn may create a deeper bond towards marketers outlets and will directly impact the purchase behavior of the customer.

Conflict of Interest: Nil

REFERENCES

1. Ailawadi, K. L., & Keller, K. L. (2004). Understanding retail branding: Conceptual Insights and research priorities. *Journal of Retailing*, 80, 331-342,
2. Chen (2009) online consumer behavior: An empirical study Lincoln, ProQuest Dissertations Publishing, 2009. 3355613
3. Jongeun Kim (2004) Understanding Consumers Online Shopping and Purchasing Behaviour, *International Journal of Interdisciplinary Social Sciences*, Volume 6, Issue 10, pp.81-110.
4. Keith E. Thompson, Yat Ling Chen, (1998) “Retail store image: a means end approach *Journal of Marketing Practice: Applied Marketing Science*, Volume 4, Number 6, 1998, pp. 161-173(13) **Publisher:** Emerald Group Publishing Limited
5. Parikh Darshan (2011) Customer acceptance of internet shopping in India: Impact of shopping orientations, knowledge and security”, Ph.D Thesis, Nirma University
6. Solgaard, H. S., & Hansen, T. (2003). A hierarchical Bayes model of choice between supermarket formats. Solgaard, Hans Stubbe; Hansen, Torben
7. Sunita Guru (2013) A study of trust and perceived risk in Online Shopping. *Journal of Business and Management Studies*, Volume 8. In: *Journal of Retailing and Consumer Services*, Vol. 10, No. 3, 2003, p. 169-180.

An Empirical Relationship between Employee's Job Satisfaction and Job Performance

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ABSTRACT

This study aims to identify the factors influence the job satisfaction of employees and to identify the factor improves the performance level of employees. The researcher used percentage analysis and regression analysis to find the result. The results shows that the Automobile industry relaxed the policies which are framed for the employees' increased the interest and involvement of the employees. Finally it concludes that there is a positive correlation between the employee's job satisfaction and job performance. To increase the productivity and job performance the Automobile industry provide all these factors of job satisfaction.

Keywords: Job satisfaction, Job Performance, Monetary benefits.

INTRODUCTION

The term job satisfactions refer to the attitude and feelings people have about their work. Positive and favourable attitudes towards the job indicate job satisfaction. Negative and unfavourable attitudes towards the job indicate job dissatisfaction (Armstrong, 2006). Job satisfaction represents a combination of positive or negative feelings that workers have towards their work. Meanwhile, when a worker employed in a business organization, brings with it the needs, desires and experiences which determinates expectations that he has dismissed. Job satisfaction represents the extent to which expectations are and match the real awards. Job satisfaction is closely linked to that individual's behaviour in the work place (Davis et al., 1985).

Employee job satisfaction is associated with how people perceive, think, and feel their jobs (Spector, 1997). The investigators have defined job satisfaction as the general behaviour and employees attitudes towards his job (Robbins et al., 2010). Keeping morale high among white collar workers can be of great value for every business, how happy employees are more likely to produce more with fewer days off and stay true to the company. There are many elements involved in enlightening and retaining the employee satisfaction high, which intellectual employers would do fine to execute.

The importance of job satisfaction specially emerges to surface if had in mind the many negative consequences

of job dissatisfaction such a lack of loyalty, increased absenteeism, increase number of accidents etc.

Factors Determining Job Satisfaction

- Monetary Benefits
- Rewards
- Promotion
- Status
- Worker's participation in Management
- Welfare Measures
- Perquisites
- Company Policies
- Job Security
- Working conditions
- Career Development

Job satisfaction is very important not only for employees but also for the success of the organization (Lim, 2008) because if an employee is not satisfied with his job then he will not be loyal with the organization and dissatisfaction with a job may lead to high staff turnover. Hanif and Kamal (2009) asserts that happy employees are more likely to be welcoming and attentive which attracts customers and the employees who are not satisfied with the job can lead to customer unhappiness. Şirin (2009) suggests more factors affecting job satisfaction

as follows: A feeling of success, relations with the management, relations with employees, job safety, more responsibility, being recognized, high salary, promotion opportunity, clarity of roles, participation in decisions, freedom, good coordinated work, lack of continuity, relocation, performance, life satisfaction, trade unions, and perceived work stress.

The most important process in an organization, satisfaction is linked with communication on a personal as well as on an organizational level. Communication in the organization motivates and stimulates employees to meet the organizational goals. Professional communicator should always link the diverse communication dimensions to the organizational strategies and the outcomes. Lack of communication creates a ripple effect in the organization and ultimately jeopardizes the business goals. Lack of communication from the superiors also results in a plethora of problems. The work situation also matters in terms of job satisfaction and organization impact. Contrary to some commonly held practitioner beliefs, the most notable situational influence on job satisfaction is the nature of the work itself—often called “intrinsic job characteristics.”

This means that achieving motivation and job satisfaction to develop organizational commitment is not simple or easy and works according to the context of individual firms. Although, there are best practices within industries, it is up to the individual organisations to determine which human resource strategies meet its needs and objectives. This study of the relationship between job satisfaction and job performance has a controversial history. In this study the researcher find the factors determine job satisfaction of employees and how this is related to their performance.

REVIEW OF LITERATURE

Lise M. Saari and Timothy A. Judge(2004), EMPLOYEE ATTITUDES AND JOB SATISFACTION. HUMAN RESOURCE MANAGEMENT, Winter 2004. This article identifies three major gaps between HR practice and the scientific research in the area of employee attitudes in general and the most focal employee attitude in particular—job satisfaction: (1) the causes of employee attitudes, (2) the results of positive or negative job satisfaction, and (3) how to measure and influence employee attitudes. Suggestions for practitioners are provided on how to close the gaps in

knowledge and for evaluating implemented practices⁵. Neeraj Kumari (2011) Job Satisfaction of the Employees at the Workplace, European Journal of Business and Management, ISSN 2222-1905, The study examines different aspects of job satisfaction like culture, leadership communication, commitment, job content, training, rewards and recognition opportunities, teamwork, superior subordinate relationship and delegation, at Badarpur thermal power station, NTPC Ltd. The research done is descriptive study involving survey and enquiry. The analysis was carried on a software SPSS and stated satisfaction level of different parameters. The overall job satisfaction showed people were satisfied with their current job but still measures should be taken to improve the satisfaction level⁴.

Brikend Aziri(2011), Job Satisfaction: A Literature Review, Management Research and Practice Vol. 3 Issue 4 (2011) Pp: 77-86, Job satisfaction represents one of the most complex areas facing today’s managers when it comes to managing their employees. Many studies have demonstrated an unusually large impact on the job satisfaction on the motivation of workers, while the level of motivation has an impact on productivity, and hence also on performance of business organizations. Unfortunately, in our region, job satisfaction has not still received the proper attention from neither scholars nor managers of various business organizations².

Mosammod Mahamuda Parvin, M M Nurul Kabir (December-2011), Factors Affecting Employee Job Satisfaction of Pharmaceutical Sector, Australian Journal of Business and Management Research Vol.1 No.9 [113-123], This study attempts to evaluate job satisfaction of employees in different pharmaceutical companies. It focuses on the relative importance of job satisfaction factors and their impacts on the overall job satisfaction of employees. Hence this research was mainly undertaken to investigate on the significance of factors such as working conditions, pay and promotion, job security, fairness, relationship with co-workers and supervisors in affecting the job satisfaction. This paper presents a comprehensive diagnosis of job satisfaction

indices of pharmaceutical business, the factors causing the dissatisfaction & suggestions to improve them⁸.

Sadegh Rast, Azadeh Tourani (April 2012), Evaluation of Employees' Job Satisfaction and Role of Gender Difference: An Empirical Study at Airline Industry in Iran, *International Journal of Business and Social Science*, Vol. 3 No. 7; April 2012. This purpose of this study is to determine level of employees' job satisfaction and to investigate effect of gender on employees' job satisfaction. Important factors that have an impact on job satisfaction are supervision, relationship with co-workers, present pay, nature of work, and opportunities for promotion. Data for this study was collected from employees of three private airline companies in Iran. Descriptive analysis performed to determine level of employees' job satisfaction. In addition, independent-sample t-test was utilized to empirically test relationship between employees' job satisfaction and their gender. Findings suggest that employees are moderately satisfied with their job and there is no significant difference between male and female employees' job satisfaction¹⁰.

Alam Sageer, Dr. Sameena Rafat, Ms. Puja Agarwal (oct 2012), Identification of Variables Affecting Employee Satisfaction and Their Impact on the Organization. *IOSR Journal of Business and Management (IOSR-JBM)* ISSN: 2278-487X. Volume 5, Issue 1. Employee satisfaction is the terminology used to describe whether employees are happy, contented and fulfilling their desires and needs at work. Many measures support that employee In this paper various variables responsible for employee satisfaction has been discussed such as Organization development factors, Job security factors, Work task factors, Policies of compensation and benefit factor and opportunities which give satisfaction to employees such as Promotion and career development also has been described. This paper also deals the various ways by which one can improve employee satisfaction¹.

Jitendra Kumar Singh, Dr. Mini Jain (December, 2013), A Study of Employees' Job Satisfaction and Its Impact on Their Performance, *Journal of Indian Research (ISSN: 2321-4155)* Vol.1, No.4. The objective of the study is to identify the factors which influence the job satisfaction of employees and to identify the impact of employees' job satisfaction on their performance. It concludes that Policy makers and managers have turned their attention to provide different kinds of facilities to their employees in order to satisfy their employees³.

Louise van Scheers Johan Botha (Oct 2014), Analysing relationship between employee job satisfaction and motivation, *Journal of Business and Retail Management Research (JBRMR)* Vol. 9 Issue 1, The aim of this is to analyse perceptions of job satisfaction levels at grocery retailers in South Africa and establish whether there is a relationship between job satisfaction and motivation of retail employees at grocery retailers in Pretoria, South Africa. It is evident from the research that the majority of respondents 43 percent strongly disagree with the statement that employee attitude is commendable, a view that is disputed by management. The research also established that the customer's perception is that there is little empowerment to the frontline staff. The conducted research finally has established that there is a positive correlation between job satisfaction and motivation of retail employees of grocery retailers⁶.

Masooma Javed, Rifat Balouch, Fatima Hassan (2014) Determinants of Job Satisfaction and its Impact on Employee Performance and Turnover Intentions, *International Journal of Learning & Development* ISSN 2164-4063. The ambition of this research paper is to examine the satisfaction level of the employees and helps organizations to know about the elements that influence job satisfaction. Convenient sampling technique was used and 200 questionnaires were circulated out of which 150 were nominated for further analysis. SPSS is used for data analysis statistically. The results showed significant positive association of employee empowerment, workplace environment, job loyalty and job performance with job satisfaction. Furthermore, there is a significant negative relationship between job satisfaction and turnover intention. The findings also demonstrate that there is no significant relation of turnover intention with employee empowerment and job performance⁷.

Robina Odaya Orute, Dr. Shedrack Mbithi Mutua, Dr. Douglas Musiega, Stephen Wekesa Masinde (Oct 2015) Leadership Style and Employee Job Satisfaction In Kakamega County, Kenya. ISSN: 2249-7196, *IJMRR/Oct. 2015/ Volume 5/Issue 10/Article No-10/876-895*. The major objective of the study was to investigate the influence leadership style on employee job satisfaction, Both descriptive and inferential statistical tools were used in data analysis. Cronbach's Alpha of coefficient of 0.873 was attained, implying that the research instruments were reliable since the value attained was way above the recommended 0.7 in social

sciences. The study established that leadership style had a statistically significant positive influence on employee job satisfaction leadership style .The study recommends the government to practice good leadership skills since they have positive effect on employee job satisfaction⁹.

Objective of the Study

The objective of the study is as follows:

- To assess the satisfaction level of employees in Automobile industry.
- To identify the factors influence the job satisfaction of employees.
- To identify the factor improves the performance level of employees.

Hypotheses

- There is no significant difference among factors of Job satisfaction.
- There is no significant difference among factors of performance level of employees
- There is no relationship between job satisfaction and performance level of employees.

RESEARCH METHODOLOGY

The research done is a descriptive study involving survey and fact finding survey. The major purpose of the study is description of the state of affairs as it exists in the present organization, Automobile Industry. The data and records of the employees are also examined to understand the problem well. A systematic research with structured and specified steps in specified sequence was designed.

Influence of Job Satisfaction on Employee’s Performance:After reviewing National and International literature the researcher identified Monetary Benefits, Rewards, Promotion, Status, Worker’s participation in Management, Welfare Measures, Perquisites, Company Policies, Job Security, Working conditions, Career Development. The subsequent verification of these factors of job satisfaction clearly revealed its nature of relationship as well as creative influence over performance of employees. Therefore, In this section the researcher intended to measure the influence of independent variables job satisfaction dimensions on the performance of employees.

Regression coefficients

Determinants	Coefficients	T	Sig.
(Constant)	1.830	5.247	0.000
Monetary Benefits	1.433	1.963	0.078
Welfare Measures	1.835	3.404	0.007
Job Security	1.834	2.309	0.044
Working Conditions	4.804E-02	0.693	0.504
Company Policies	8.310E-06	0.191	0.852
Career Development	0.183	0.312	0.761

The above table shows that the employees are mostly influence by welfare measures provided by the Automobile Industries followed by Job security. The employees also satisfied by the factor of monetary benefits given by the Industry such as salary, bonus, commission, overtime pay etc., the employees least satisfied by the factor of company policies. Hence, too much of rules and regulations irritate the employees and because of this factors they are less concentrate in their works.

FINDINGS AND CONCLUSIONS

This study finds that to improve the employees performance the industry concentrate to the welfare measures of the employees such as educational allowance, medical facility, house rent allowance, etc., The employees are highly influence by these factors. The Automobile industry relaxed the policies which are framed for the employees’ leads to interest and involvement of the employees. The rigid policies leads dissatisfaction to the employees and it also affect the performance of the employees. Finally it concludes that there is a positive correlation between the employee’s job satisfaction and job performance. To increase the productivity and job performance the Automobile industry provide all these factors of job satisfaction.

Conflict of Interest: Nil

Ethical Clearance: Taken From UGC Committee

Source of Funding: Self

REFERENCES

1. Alam Sageer, Dr. Sameena Rafat, Ms. Puja Agarwal (oct 2012),Identification of Variables Affecting Employee Satisfaction and Their Impact on the Organization. IOSR Journal of

- Business and Management (IOSR-JBM) ISSN: 2278-487X. Volume 5, Issue 1.
2. Brikend AZIRI(2011),JOB SATISFACTION: A LITERATURE REVIEW , MANAGEMENT RESEARCH AND PRACTICE VOL. 3 ISSUE 4 (2011) PP: 77-86.
 3. Jitendra Kumar Singh, Dr. Mini Jain(December, 2013), A STUDY OF EMPLOYEES' JOB SATISFACTION AND ITS IMPACT ON THEIR PERFORMANCE, Journal of Indian Research (ISSN: 2321-4155) Vol.1, No.4.
 4. Neeraj Kumari (2011)Job Satisfaction of the Employees at the Workplace , European Journal of Business and Management , ISSN 2222-1905.
 5. Lise M. Saari and Timothy A. Judge(2004), EMPLOYEE ATTITUDES AND JOB SATISFACTION. HUMAN RESOURCE MANAGEMENT, Winter 2004.
 6. Louise van Scheers Johan Botha(oct 2014),Analysing relationship between employee job satisfaction and motivation, Journal of Business and Retail Management Research (JBRMR) Vol. 9 Issue 1.
 7. Masooma javed ,Rifat Balouch ,Fatima Hassan(2014) Determinants of Job Satisfaction and its Impact on Employee Performance and Turnover Intentions , International Journal of Learning & Development ISSN 2164-4063.
 8. Mosammod Mahamuda Parvin, M M Nurul Kabir(December-2011), FACTORS AFFECTING EMPLOYEE JOB SATISFACTION OF PHARMACEUTICAL SECTOR.
 9. Robina Odaya Orute, Dr. Shedrack Mbithi Mutua, Dr. Douglas Musiega, Stephen Wekesa Masinde(Oct 2015) LEADERSHIP STYLE AND EMPLOYEE JOB SATISFACTION IN KAKAMEGA COUNTY, KENYA. ISSN: 2249-7196, IJMRR/Oct. 2015/ Volume 5/Issue 10/ Article No-10/876-895.
 10. Sadegh Rast ,Azadeh Tourani (April 2012),Evaluation of Employees' Job Satisfaction and Role of Gender Difference: An Empirical Study at Airline Industry in Iran, International Journal of Business and Social Science , Vol. 3 No. 7; April 2012.

The Model of Supervision for Impermanent Food Sellers by Women Volunteer in Kendari City Indonesia

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ABSTRACT

Objectives: Many fast food sellers emerged in Kendari city of Southeast Sulawesi Province Indonesia. The number of staff in Environmental division in Primary Health Services was limit, so they could not supervise for all fast food sellers in that area. Therefore, involving of women volunteer in the villages of Kendari City was necessary. Therefore, this study aimed to find out the model of supervision for impermanent food sellers by the women volunteers in Kendari City, Southeast Sulawesi Province in Indonesia.

Method: This study used Quasy Experiment with the One-Group Pre-test-Post-test Design. The study was conducted in 3 villages in Kendari City. This study recruited 17 women volunteers and 39 fast food sellers. The statistical analysis used linier regression.

Results: The model of supervision under the women volunteers could be found in this study. The characteristic of women volunteers which involved and be active to supervise were they who have be active in social activities in their village. They have also been involved in Primary Health Services in the village for more than 6 years, they were above 41 years old. They were married and had 3 children in average. Each village involve about 4-10 women. Each village was organized by 1 person as a village coordinator. The village coordinator had responsibility to communicate or mediate to primary health services, especiallay to environmental division. Every month the coordinator reports the results of women's supervision for the fast food sellers. The time of reaching the fast food sellers was found to be significant relation with the seller's behavioural change and fast quality improvement.

Conclusion: Women volunteers can supervise to the fast food sellers in kendari City in southeast Sulawesi Province, Indonesia. They have closed with the food sellers and with sanitation and environmental staff in primary health service.

Keywords: *Women volunteer, Fast food, Supervision, Food seller*

INTRODUCTION

Insecure food remains globally crucial issue, including in Kendari City of Southeast Sulawesi Province, Indonesia. As reported by Kendari City Health Department¹, there were about 176 food sellers

(20.21%) who were insecure in Kendari City in 2015. This number was the highest compared to other districts, such as South Buton (7.19%) and North Konawe (10,09%)¹. That condition has increased the incidence of diarrhoea and hypertension in Kendari City. In 2015, the incidence of diarrhoea in Kendari city was about 63,28%¹. This incidence was higher than North Konawe (6,64%) and Wakatobi (15,87%)¹. While the prevalence of hypertension were also higher (14,83%) compared to 7.15% of Bau-Bau city in 2015¹. To reduce the negative effect of hazardous food in the public places, so the government applies several strategies as described in the strategic planning inn 2015-2019. The

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strategies include collaborated programs between the producers, governments, non-government organization and communities². Because the fast food sellers were huge, while there were a few health workers in Kendari City Health Department, so communities had big responsibilities to involve in controlling the fast food which were sold in the public places. However, the community involving model is unclear. Therefore, understanding the model of community involvement in the fast food control is necessary in Kendari city. Based on that phenomenon, the aim of this study is to find out the model of community involvement in controlling to fast food sellers in Kendari city to increase the quality of food hygiene and sanitation.

MATERIAL AND METHOD

Research Design: This study applied a Quasy Experiment method using The one-Group Pretest - posttest Design as described below.

Pre-test	Treatment	Post-test
O_1	X	O_2

Notes:

O_1 : Pre-test

X : treatment from communities as controller and educator

O_2 : Post-test

Figure 1: The Quacy-Experiment method using The One-Group Pretest-posttest Design

The Study Site and Time: This study was conducted in Andonohu, Rahandauna and Wundumbatu villages in Kendari City. This study was conducted from February to July 2018.

The Population and Samples

- a. Population:** The population of this study were all of the fast food sellers in Kendari City namely 119 sellers.
- b. Sample and sampling technique:** This study recruited 39 fast food sellers in 3 villages in Kendari City with 5% of error tolerance. The samples were selected with using the purposive sampling. The inclusive criteria of sampling technique included the sellers were included in 3 villages, the fast food sellers and there were civil communities who willing to control the fast food sellers.

DATA COLLECTION

Data was collected through in-depth interview, observation and laboratorial test of food sample. The interview was purposed to the fast food sellers, women volunteer, health workers in Health Department of Kendari City and Poasia Primary Health Care Services.

DATA ANALYSIS

The data was analysed through descriptive and inferential analysis. The descriptive analysis produced distribution of each variable such as the characteristic of women volunteers, the model of the fast food supervision. The inferential analysis was proposed to understand the relationship between the time of supervision and the food seller's behavioural change to the quality improving of the food hygiene and sanitation. The statistical analysis used linier Regression.

RESULTS

- a. Characteristic of Women volunteers:** This study identified 17 women volunteers who could take supervision to the fast food sellers in Andonohu, Rahandauna and Wundumbatu Villages of Kendari City. The characteristic of women volunteers who actively involved in this study is presented in this below table.

Table 1: The Women volunteers' characteristic who involved in the Fast food control in Andonohu, Rahandauna and Wundumbatu Villages of Kendari City

Characteristics	Number	Percentage
Education		
Primary School	1	5.9
Junior High School	3	17.6
Senior High School	9	52.9
Diploma/ Bachelor/ Post graduate	4	23.5
Age: (year): mean (\pm) 1 SD*		41.5 \pm 7.3
30 - 34	2	11.8
- 39	5	29.4
40 - 44	7	41.2
45 - 49	2	11.8
> 50	1	5.9

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Occupation		
No working	12	70.6
Private/trader	3	17.6
Teacher	1	5.9
Civil servant	1	5.9
Number of children: mean (\pm) 1 SD*		3 \pm 1.3
One	1	5.9
Two	7	41.2
Three	4	23.5
Four	1	5.9
Five	4	23.5

SD* = Standard Deviation

b. The time of reaching to the fast food sellers behaviour and the quality of fast food.

Table 2: The time of reaching to the Fast Food Sellers in 3 Village of Kendari City in 2018

	Number	Percentage (%)
The time to reaching to the food seller (minute): mean (\pm) 1 SD*	6.7 \pm 3.2	
< 4	4	23.5
5 – 9	8	47.1
10 – 14	3	17.6
15 – 19	1	5.9
20	1	5.9

SD* = Standard Deviation

Table 3: The Seller’s Behaviour and the Quality of fast food Hygiene and Sanitation between before and after women volunteer supervision for the Fast Food Sellers in Kendari City

Category	Before		After	
	n*	%	n*	%
Poor	0	0	0	0
Medium	10	25.6	3	7.7
Good	29	74.4	36	92.3
total	39	100.0	39	100.0

n* : Number of fast food sellers

Table 4: The relationship between the time of reaching to food seller be women volunteers and the food seller’s behavior and food quality improving

Model	Unstandardized coefficients		Standardized Coefficients	t	Sig	95% confidence Interval for B	
	B	Std.error	Beta			Lower Bound	Upper Bound
The time of reaching to food seller (minute)	2.947	.951		3.097	.004	1.019	4.875
	-.175	.128	-.219	-1.366	.180	-.434	.084

Note: Linier Regression result

DISCUSSION

This study showed the women volunteer could supervise the fast food sellers in 3 villages in Kendari City. This can be explained that the women volunteers can help Poasia Primary Health Care Services especially for environmental division. As identified that the women volunteers who were active in social activities in their village. They have been trained by Poasia Primary health care services³. The women volunteers who involved in this study have been the health volunteer about 6.9

years in average. They have also gotten training or workshop about 9.2 times. They are given responsibility to do health planning and health promotion to the communities in their village³. This means they have had huge experiences, especially in community engagement towards better healthy life behaviour. Furthermore, they got support from their family member including from their husband because all of the cadres were women (94.1% of married and 5.9% of widow). Family support is reinforcing factor to determine the individual behaviour. Thus, women volunteer have high motivation to take

social responsibilities⁴. As mentioned in the above table that about 52.9%, they passed from senior high school. This means they could synthesize health information which they got⁵. Women Volunteer with more higher educational level tends to have awareness about science and information⁵. Some previous study also found that individual knowledge is determinant factor of successful cadres to take their responsibility in the comprehensive community health care services in the village⁶.

Furthermore, motivation is also the essential factor of successful for women volunteers. Motivation has significant relationship with human basic needs⁷. The human basic needs include physiological, safety, love, esteem and self-actualization needs⁷. This is true that women volunteer's involvement in the fast food control in this study because they want to get new experiences and self-actualization. This is based on depth interview with women volunteers. Another thing, they hope to get an incentive from Poasia Primary Health Care Centre or from their village leader. Some of them (70.6%) do not have job. They are wives who do domestic chores only. If they got incentive such as a few money, there will be increasing their family income. Additional household income will give significantly impact for their children nutrition because they will increase their purchasing power for food⁸. Increasing in the household income also can improve their household facilities such as water and latrine facilities. The housing condition also influence significantly to their under-five children's nutrition status⁹. Some of women volunteers have under-five years' old children. Also, they can buy gasoline for their motor cycle because there are about 82.4% of them used motor cycle when they supervise the fast food sellers. This means that incentive includes in intrinsic factor which motivate the human to involve in the activity like involving in the fast food control. Other previous study also argued that women volunteers' motivation was important factor for them to be active in the social activities in their village⁶.

Other important factor why they were effective to involve in the fast food control is they have lots of free time. As above mentioned that there were about 70.6% of cadres were no job. Thus, they had lots of time to involve in the fast food control. This activity took about 6.7 minutes only. Even some of cadres (29.4%) who had a job, they

still could use their free time to involve in this activity. The distance between the women volunteers' home and the fast food seller is about 766 meters in average. They have 3 children in the average. Therefore, they do not have heavy burden between their responsibility in their home and in this fast food control. As we known, the wives in this culture have responsibility to child rearing including the domestic chores.

Furthermore, women volunteer have had some experiences in the previous activity could do the best approach and communication with the fast food seller. Thus, they could also give health promotion to the sellers during supervision. They were about 41.5 years old in the average. They included in the adult people who changed their interest and responsibility towards socialist people¹⁰. With the simple instrument of control the fast food quality, the women volunteers could show their ability to involve in the fast food control. The form includes several aspects such as about environment, the seller's behaviour towards the food hygiene and sanitation. Thus, they could give health education for the food sellers during supervision. The number of assessment (0-10) of the quality of the food hygiene and sanitation is easier for them. The number of 5 becomes the basic to determine the good or poor because this number was agreed as a middle number.

The mechanism of reporting to the environmental staff in the Poasia primary health care services also could be done by the cadre because the coordinator only who reported to the environmental staff every month. The women volunteers have become familiar with all of health staff in this primary health care service. Every Saturday morning, they also take gymnastic in this primary health care. The gymnastic is purposed to increase fitness for people who are above of 40 years old and prevent for the chronic diseases such as hypertension, stroke and others. Therefore, their involvement in the fast food control was significant effective to increase the quality of the fast food.

CONCLUSIONS

This study has explained that the women volunteer can supervise the fast food traders in Kendari city, especially in Andonohu, Rahandauna and Wundumbatu villages. They are volunteers who have gotten lots of trainings and experiences in the health promotion program by primary health care services and others.

Thus, they can influence the fast food traders to change their hygiene and sanitation to manage their fast food. The women volunteers can use their free time in the social activity because they have trained to manage their time effectively.

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REFERENCES

1. Health Department of Southeast Sulawesi Province. *Southeast Sulawesi Health Profile in 2015*. Kendari: Health Department of Southeast Sulawesi Province; 2016.
2. Bureau of Food and Drug Control of Kendari City. *Strategic Plan of Bureau of Food and Drug Control in Kendari in 2015-2019*. Kendari: Bureau of Food and Drug Control of Kendari City; 2015.
3. Ministry of Home Affairs Republic of Indonesia. *Ministry Regulation of Home Affairs no.19 in 2011 about guideline of integration of the basic social service in comprehensive service*. Jakarta: Ministry of Home Affairs Republic of Indonesia; 2011.
4. Ryan RM, Patrick H, Deci EL, Williams GC. Facilitating health behaviour change and its maintenance: Interventions based on self-determination theory. *The European Health Psychologist*. 2008;10:2-5.
5. Setyatama IP. The relationship between cadre's knowledge and motivation with cadre's roles in elderly health care service in Kangkung Village of Mranggen Sub-district in Demak District. *Dinamika Kebidanan*. 2012;2(2):1-7.
6. Nugroho HA, Nurdiana D. The relationship between Cadre's knowledge and motivation with active Cadre in Village health care service in Dukuh Village Central Ketanggungan Sub-district of Brebes District. *Jurnal Keperawatan*. 2008;2(1):1-8.
7. Ryan RM, Deci EL. Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*. 2000;25:54-67.
8. Tasnim T. Determinants of malnutrition in children under five years in Developing Countries: A systematic review. *Indian Journal of Public Health Research & Development*. 2018;9(6):333-338.
9. Tasnim T. Housing conditions contribute to underweight in children: An example from rural villages in Southeast Sulawesi, Indonesia. *Journal of Preventive Medicine & Public Health*. 2017;50(1):328-335.
10. Simanjuntak M. Characteristic of demography social and reinforcing factor to increase Cadre's performance in the comprehensive village health care services. *Jurnal Wira Ekonomi Mikroskil*. 2012;2(1):49-58.

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