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## Editor

Dr. R.K. Sharma  
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## Contents

Volume 03 Number 04

October - December 2012

1. A Cross Sectional and Prospective Study of Cesarean Delivery and Feto-maternal Outcome at HIMS, Safedabad, Uttar Pradesh ..... 01  
*Agarwal Anjana, Krishna Hema*
2. A study of female genital tuberculosis in sub-urban population of Hapur, Uttar Pradesh ..... 06  
*Asha Misra, Ajay Kansal, Yogesh Kumar Rai*
3. Evaluation of Compliance of Mass Drug Administration and its Determinants for Elimination of Lymphatic Filariasis in Endemic Areas of Rural North Karnataka ..... 10  
*A. S. Dorle, B. S. Mannapur, L. D. Hiremath, C. H. Ghattargi, Gundappa*
4. Factors Influencing utilization of intranatal care services in rural field practice area of J. S.S Medical college, Mysore ..... 14  
*B. S. Mannapur, N. C. Ashok*
5. Thyroglossal Duct Anomalies: A Retrospective Analysis ..... 18  
*Basant Mohan Singh, Satender Kumar, Sanjay Pandey, Ashutosh Niranjana*
6. Prevalence of HBV, HCV, and HIV Infections among Individuals Included in premarital screening program at Jazan Province, Saudi Arabia ..... 23  
*Zaki M. Eisa, Saleh A. Eifan, Basheer A. Al-Sum*
7. Factors Affecting the Efficiency of Public Private Partnerships for Healthcare Delivery in India ..... 27  
*Bharti Birla, Udit Taneja*
8. Multiple Supernumerary Teeth: A Review of Literature and Report of Two Cases ..... 34  
*Mohd. Faisal, Iqbal Ali, Chetan Chandra, Vikas Kumar, Yogendra Kr. Singh*
9. A Retrospective Study of Changing Clinical Pattern of Malaria in Western UP, India ..... 38  
*Subhash Chandra, Yogesh Kumar Goel, Daya Chand, Deepak Gupta*
10. Evaluation of the Health Awareness Package for the Improvement of Knowledge, Attitudes and Practices (KAP) of Secondary School Students at Rural Areas of Paschim Medinipur, West Bengal ..... 41  
*Soumyajit Maiti, Kausik Chatterjee, Kazi Monjur Ali, Kishalay Jana, Tushar Kanti Bera, Debidas Ghosh*
11. Histomorphological Study of Malignant Tumours of Liver ..... 47  
*Deepti.P, Hiremath.S.S, H.R.Chandrashekhra, P.Shashikala, Anitha.M.R, Vijayanath.V*
12. Efficacy of Ebastine 5 mg in the Treatment of Children with Allergic Rhinitis: A Post Marketing Surveillance Study ..... 52  
*Harsha K.P., Gurudutt Nayak, Vasudeva Murthy C.R.*
13. Knowledge and perception of community regarding mosquito-borne diseases in a coastal rural area of South India ..... 57  
*SHN Zaidi, P Sukla, J Ramasamy*
14. Unicystic Ameloblastoma : A Case Report ..... 62  
*Heena Zainab*

## II

15. Role of collagen in Vestibuloplasty – A comparative study ..... 66  
*Hemavathy Osuraman, Jaya Prasad. N. Shetty, Chandan Prabhakar, A.R. Pradeep*
16. A Comparative Study of Random Urine Protein : Creatinine Ratio With 24 Hour Urine Protein Excretion in Diabetic Nephropathy ..... 70  
*Hamsaveena, Rashmi.M.V*
17. Diagnostic Imaging in Implantology: From Conventional to Newer Paradigms ..... 73  
*Hemen Das, Himanshu Gupta, Ajay Singh, Geeta Verma*
18. Assessment of quality health services rendered by the Health facilities to improve the reproductive and child health under National Rural Health Mission in Uttarakhand ..... 80  
*Itisha Vasisht*
19. Effect of Two Tongue Cleaning Methods on Oral Mutans Streptococci Level ..... 83  
*Jayachandra. M.G, Anil.V.Ankola, Karibasappa.G.N., Vijayanath.V.*
20. School teachers as facilitators in imparting knowledge on road safety measures to school children ..... 87  
*Jayakumary Muttappillymyalil, Jayadevan Sreedharan, Binoo Divakaran, Jeesha C Haran*
21. Antinociceptive Activity of Selective Serotonin Reuptake Inhibitors in Albino Rats ..... 93  
*K.V. Shivnand Reddy, J.Balaji, Umakant Patil*
22. Osteotome-assisted Ridge Expansion With Immediate Implant Placement: A Review and Clinical Report ..... 96  
*Leena Tomer, Anil Tomer, Ajay Gupta, Sarawati Rana, Himanshu Shekhawat*
23. Ethical Issues in current Medical Practice-an Introspection ..... 102  
*S.K. Thakur*
24. Hypertension: Prevalence and its associated factors in a rural south Indian population ..... 105  
*Madhu.B, Srinath K M, Ashok N C*
25. Health Scenario of Urban Set Up of Assam in Regard to Chronic Diseases ..... 110  
*Manab Deka, Labananda Choudhury, Amit Choudhury*
26. Synthetic Drinks and Ill Health in Children ..... 116  
*S.K. Manuprakash, K.Varadarajshenoy*
27. Private Sector Involvement to enhance skills of physicians to manage HIV Cases–Andhra Pradesh Experience .... 120  
*Meenakshi Misra, Ramesh Reddy Allam, K. Srinivas Varma, Abhik Dutta, Jammy Guru Rajesh, Ganesh Oruganti, Vijay V Yeldandi*
28. Acute Neurotoxicity With Appropriate Dose of Isoniazid – A Case Report ..... 126  
*Md. Aleemuddin Naveed*
29. Prostate-specific antigen variations in Moroccan patients with histologically proven benign prostatic hyperplasia ..... 128  
*I. Sadaoui, H.A.H. Joutei, N.Elignaoui, A.Seddiki, S. Nadifi et H. Benomar*
30. Incidence, correlates and outcomes of Low Birth Weight – A one year Longitudinal Study ..... 132  
*Nitin Joseph, Subba S H, Vijaya.A.Naik, Mahantshetti N.S, B. Unmikrishnan, Maria Nelliyanil, Mallapur, Shashidhar Kotian*
31. Soft Drinks and Oral Health - A Review ..... 138  
*Pallavi S.K, Rajkumar G.C*
32. A Study of Epidemiological and Anthropometric Predictors of Type-2 Diabetes Mellitus in Rural Coastal Andhra Pradesh ..... 142  
*Pradeep Sukla, Karun Dev Sharma, Sipra Komal Jena, Durga Prasad*
33. A Study of Psychiatric Co- Morbidity in Cases of Renal Failure, Undergoing Hemodialysis ..... 147  
*Prakash Chandra, Rahul M Deo, B.K Singh*

34. The common and uncommon cestodal infestation encountered in routine histopathological practice from a semi-urban population in south India and their public health importance .....	150
<i>Ramkumar Kurpad R., Shuba S, Prakash H Muddegowda, Jyothi B Linge Gowda</i>	
35. Left Side Rectus Sternalis Muscle – A Case Report .....	154
<i>Sugavasi.Raju, G.Kanchana Latha, Anandakumar.L.</i>	
36. A Study to Compare the Micro-shear Bond Strength of Coronal Dentin and Pulp Chamber Dentin using three Dentin Bonding Systems. ....	156
<i>Lakshmi DeepaVelagala, Bolla Nagesh, Indira Priyadharsini, Sravanthi, Bhargavi</i>	
37. Study of Morphological Changes in Placenta in Pregnancy Induced Hypertension .....	161
<i>Ramesh S T, Rashmi M V, Kodanda Swamy C R</i>	
38. Prevalence of Tobacco Use & Its Correlate Factors among School Going Adolescents in Rural Areas of Haryana, India .....	166
<i>Ramesh Verma, Meena, Pardeep Khanna, Mohan, Mukesh, Shankar Prinja, Varun Arora</i>	
39. A Comparative Study Between Propofol and Thiopentone With Lignocaine Spray For Laryngeal Mask Airway Insertion .....	172
<i>Ravi kumar, Parashuram R Jajee</i>	
40. Hemisection - an Alternative Treatment For Vertically Fractured Mandibular Molars : A Case Report .....	177
<i>Sachin Gupta, Bhawna Gupta, Ritu Goyal</i>	
41. Hepatitis B Immunization Coverage Evaluation Amongst Slum Children .....	181
<i>Sandeep Sachdeva, Utsuk Datta</i>	
42. Anatomical Site Distribution of Cutaneous Cystic lesions- A Six years Study in Karnataka. ....	185
<i>Sandhyalakshmi B.N, Shashikala P, Manjula A</i>	
43. A Study to Determine the Effects of Air Pollution on Conjunctival Tissue using Scraping and Impression Cytology .....	187
<i>Agarwal Sarita, Verma Manisha, Ranjan Somesh, Kumar Manoj</i>	
44. Non Pigmented Mass on The Lid Margin – A Case Study .....	192
<i>Sathyannarayana, Radhika, Saila Rekha, Murali Mohan</i>	
45. Breast Feeding Practices in Post IMNCI Era in Rural Community of Haryana .....	195
<i>Shahida Parveen, I.B. Sareen, B. R Dahiya</i>	
46. A Study of Medial Thigh Pain In Fracture Neck of Femur With Bipolar Hemiarthroplasty .....	200
<i>Neelkant.S, Sameena, Karigoudar R.N, Sreekantha</i>	
47. Study of Rectus Sternalis Muscle in Karnataka Region .....	203
<i>Siri AM, Ravikumar.V, Rajasekhar.HV, Vijayakumar B. Jatti</i>	
48. A Pilot One Year Study of Lipid Lowering Effect of the Guggul Preparation in Hyperlipidemia .....	205
<i>Sunita Singh, Yogesh Kumar Rai, Anil Kumar Kem, Harsh Misra</i>	
49. Scaling up Emergency Medical Services under the Universal Health Insurance Scheme in Thailand .....	210
<i>Suriyawongpaisal Paibul, Woratanarat Thira, Tansirisithikul Rassamee, Srithumrongsawat Samrit</i>	
50. A Study on Evaluating the Quality of Health Education Given to Pregnant Women in a Tertiary care Hospital in Bangalore .....	216
<i>T S Mahadeva Murthy,Vaishali Gaikwad, Suvarna Madhukumar</i>	
51. Health Seeking Behavior among Residents of Underprivileged areas of Gangtok, Sikkim .....	220
<i>Vidya Surwade, Shruti Surwade</i>	
52. Health promotion across the world: challenges and future .....	226
<i>Vinayak Kumar Nahar</i>	

#### IV

53. Incidence and Microbial Profile of Chronic Suppurative Otitis Media at Gulbarga, Karnataka ..... 231  
*VinodKumar C.S, Yuvaraj B.Y., Bushara, Vandana Rathod, Shameem Sulatana, Praveen D.S., Suneeta Kalsurmath*
54. Evaluation of Maternal and Fetal Outcome in Pregnancy with Congenital Heart Disease ..... 236  
*Rekha Bharti, Manjula Sharma, Harsha S Gaikwad, Vrijesh Tripathi, Ayesha Ahmed, Achla Batra*
55. Are the Marketing Strategies Used By Pharmaceutical Companies Successful Against Prescribing Physician? ..... 240  
*Yogendra Keche, Archana Wankhade*
56. Development Towards Achieving Health Care For All - An Approach To The XIIth Five Year Plan ..... 243  
*Mangesh Tyagi, Yogesh Mahor*

# A Cross Sectional and Prospective Study of Cesarean Delivery and Feto-maternal Outcome at HIMS, Safedabad, Uttar Pradesh

Agarwal Anjana<sup>1</sup>, Krishna Hema<sup>2</sup>

<sup>1</sup> Associate Professor, <sup>2</sup> Senior Resident, Hind Institute of Medical Sciences, Safedabad Barabanki.

## ABSTRACT

**Objectives:** To determine the cesarean section rate, the indications, maternal and neonatal outcomes in a rural teaching hospital at Safedabad, Barabanki.

**Method:** The study was cross sectional and prospective from January 2008 to December 2011 in Hind Institute of Medical Sciences, (HIMS). Data were collected regarding demographic factors, obstetric history, the current pregnancy, its outcome, and maternal complications for 460 cesarean deliveries during the period.

**Result:** The cesarean section rate was 19.48 % among 2361 deliveries in the hospital. Among the 460 mothers 68.05% were  $\leq$  28 years of age, and 45.65% were primigravida. Gestational age was less than 37 weeks in 11.74 %, post term 4.13% and unknown in 29.96% of the mothers. Major indications for cesarean section were Fetal distress (25%), Dystocia (23.26%), repeat C/S (15.44%), breech alone or with other factors (11.30%). There were 471 newborns with 6(10.9%) intrauterine fetal death. There were 55 perinatal deaths with a PNM rate of 116.77/1000 cesarean deliveries and one maternal death from PPH with MMR of 217.39/100,000 cesarean deliveries. Main morbidities in the perinatal deaths were RD, HMD, MAS, VLBW, and hypothermia. Postoperative maternal complications were superficial wound infection, febrile morbidities, PPH, and complete wound failure. There were 3 (0.65%) cesarean hysterectomies.

**Conclusion:** Efforts should be made to bring down the C/S rate or at least keep it at the current level, to reduce major maternal and perinatal complications.

**Key Words:** Lower segment cesarean section, Maternal outcome, Perinatal mortality

## INTRODUCTION

Cesarean section, cesarean delivery, and cesarean birth are used to describe the delivery of a fetus through a surgical incision of the anterior abdominal wall and uterine wall. Cesarean birth has now become the most common hospital based operative procedure.

The first successful cesarean section in the USA was done in a cabin near Staunton, Virginia, in 1794; both mother and baby survived<sup>1</sup>.

Cesarean delivery rates have increased worldwide in the past 20 years<sup>1</sup>. The early onset of a change in the overall cesarean delivery rate was demonstrated by data from the Chicago Lying-In Hospital, which had a five fold increase in the cesarean rate from 0.6% in 1910 to 3% in 1928. In the USA the cesarean delivery rate increased from 4.5% in 1965 to 16.5% in 1980,

finally peaking at 24.7% in 1988<sup>5</sup>. The increase has been attributed to increasing avoidance of midforceps and vaginal breech deliveries, liberalization of indications for fetal distress, CPD/failure to progress, and the belief that once a woman has had one cesarean delivery, all subsequent pregnancies must be delivered by cesarean section<sup>4</sup>.

It is probably not possible to define an ideal cesarean rate. WHO has recommended an acceptable cesarean delivery rate of 5 – 15%<sup>9</sup>.

Maternal morbidity and mortality remains several fold higher for cesarean delivery than for vaginal delivery. Major sources of morbidity and associated mortality relate to complications due to sepsis, anesthesia, thromboembolic disease, hemorrhage and injury to the urinary tract<sup>15</sup>.

With the advent of modern antibiotics, the incidence of life threatening complications, including pelvic abscess, septic shock, and septic pelvic thrombophlebitis, is now less than 2%. Cesarean rate in the USA (24%) and UK (22%) rank somewhat above the acceptable level recommended by WHO. Brazil tops the list with the world's highest cesarean rates, 30% in public hospitals and more than 70% in private hospitals and maternity clinics<sup>1</sup>.

In a study in a teaching hospital in India, the overall rate of cesarean section increased from 21.8% in 1993 – 1994 to 25.4% in 1998 -1999. In the same study analyzing 7017 consecutive cesarean deliveries 66% were booked and in 18% the surgery was elective. Indications for cesarean section included dystocia (37.5%), fetal distress (33.4%), repeat section (29.0%), malpresentation (14.5%), and PIH (12.5%). Maternal and perinatal mortality were 299/100,000 live births and 493/1000 total deliveries, respectively, and were high proving that increasing cesarean rate does not translate into reduction of fetomaternal complication<sup>2</sup>.

Improved perinatal outcomes for cesarean deliveries have largely been attributed to developments in neonatal care than to the increased rate of C/S.

A retrospective study in India (1986 - 1995) showed a reduction in perinatal mortality with judicious use of C/S without change in personnel and medical facilities in the hospital<sup>6</sup>.

## OBJECTIVE

This study was done at H I M S Hospital to determine Cesarean section rate, to identify indications for cesarean section and to find out perinatal and maternal out come in rural and semi urban setup.

## MATERIAL & METHOD

A cross sectional prospective and descriptive hospital based study was done from January 2008 to December 2011 at Hind Institute of Medical Sciences (HIMS), Barabanki having 60 Obstetric & gynec beds. All deliveries at HIMS were included for the study. Data were collected and analysed regarding demographic factors, past obstetric history, present pregnancy and its out come and fetomaternal complications for all women having cesarean section.

## RESULTS

During the study period there were total of 2361 deliveries in the hospital.

Out of these 460 mothers were delivered by cesarean section, thus C/S rate was 19.48%.

Maternal age ranged from 18 to 33 years and above. About 80.65% of the mothers were between 23 years to 32 years old.(Table 1).

**Table 1 : Age of mothers delivered by C/S**

Maternal age (yrs)	Number	Percent %
18 – 22	63	13.70
23 – 27	250	54.35
28 - 32	121	26.30
33 & More	26	5.65
Total	460	100.00%

\*There were total of 2361 deliveries in the hospital during study period.

Two hundred ten women (45.65%) were primiparous and two hundred fifty (54.35%) were Para two and above.(Table 2).

**Table 2 : Parity of mothers delivered by C/S**

Parity	Number	Percent
1	210	45.65
e" 2	250	54.35
Total	460	100.00%

As per the gestational age 54 (11.74%) mothers were preterm, 263 (57.17%) were term, 19(4.13%) were post-term and gestational age was unknown in 124 (29.96%) mothers. (Table3).

**Table 3 : Gestational age at delivery of mothers delivered by C/S.**

Gestational age	Number	Percent
Preterm	54	11.74
Term	263	57.17
Post term	19	4.13
Unknown	124	26.96
Total	460	100.00%

Three hundred ninety two (85.22%) fetus presented by vertex and 42 (09.13%) by breech. Thirteen (2.82%) were transverse lie, eight by face (1.74%) ,and brow by (1.09%) (Table 4).



**Table 4 : Number of mothers as per fetal presentation**

Presentation	Number	Percent
Vertex	392	85.22
Breech	42	9.13
Shoulder	13	2.82
Face	8	1.74
Brow	5	1.09
Total	460	100.00%

As per the table 5 the major indications for C/S were Fetal Distress 25.0%, Dystocia and CPD 23.26%, repeat C/S 15.44% and breech +/- x factor were 11.30%. However APH and miscellaneous other indication combined were 25.02%.

**Table 5- Indications of C/S**

Indication for C/S	Number	Percent
Fetal Distress	115	25.0
Dystocia & CPD	107	23.26
Repeat c/s	71	15.44
Breech +/- x factor	52	11.30
APH	21	4.57
Miscellaneous	94	20.45
Total	460	100

449 (97.60%) gave birth to singletons, and 11 (2.40%) to twins. Birth weight was in the normal range in 386 (81.95%), and 22 (4.67%) were equal or above 3000gm and 63 (13.38%) babies had LBW & VLBW. (Table 6).

There were 55 perinatal deaths including 6 IUFD (10.9%) thus making a perinatal mortality rate of 116.77 per 1000 Cesarean deliveries.

**Table 6- Birth weight of neonates born**

Birth weight (gm)	Number	Percent
< 1500	11	2.34
1500 – 2000	52	11.04
2500 – 3000	386	81.95
>= 3000	22	4.67
Total	471	100

Common causes of morbidities in the neonatal deaths were respiratory distress following HMD & VLBW, hypothermia, LBW and Pneumonia. (Table 7).

**Table-07 : Frequencies of morbidities of neonatal death.**

Morbidity	Number	Percent
RD	11	20.0
HMD	09	16.36
MAS	03	5.45
Hypothermia	07	12.72
VLBW	08	14.54
LBW	05	9.09
Congenital Pneumonia	06	10.90
Still Born	06	10.90
Total	55	100.00%

According to Table 8 forty four mothers (9.56%) had various postoperative complications. Commonest morbidities were superficial wound infection, followed by febrile morbidity PPH and endometritis. There were 3 cases of cesarean hysterectomies, which were due to PPH. There were 3 cases of extension of incision and one bladder injury..

**Table 8 : Frequencies of maternal complications of C/S deliveries.**

Complication	Number	Percent
Superficial wound infection	13	2.82%
Febrile morbidity	10	2.17%
Complete wound failure	02	0.43 %
PPH	5	1.08 %
Cesarean hysterectomy	3	0.65%
Endomyometritis	4	0.86%
Extension	3	0.65%
Pneumonia	2	0.43%
Bladder injury	1	0.22%
Death	1	0.22%
Total	44	100.00%

One mother died of PPH, making MMR of 217.39 per 100,000 cesarean deliveries, in this study.

## DISCUSSION

In this study the majority of mothers (80.65%) were in age group of 23 to 32, more than Sub saharan study having 57%<sup>4</sup> but similar to another Indian study where mother aged 20 to 29 years were 76.4%<sup>2,4</sup>.

Emergency C/S accounted for 71.2% of cesarean deliveries and was comparable to other studies, 80.07% in a study from Pakistan<sup>3</sup>, 82% in an Indian study<sup>2</sup>, and 93.5% were emergency C/S in study from Ethiopia which was higher than our study<sup>16</sup>.

The major indications for C/S in Sub Saharan Africa were said to be protracted labour, APH, previous C/S, eclampsia and malpresentations. Most of these indications were true for this study with fetal distress as an additional indication (25.0%)<sup>4</sup>.

Dystocia was indication for C/S in (23.26%) cases which was less than African study having 30.9% and 45.3% in another study done by Eyob et al<sup>15,16</sup> in Ethiopia.

The reduction in the incidence of C/S for mechanical reasons like dystocia and CPD in our study could be due to earlier detection and lesser threshold for allowing manifestations of fetal compromise due to obstructed labour.

The rate of repeat C/S, as a whole in this study was 15.44%. Whereas it was 26% in a study done in Pakistan<sup>3</sup> and 29% in another Indian study<sup>2</sup> Thus the rate of repeat C/S, as an indication for C/S in this study was much lower than the others. which could be due to considering VBAC as protocol in this teaching hospital having women from rural background. However this rate was higher than the recommendation of WHO.

Worldwide efforts to evaluate interventions to bring down cesarean delivery rates are on progress. A study from Italy<sup>10</sup> indicated that a significant reduction could be achieved in a tertiary care center by using a standardized protocol without detrimental effects on mother or newborn. Another intervention studied by WHO consisted of systematic second opinion requested before every non-emergency cesarean section. The strategy contributed to a modest reduction in cesarean section but not to the extent identified as of major clinical significance<sup>11</sup>.

210 of the cesarean deliveries (45.65%) was done in primiparous women with the major indications being non repeatative like fetal distress, dystocia, and breech with or without 8 other factors. These women may have a repeat cesarean in their next pregnancies, so a more considerate and having second opinion approach in the decision of primary sections appears important in reducing the C/S rate. The judicious and well thought decision for performing cesarean section will lead to the reduction of cesarean rate<sup>5,6</sup>.

There was only one maternal death making the MMR 217.39 per 100,000 cesarean deliveries. This rate was 299/100,000 deliveries in an the Indian study<sup>2</sup> 1500/100,000 cesarean deliveries as per the Ethiopian study, and 1540/100,000 in a study from Nigeria<sup>7</sup>, and 22.3/100,000 cesarean deliveries in Massachusetts, USA<sup>8</sup> Even if our MMR is lower than reports of developing countries, there is a scope to bring it down further.

The PNMR in this study was 116.77/1000 cesarean deliveries. It is seen that APH, LBW and VLBW were associated with an increased risk of neonatal deaths.

The improvement in survival and reduction of PNM rate could occur by further intensive neonatal care by expert neonatologist for critically ill and low and very low birth weight babies.

## CONCLUSIONS

The health and well being of mothers and their new

born are true indicators of the efficacy of the healthcare system in the institution or society of a country. India's national MMR being at 301/100.000 deliveries is higher than our study and supposed to be more if taken for one lakh cesarean cases only. However scope for further reductions in MMR and PNMR especially due to avoidable reasons exists.

## REFERENCES

1. Finger C. Cesarean section rates skyrocket in Brazil. *Lancet*. 2003 Aug 23;362(9384):628
2. Kambol I; Bedi N; Dhillon BS; Saxena NC. A critical appraisal of cesarean section rates at teaching hospitals in India. *Int J Gynecol Obstet* 2002 Nov; 79(2):151-158.
3. Ahmad N; Mehboob R. A study of cesarean birth in a teaching hospital. *Pakistan Journal of Medical Research*. 2002 Jul-Sep; 41(3):118-122.
- 4) Dumont A; de Bernis L; Bouvier-Colle MH; Breat G. Cesarean section rate for maternal indication in Sub-Saharan Africa: a systematic review. *Lancet* 2001 Oct 20; 358(9290):1328-33.
5. Gonzalez-Perez GJ; Vega Lopez MG; Cabrera-Pivarel C; Munzo A; Valle A. Cesarean sections in Mexico: are there too many? *Health Policy and Planning*. 2001 Mar; 16(1):67.
6. Dwivedi AD, Increasing cesarean section and perinatal outcome. *Medical Journal Armed Forces India* 1998;54:199-201.
7. Ozumba BC, Anya E. Maternal deaths associated with cesarean section in Enugu, Nigeria. *Int J Gynecol Obstet* 2002;76(3):307-309.
8. Sachs BP, Yeh J, Acker D, Driscoll S, Brown DAJ, Jewitt JF. Cesarean section-related maternal mortality in Massachusetts, 1954-1985. *Obstet Gynecol* 1998;71(3):385-388.
9. World Health Organisation. Appropriate technology for birth. *Lancet* 1985;ii:436-437.
10. Zanetta G, Tampieri A, Currado I, Nespoli A, Midwife T, Fei F, et al. Change in cesarean delivery in an Italian university hospital, 1982-1996: a comparison with the national trend. *Birth* 1999;26(3):144-148.
11. Annual technical report. Dept. of RHR including UNDP/UNFPA/WHO/World Bank special programme of Research, development and research training in human reproduction. Geneva: World Health Organisation, 2000.
12. American College of Obstetrician and Gynecologist. Task Force on Cesarean delivery rate. Evaluation of Cesarean delivery Washington, DC: Author 2006.
13. Weber A. Elective cesarean delivery: the pelvic perspective. *Clin Obstet Gynecol* 2007;50(2):510-517.
14. Villar J, Valladares E, Wojdyla D, et al. Cesarean de-

- livery rate and pregnancy outcome:the 2005 WHO global survey on maternal and perinatal health America.Lancet 2006;367:1819-1829.
15. Shah A, et al, cesarean delivery outcomes from the WHO global survey on maternal and perinatal health. *Int J Gynecol Obstet* 2009; 107(3): 191-197.
  16. Eyob T; Lukman Y; Zein A. Retrospective cross sectional analysis of cesarean deliveries at GCMS 1985-1989. *J Obs Gyn of East and Central Africa.* 12(1):1996.

# A Study of Female Genital Tuberculosis in Sub-urban Population of Hapur, Uttar Pradesh

Asha Misra<sup>1</sup>, Ajay Kansal<sup>2</sup>, Yogesh Kumar Rai<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of Obstetrics & Gynaecology, <sup>2</sup>Assistant Professor, Department of Pathology, <sup>3</sup>Assistant Professor, Department of Biochemistry, Saraswathi Institute of Medical Sciences Hapur, U.P., India.

## ABSTRACT

**Introduction :** The study was conducted to analyse the clinical characteristics of patients with genital tuberculosis. Mycobacterium tuberculosis is a silent invader of genital tract, and poses dilemma in making diagnosis, It is an important cause of morbidity among Indian women.

**Methodology :** 140 women suspected of having genital tuberculosis from Jan. 2008 to June 2011 were subjected to a battery of nonspecific and specific tests. An algorithm was designed to confirm the diagnosis prior to treatment. Specific investigations included Elisa test, endometrial biopsy/histopathological examination, PCR, laparoscopy and ultrasound.

**Results:** Majority of women belonged to 21-30 years of age. Patients presented with menstrual dysfunction(74.38%), chronic pelvic pain & recurrent PID (71.42%), dyspareunia (40%) and infertility (30.71%). Past and family history of TB was given by 45% and 17% cases respectively. Raised ESR (138) & positive mantoax test (140) was noted. Specific investigation such as Elisa (128), Endometrial biopsy(29), PCR( 59) and laparoscopy (87) were positive. Laparoscopy in conjunction with mantoax test and Elisa test is an important diagnostic tool in risk population for therapeutic treatment. PCR has definite diagnostic value.

**Conclusion :** Frequency of genital TB among sub-urban population is still high in spite of various TB programmes. It is a major public health hazard need further research for cheaper test for developing countries.

**Key Words:** CPP, FGTB, Hapur, Laparoscopy, Menstrual dysfunction, PID, PCR, TB

## INTRODUCTION:

Genital tuberculosis is an important cause of morbidity among women in India. TB has devastating impact in developing nations with 13 countries accounting for 75 % of all cases<sup>1</sup>. Extra pulmonary TB is becoming more prevalent among the young women of reproductive age group<sup>2</sup>. Worldwide genital TB is found in 5-10% of women with infertile problems<sup>3</sup>. The lowest incidence of FGTB was observed in Australia 0.1% and highest rate of upto 19% in India<sup>4</sup>. The actual figure of incidence of female genital tuberculosis is not available. It is observed that incidence of FGTB parallels the overall prevalence of TB in population. In the past there was definite predilection for female genital tuberculosis to affect the reproductive age group only

sparing young and elders. Since 1950 the age group has shifted to pre-menopausal age<sup>5, 6, 7</sup>. Where male partner suffer from acute genitourinary TB, transmission takes place by sexual contact<sup>8</sup>. In pelvic mycobacterium TB fallopian tubes are commonly affected<sup>9, 10</sup>.

## MATERIAL & METHODS

This study retrospectively analysed a total of 140 patients between Jan. 2008 to June 2011 attending Gynae OPD at Saraswathi Institute of Medical Science, Hapur Ghaziabad UP India. Cases were registered on the ground of clinical suspicion. Beside infertility woman suffering from recurrent PID & chronic pelvic pain were also investigated After thorough history and detailed examination of patients were subjected to a

list of non specific & specific tests ( Endometrial biopsy , tissue biopsy PCR and laproscopy). Invasive test laproscopy was done where indicated and increases with negative endometrial biopsy. FGTB was diagnosed on the ground of two or more positive nonspecific and one specific test or laproscopic evidence.

**OBSERVATION:**

**Table 1 : Summary of clinical features**

Age at diagnosis (years)	No of patients	percentage
Less than 20	05	3.57%
21-30	96	68.58%
31-40	33	23.57%
Above 40	06	4.28%
Total	140	100%

**Table 2 : Summary of presenting symptoms**

Symptoms	No of patients	Percentage
Pelvic pain	100	71.42%
Dyspareunia	56	40.00%
Vaginal dysfunction	48	34.28%
Menstrual dysfunction	104	74.38%
Fever	16	11.42%
Infertility	43	30.71%
Loss of weight	28	20.00%
Loss of appetite	36	25.71%
Asymptomatic	14	10%
Past history of TB	63	45%
Family history of TB	24	17.14%

**Table 3 :Various menstrual abnormalities**

Menstrual problem	No of patients	Percentage
Menorrhagia	14	10%
Oligomenorrhoea	62	44.28%
Secondary amenorrhoea	23	16.42%
Irregular cycle	05	3.57%
Normal mensis	36	25.71%
total	140	100%

**Table 4 : Detail of examination finding**

Types	No of patients	Percentage %
Anemia	88	62.85%
Weight d" 42 kg	76	54.28%
Abdominal tenderness	64	45.71%
Doughy feel abdomen	52	31.14%
Vague mass	24	17.14%
Cervical erosion	38	27.14%
Cervical excitation	40	28.57%
Tenderness uterus	84	60.00%
Adenexal tenderness/thickening	80	57.14%
Adenexal mas	16	11.42%

**Table 5 : Positive specific & nonspecific investigation**

Test	No of patients with positive test	Percentage%
Hb d" 10	124	88.57%
ESR	138	98.57%
Montaoux TEST	140	100.00%
X Ray chest	16	11.42%
ELISA test	128	91.42%
Ultrasound	87	62.14%
HPE(Endo/ tissue)	29	20.71%
PCR endomerium	59	42.14%
Laproscopy	87	62.14%

**TABLE 6 : DETAILS OF LAPROSCOPY**

Findings	No of patients (87)	Percentage%
Congestion	87	100%
Tubercle on tube &peritonium	63	72.41%
Granuloma/caseation	1	1.14%
Beaded tubes	52	59.71%
Blocked tubes	49	56.32%
adhesion	85	97.70%
Hydrosalpinx	51	58.62%
T.O. Mass	12	13.79%

**RESULT**

FGTB is a silent disease of reproductive age group. Maximum women are between 21-30 years of age ( 68.57%). The common presenting symptoms are menstrual dysfunction (74.38%), pelvic pain (71.42%), dyspareunia (40%) and infertility (30.71%). Asymptomatic cases are 10%. Positive past and family history was observed in 45% & 17.14%.Oligomenorrhoea (44.28% )was chief menstrual presentation followed by secondry annenorrhoea 16.42%. Examination finding are anaemia (62.85%), weight < 42kg (55.8%), abdominal tenderness/ doughy feel (45.71/ 37.4), cervical excitation( 28.57%) & adenexal mass (11.42%). Non specific positive tests reveal , raised ESR (98.57%) & mantoax test ( 100% positive), Elisa test are supportive indicator of disease . Specific test Elisa (91.42%), PCR (42.54%), endometrial biopsy (20.71%) and laproscopy (62.14%) are positive.

**DISCUSSION**

FGTB is an increasing public health concern & this form of extrapulmonary TB is not uncommon. Estimated global prevalence is 8-10 million cases with a rising incidence in developing countries. It is observed from the study FGTB pavelles the are all prevalence

of TB in population<sup>11</sup>. Though common in all age group majority fall in between 21-30 years (68.56%)<sup>1,12</sup>. It may be asymptomatic (10%) & diagnosis requires high degree of suspicion<sup>13</sup>. Common clinical symptoms are menstrual (74.38%), pelvic pain (71.42%), infertility (30.12%), and Past history of TB (45%) and familial history (17.17%) was reported<sup>14,15</sup>. Oligomenorrhea (44.25) was observed as an important menstrual irregularity<sup>16</sup>. Examination findings (table4) tenderness of uterus & adnexa (60%) and adnexal thickness (71.4%) are relevant finding. Adnexal mass noted (11.42%) is lesser as compared to other studies as patients of PID not responding to treatment were included in this study<sup>17</sup>. Anemia & low weight observed in (62.8 & 54.5%) as women belong to low socio economic status. Raised ESR (98.57%) was in almost all cases. Mantoax test has 55% sensitivity & 80% specificity with laproscopic finding of TB<sup>18</sup>. X Ray chest showed old lesion (11.42% cases) though ultrasound not diagnostic test had suspicious finding in 62.14%. ELISA tests (91.42%) give adjuvant to clinical diagnosis<sup>19</sup>. Histopathological confirmation was possible in (21.71%). Samples were taken from endometrium & tissue biopsy from laproscopy, results is higher due to inclusion of PID cases<sup>20</sup>. PCR demonstrated Mycobacterium Tuberculosis DNA in 42.14%. Other authors also observed PCR to be more sensitive than histopathology<sup>21</sup>. Laproscopy helped in making diagnosis in 62.14% in association with other diagnostic modalities<sup>22</sup>.

### CONCLUSION

FGTB presenting as PID is common among sub-urban population of India. In patients presenting with CPP, recurrent PID and menstrual dysfunction, it is imperative to consider possibility of genital TB. Problem is faced by clinician in making definite diagnosis many times. For developing countries with high risk population, an Algorithm should be designed on the basis of clinical finding, nonspecific and specific tests to start the treatment. Patients having clinical suspicion were offered treatment and are being followed. Undoubtedly PCR is a rapid and sensitive test but laproscopy too is highly diagnostic. In order to significantly reduce the incidence of FGTB suspected cases should be investigated and treated as therapeutic trials. There is need for finding simple and cheap methods for making definitive diagnosis so the use of therapeutic trials can be avoided.

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**Conflict of interest** - None

### REFERENCE

1. Haas DW. Mycobacterial disease. In: Mandell GJ, Bennet JE, Dolin R, Principles of practice infections Disease. Philadelphia, PA: Churchill Livingstone; 2000; 2576-607.
2. Kumar S. Female genital tuberculosis. In: Sharma SK, Mohan A, (eds) Tuberculosis 1st edn. Delhi 2001; Japee: 311-324.
3. Figueroa-Damian R, Martinez-Vrlazco I, Villagrana Zesati R, Arredondo-Garcia JI. Tuberculosis of female reproductive tract: effect on function. 1996; Int J Fertil Menopausal Stud, 211: 430-436.
4. Chowdhury NM. Overview of tuberculosis of female genital tract. J Indian Med. Assoc, 1996; 94:343-6.
5. Falk V. Genital tuberculosis in woman. Am J Obstet Gynecol, 1980; 138:974.
6. Hutchins CJ. Tub of fem. Gen.tract-a changing picture. Br J Obstet Gynecol, 1977; 84:534.
7. Sutherland AM. Gynecological tuberculosis. Br J Hosp Med, 1979; 22:569.
8. Sutherland AM et al. Transmission of tuberculosis of female genital tract. Health Bul, 1982; 40:87.
9. Daly TW, Monil GRG Mycobacterium infectious disorder. Harpers Row Publisher Hagerstown, 1974; P 222.
10. Sutherland AM. Gynecological B analysis of a personal series of 710 cases. Austn J Gynaecol, 1985; 25: 2003.
11. Figueroa-D Amian, Martinez ve la et al. Female reproductive tract: effect on function. Int J Fertil menopausal study, 1996;47:430-6.
12. Agrawal J, Gupta JK. Female genital tuberculosis a retrospective clinicopathologic study of 501 cases. Indian J Pathol & Microbiol, 1993; 36:389-97.
13. Arora VK, Gupta R. Female Gen TB need for more research. Indian J Tuberculosis, 2003; 50:9-11.

14. Sutherland AM. Some Aspect of Gynecol,BP. Health BUL, 1978;36:119.
15. SY Sin Low- Venco, CH Tang. Hongcong Practioner 17(1), Jan 1995.
16. David K Gatongi. Adnan hasan Obstetrician & Gynaecologist, 2005; 7:75-79.
17. Madhu Nagpal. 2002, vol 3 no 4.
18. Rauta VS, Mahashurb AM. Int J Gynecology & obstetrics, 2001; vol 72 Issue 2, P 165.
19. Parkin MD. New Diagnostic tools for TB. Int J Tuberc lung dis, 2000; 4:182-188.
20. Manu R, Nayale KS. Tuberculosis in infertility. Indian J Tuberculosis, 2003; 50:161.
21. Rozati R. Evaluation of woman with infertility & gyn TB. J AObstel & Gynaecol india, 2006; 56:423-426.
22. Gupta N, Sharma JB, Mittal S, et al. genital TB in Indian infertile patients. Int J Obstel & Gynecol, 2007; 97:135-138.

# Evaluation of Compliance of Mass Drug Administration and its Determinants for Elimination of Lymphatic Filariasis in Endemic Areas of Rural North Karnataka

A. S. Dorle<sup>1</sup>, B. S. Mannapur<sup>2</sup>, L. D. Hiremath<sup>1</sup>, C. H. Ghattargi<sup>3</sup>, Gundappa<sup>4</sup>

<sup>1</sup>Professor, <sup>2</sup>Associate Professor, <sup>3</sup>Professor and Head, Department of Community Medicine, S. Nijalingappa Medical College, Bagalkot, <sup>4</sup>DHO, Bagalkot

## ABSTRACT:

**BACKGROUND:** Mass drug administration (MDA), which means once in-a-year administration of diethyl carbamazine (DEC) tablet to all people (excluding children under 2 years, pregnant women and severely ill persons) in identified endemic areas.

**OBJECTIVES:** 1. To study the compliance of MDA and its determinants in rural areas of Bilagi taluk. 2. To study the reasons for non compliance

**STUDY DESIGN:** A cross sectional study

**STUDY SETTING:** Rural areas of Bilagi taluk belonging to Bagalkot district, Karnataka state, identified as endemic areas of Filariasis where MDA 2008 was undertaken

**SAMPLE SIZE:** 10% of families from each cluster totaling to 5512 population from 30 clusters.

**SAMPLING METHOD :** Two stage sampling method (stratified and 30 cluster sampling method)

**RESULTS:** 77.34% of study population consumed the DEC and 22.66% did not consume DEC. 97% of the children in the age group of 6-14 years consumed DEC and 88% of the children in the age group 2-5 years consumed the DEC. Compliance in age group of 15-60 years was 73%. Compliance in females was 79% as compared to males 75.56%. 88.27% of individuals were motivated by the head of the family who consumed DEC. Compliance of DEC consumption was significantly higher when distributed by teacher.

**Keywords:** MDA, Lymphatic filariasis, DEC, Compliance.

## INTRODUCTION

Mass drug administration (MDA), which means once in-a-year administration of diethyl carbamazine (DEC) tablet to all people (excluding children under 2 years, pregnant women and severely ill persons) in identified endemic areas.<sup>1</sup> It aims at cessation of transmission of Lymphatic filariasis in the community. MDA in combination with other techniques has already eliminated LF from Japan, Taiwan, South Korea and Solomon Islands and markedly reduced the transmission in China<sup>2,3</sup>. In India, MDA with single dose of DEC (6 mg/kg body weight) was taken up as a pilot project covering 41 million population in 1996-97 and was

extended to 77 million population by 2002<sup>1</sup>. In order to achieve the elimination of LF by 2015 under the National Health Policy, National Filariasis Day (NFD) was proposed to be observed every year starting from 2004 in the endemic districts<sup>4</sup>.

In Karnataka, 8 districts are endemic to lymphatic filariasis from 2005. MDA campaign using DEC and Albendazole combination targeted a population of 1.6 lakh<sup>5</sup>. In Bagalkot district about 1072 lymphatic cases were present based on microfilaria survey and line listing of lymphoedema cases. In Bagalkot district, 4 taluks have been included for observing MDA. The present study was undertaken in one of the PHC of Bilagi taluka with following objectives.



**OBJECTIVES**

1. To study the compliance of MDA and its determinants.
2. To study the reasons for non-compliance.

**MATERIAL AND METHODS**

**1. STUDY DESIGN:**

Type of study: A Cross sectional study

Study area: Bilagi taluka of Bagalkot district which comprises 65 villages. The total population is around 1, 50,000.

Study period: The study was conducted for 6 months i.e. from march 09 to Sept.09, after obtaining the permission of DHO for conducting the evaluation survey.

**2. SAMPLING METHOD**

Two stage sampling method (stratified & cluster sampling) was used for selecting the study population. In first stage, villages were stratified on the basis of distance from respective PHC i.e. within 5 KMs, 5-10 KMs and more than 10 KMs and the number of clusters were decided from each strata as per the number of houses of the strata. In second stage, from each selected cluster, 10% households were selected for survey by systematic random sampling method, totaling to 5512 population.

**3. DATA COLLECTION**

A team of 4 health workers were trained for the data collection for two days. All the members of selected family who were present at the time of the visit of the health worker were included in the study. The compliance in our study refers to the actual consumption of drug by the community.

**4. STATISTICAL TEST USED:** Chi square test

**RESULTS**

**Table I - Age wise Distribution of study population.**

Age group (yrs)	Number of individuals	Percentage
2-5	314	5.7
6-14	1214	22.0
15-60	3868	70.2
60 & above	116	2.1
Total	5512	100.0

The study included 5512 individuals. Most of the study population were in the age group of 15-60 years (70.2%) followed by 6-14 years (22.0%), 2-5 years (5.7%) and 60+ yrs (2.1%).

**Table II - Age and DEC compliance**

Age (in yrs)	DEC consumed		Total	p-value
	No	Yes		
2-5	38(12.00%)	276(88.00%)	314(05.69%)	< 0.001
6-14	39(03.00%)	1175(97.00%)	1214(22.02%)	
15-60	1092(28.22%)	2777(72.78%)	3869(70.19%)	
60+	80(69.00%)	35(31.00%)	115(02.08%)	
Total	1249(22.66%)	4263(77.34%)	5512(100.00%)	

97% and 88% of the children in 6-14 years age group and 2-5 years age group consumed DEC tablets respectively. DEC consumption was comparatively low in other age groups 60+ yrs and 15-60 years i.e.31% and 72.78%. This finding was found to be highly significant.

**Table III - Motivation and DEC compliance**

Motivation By HOF	DEC compliance		Total	P-value
	No	Yes		
No	776 (52.40%)	705 (47.60%)	1481	< 0.001
Yes	473(11.73%)	3558 (88.27%)	4031	
Total	1249	4263	5512	

73.13% were motivated by their head of the family for consumption of DEC tablets and among the motivated, 88.27% consumed the DEC tablets. The association between motivation by head of the family and compliance was found to be highly significant (p < 0.001).

**Table IV Drug distributors and DEC compliance**

Drug Distributors	DEC compliance		Total	p-value
	No	Yes		
ANM	596(29.34%)	1435(70.66%)	2031	< 0.001
AWW	344(20.89%)	1303(78.11%)	1647	
HW	262(44.75%)	322(54.25%)	584	
Teachers	49(04.00%)	1205(96.00%)	1254	
Total	1249	4263	5512	

The consumption of the tablets were more when they were distributed by school teachers (96%) followed by Anganwadi worker (79%), ANM (73%) and Health worker (56%). This finding is found to be highly significant.

**Table V Main Reasons for non compliance of DEC tablets**

Reason for non-compliance	Number of individuals	Percentage
Lack of knowledge	305	24.42%
Fear of drugs	44	5.28%
Empty stomach	629	50.36%
Side effect of drugs	249	19.94%

The reasons for not consuming DEC were - empty stomach (50.36%), 24.42% had expressed lack of knowledge about MDA activity, 5.28% did not consume DEC because of fear of drugs and nearly 20% because of side effects of drugs.

### DISCUSSION

We found compliance of MDA to be 77.34%. These findings are comparable to most of the studies conducted within the countries.<sup>6,7,8,9</sup> Mukopadhaya et al. in his study in AP found compliance as 64.6%<sup>6</sup>. Babu et al. in East Godavari district of A.P found the compliance of 64%<sup>7</sup>. Laharaiya C. in his study in Gwalior found that, the tablet intake was not ensured by the distributors and the compliance rate was in the range of 60–70%<sup>8</sup>. The drug consumption in presence of drug distributor was <5%. However, Kumar P in his study "Evaluation of coverage and compliance of MDA in Gujrat" found that, the compliance with drug ingestion was satisfactory (89%)<sup>9</sup>.

In our study, among those who consumed DEC, 7.25% of them developed adverse reactions. There are two groups of adverse reactions observed in our study. They are general and local. General reactions in decreasing order of frequency were headache, bodyache, fever, dizziness, decreased appetite, malaise, nausea, urticaria and vomiting. Only few subjects mentioned about local reactions like pain and swelling around inguinal and scrotal region and local reactions may be because of destruction of microfilariae and adult worms.

In Kumar P<sup>9</sup> study, 2.15% cases complained of some side effects. Hochberg N et al in his study found that, 8% of respondents complained some side effects<sup>10</sup>. But other reasons of non compliance in our study were trivial, such as empty stomach, fear of drugs. It seems that, LF is not perceived as a serious public health problem or people think that, they will not be affected by this disease. One reason commonly given by the community for not consuming DEC was that, it causes gastric upset and so they prefer to take it after the meal. In this regard, suggestion came to us that Drug distributor may carry small packets of biscuits to facilitate spot consumption of DEC.

### CONCLUSIONS AND RECOMMENDATIONS

- Compliance of MDA was 77.34% which is poor compliance. So the goal to eliminate filariasis requires a higher compliance.
- Compliance was better in younger age group than older people, so there should be more IEC programme to attend older people.
- Incidence of side effects after MDA was minimal. All side effects were mild and needed no medical intervention.
- Various modes of pre-MDA IEC can be utilized such as TV, news papers, recorded messages or SMS, radio and cable. It should be done just few days before the campaign.

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### REFERENCES

1. Govt.of India. Problems and elimination of LF.in India. National vector borne diseases control programme, Ministry of Health and Family Welfare.(Cited 2009, May 30).Available from <http://www.namp.gov.in/filariasis.html>.
2. Molyneux DH, Zagaria N.Lymphatic Filariasis elimination: Progress in global program development. *Ann Trop Med Paracitol* 2002; 96:15S-40S
3. Molyneux DH, Zagaria N.Lymphatic Filariasis elimination: Public health success and development opportunity. *Filarial Jr*2003; 2:13
4. Govt.of India. National health policy 2002, Dept. of Health and ministry of health and family welfare, New Delhi.
5. Joint Director Office Malaria and Filariasis, Bangalore, Karnataka
6. Mukhyopadhyay AK, Patnaik SK, Babu PS, Rao KN.Knowledge on lymphatic filariasis and Mass Drug Administration(MDA) Program in filaria endemic districts of Andhra Pradesh,India.*J Vector Borne Dis*,2008;45(March):73-75
7. Babu BV, Satyanarayana K. Factors responsible for coverage and compliance in mass drug administration during the programme to eliminate LF in East Godavari district, south India. *Trop Doctor* 2003; 33: 79–82.

8. Lahariyaa C, Mishra A. Strengthening of mass drug administration implementation is required to eliminate lymphatic filariasis from India: an evaluation study. *J Vector Borne Dis*, 2008;45(Dec):313–32
9. Kumar P, Prajapatil PB, Saxena D, Kavishwar AB, Kurian G. An Evaluation of Coverage and Compliance of Mass Drug Administration 2006 for Elimination of Lymphatic Filariasis in Endemic Areas of Gujarat. *Indian Journal of Community Medicine*, 2008; 33(1)
10. Hochberg N et al. Symptoms reported after mass drug administration for Lymphatic Filariasis in Leogane, Haiti. *Am. J. Trop. Med. Hyg.*, 75(5), 2006, 928–932

# Factors Influencing Utilization of Intranatal Care Services in Rural Field Practice Area of J. S.S Medical College, Mysore

B. S. Mannapur<sup>1</sup>, N. C. Ashok<sup>2</sup>

<sup>1</sup>Associate Professor, Dept. of Community Medicine, S N Medical College, Bagalkot

<sup>2</sup>Professor & Head, Dept. of Community Medicine  
J.S.S Medical College, Mysore

## ABSTRACT

**Background:** Intra Natal care (INC) means, care taken during delivery. This consists of taking care of not only the mother but also newborn at the time of childbirth.

### Objectives

1. To find out, the factors influencing utilization of intra-natal care services
2. To determine, to what extent the intra-natal care services are utilized by the mothers.

### Materials and methods

**Study design:** A cross sectional study

**Sampling method:** Two stage sampling method was used

**Setting:** Villages of Suttur & Kadakola PHC's

**Source of data:** Mothers who had delivered during last one year

**Statistical test used:** Chi – square test

**Results :** 48.11% of the mothers had delivered at Taluka & District Government hospital. In 15-19 years age group, 96.30% of mothers had utilized Intra-natal care (INC) services. 93.33% of the mothers had utilized INC services whose socio-economic class was I & II. 90% of the mothers had utilized INC services who had studied up to college level. The Socio-demographic factors such as Age, Literacy status of the mother & Socio- economic status were found to influence the pattern of utilization.

**Conclusion:** Utilization of Intra-natal care service was increased with increase in literacy status and socio-economic status of the mother.

**Keywords:** Utilization, Intra-natal care services, Factors, Rural area

## INTRODUCTION

Women need additional care during childbirth to make the deliveries safe and to bring down the high levels of morbidity and mortality rates<sup>1</sup>.

Women can get health services either by visiting a health centre or from health workers during their domiciliary visit. The former gives an idea about

voluntary utilization about health services<sup>2</sup>. Health of the mother and child depends upon the socio- economic factors, educational status of the family and utilization of health services. All these factors are significant for child survival and safe motherhood<sup>3</sup>.

Most women experiencing morbidity and mortality due to pregnancy and childbirth live in remote rural areas and urban slum which are underserved. There-

fore, the programme should be effective in overcoming specific problems<sup>4</sup>. Hence the study had been undertaken in rural area.

**OBJECTIVES**

3. To find out, the factors influencing utilization of intranatal care services
4. To determine, to what extent the intranatal care services are utilized by the mothers.

**MATERIAL AND METHODS**

**Study design:** A cross sectional study

**Study period:** The study was conducted for one year i.e., from February 08 to January 09

**Sampling method :** Two stage sampling method was used

**First stage :**

Out of 3 PHC's coming under rural field practice area of JSS Medical College (Suttur, Kadakola and Hadinuru); two PHC's were selected on the basis of simple random sampling (Suttur and Kadakola).

**Second stage :**

Two subcentres were chosen from each PHC based on simple random sampling. All the villages coming under these subcenters were considered for the study.

**Source of data :**

Mothers who had delivered during the last one year. Thus a total of 370 mothers were surveyed (N= 370)

**Data collection:**

Information of socio-demographic factors & utilization of services were collected on a pre-designed and pre-tested structured questionnaire. House to house visit was done.

**Statistical methods employed:** Chi-square ( $X^2$ ) test

**RESULTS**

A total of 370 mothers were studied. Majority of the mothers (60.27%) belonged to the age group of 20-24 years. 38.92% of the mothers had studied up to primary school and 26.65% of the mothers were illiterate. 47% of the mothers were from upper lower (IV) socio-economic class.

**Table 1: Distribution of mothers according to place of delivery**

Literacy Status	Utilized	Not Utilized	Total
Illiterate	70 (66.04)	36 (33.96)	106
Primary School	122 (84.72)	22 (15.28)	144
High School	90 (90.00)	10 (10.00)	100
College	18 (90.00)	02 (10.00)	20
Total	300 (81.08)	70 (18.92)	370

48.11% of the mothers had delivered at Government hospital and 29.19% at home. 64.81% of the home deliveries were conducted by untrained dais and 35.19% by trained dias.

**Table 2: Utilization of Intra-natal care services as per age of the mothers**

Literacy Status	Utilized	Not Utilized	Total
Illiterate	70 (66.04)	36 (33.96)	106
Primary School	122 (84.72)	22 (15.28)	144
High School	90 (90.00)	10 (10.00)	100
College	18 (90.00)	02 (10.00)	20
Total	300 (81.08)	70 (18.92)	370

(Figures in parenthesis indicate percentage)

$X^2 = 41.09$ , d.f=3,  $P < 0.01$

The utilization of INC service was 96.3% in the age group of 15-19 years and the non utilization was 3.75%. In 30 years and more age group, the utilization was 39.29% and 60.71% of them had not utilized. The association between age of the mother and INC service utilization was found to be statistically significant.

**Table 3: Utilization of INC services as per literacy status of the mothers**

Literacy Status	Utilized	Not Utilized	Total
Illiterate	70 (66.04)	36 (33.96)	106
Primary School	122 (84.72)	22 (15.28)	144
High School	90 (90.00)	10 (10.00)	100
College	18 (90.00)	02 (10.00)	20
Total	300 (81.08)	70 (18.92)	370

(Figures in parenthesis indicate percentage)

$X^2 = 23.11$ , d. f= 3,  $P < 0.01$

90% of the mothers who had literacy status up to college level utilized the INC services whereas 10% didn't. 33% of the illiterate mothers had not utilized

the services and 66.04% of them utilized. The association between literacy status of the mother and utilization of INC services was found to be statistically significant.

**Table 4: Utilization of INC as per socio-economic status**

S.E Class	Utilized	Not Utilized	Total
I and II (Upper & Upper Middle)	14 (93.33)	01 (06.67)	15
III (Lower middle)	62 (91.18)	06 (08.82)	68
IV (Upper lower)	152 (87.36)	22 (12.64)	174
V (Lower)	72 (63.72)	41 (36.28)	113
Total	300 (81.08)	70 (18.19)	370

(Figures in parenthesis indicate percentage)

$\chi^2 = 32.66$ , d. f = 3,  $P < 0.01$

93.33% of the mothers had utilized the services whose socio-economic status was class I and II. 36.28% of the lower socio-economic status mothers had not utilized the services. The association between socio-economic status and INC service utilization was found to be statistically significant.

## DISCUSSION

In the present study, majority (48%) of the mothers had given birth at Taluka & District Govt. hospitals, because Taluka Govt. hospitals and Cheluvamba maternity hospital (District Govt. Hospital, Mysore) are nearer to most of the villages and also due to 24 hours availability of health care personnel and better facilities at these places. In this study, the home deliveries were 29%. In contrast to this, several studies revealed that, majority of the mother's delivered at home. [Vijayakumar S et al<sup>5</sup> (74.8%), Agarwal OP et al<sup>6</sup> (70%), Lingaraju M<sup>7</sup> (78%), Kartha GP et al<sup>4</sup> (72%), Sinha RN et al<sup>1</sup> (72.7%), Ali Ahmad Hawaldar et al<sup>8</sup> (80%), Pandse V<sup>9</sup>, Singh DR<sup>10</sup>].

In the present study, majority (64.81%) of the home deliveries were conducted by untrained personnel. The reason being preference for home delivery and traditional birth attendants is due to non availability of health personnel during delivery. Similar observations were made by Agarwal OP et al<sup>6</sup>, Jha N et al<sup>11</sup> (Majority i.e., 81.9%, 61.7%, of the home deliveries were conducted by untrained dais respectively). The study results differ from the observations made by Lingaraju M<sup>7</sup> and Pandse V et al<sup>9</sup> where in majority (55% and 68%) of the mothers utilized the services of trained dais.

The utilization of intranatal care service was found to be more in 15-29 years age group when

compared to 30 years and more. Utilization was higher among women with lower parity and in women in the 15-29 years age group. This proportion gradually declined with rise of parity and age. Similar findings were observed by Dutta PK et al<sup>12</sup>. This could be due to the fact that, the younger primiparous were more aware of the need for Intra natal care, hence the utilization is more compared to the awareness amongst the elderly multiparous.

In this study, the utilization of intranatal care service was increased with increase in literacy status of the mother and the association is statistically significant. There was a better awareness of health promotion, availability of existing health services leading to better utilization of the same by the educated mothers whereas it was less amongst illiterate women who were bound by cultural and superstitious beliefs. These results strengthen the findings of study reported by Rajeswari NV<sup>13</sup>. The present study differs from observations made by Umesh Kapil et al<sup>14</sup> who observed that no significant difference was found between literacy status of the women and utilizing or non utilizing the services.

It was observed in this study that, utilization of intranatal care services was increased with increase in socio-economic status of the family. The association between them is found to be statistically significant. Similar finding was observed by Venkatesh RR et al<sup>15</sup>

## CONCLUSIONS AND RECOMMENDATIONS

The Maternal and Child Health services in India have been initiated, strengthened and expanded over the year and are still underutilized particularly in rural areas. The present study has observed that there are socio-demographic factors like female literacy, low socio-economic status of women, parity, and age of the women which have influenced the utilization of the same by the expectant mothers. It was also observed that the awareness and the benefit of these services are yet to be understood by the maternal community. Therefore vigorous attempts should be made in this direction to usher the establishment of a safe mother in a safe society. 64.81% of the home deliveries were conducted by untrained dais. There is a need to improve the literacy level and socio-economic status of the mother.

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## REFERENCES

1. Sinha RN, Dasgupta S, Pal D Mandal NK, Raykumar P, Baur B et al. Coverage of Maternal care services in the state of West Bengal. *Indian Journal of Public Health* .2001; 45(4): 116 – 121.
2. Mandal SK. Utilization of antenatal care services in Rajasthan. Observations from NFHS. *The Journal of Family Welfare*. 1997; 43 (3): 28 -33.
3. Swamy HM . Vikas Bhatia, Bhatia SPS Kamaljeetsingh, Manmeet kaur, Amritpal Kaur. Existing. MCH services in rural areas of Chandigarh. *Indian Journal of Community Medicine*. 1997 ;23 (3): 110-113.
4. Kartha GP, Kumar P, Purohit CK. A longitudinal study on some aspects of maternal and child health in an urban community of Ahmadabad. *Indian Journal of Preventive and Social Medicine*. 1993; 24 (1): 15-19.
5. Vijayakumar S, Chakrapani C. Availability, accessibility and utilization of rural health services. *The Journal of Family Welfare*. 1995; 41 (3) 52-60.
6. Agarwal OP, Rakesh Kumar, Anita Gupta, Tiwari RS. Utilization of Antenatal Care Services in peri-urban area of East Delhi. *Indian Journal of Community Medicine* 1997; 22(1): 29-32.
7. Lingaraju M. Utilization of MCH and Family Planning services by a scheduled caste community in Mysore District. *The journal of Family Welfare*. 1998; 44:28-35.
8. Ali Ahmed Hawaldar, Ajitkumar Majumdar, Sadiq Tahera Khanam, Kabir M. Factors affecting maternal and child health in city slums. Evidence from a recent survey. *The Journal of Family Welfare*. 1995; 41(2): 41-48.
9. Pandse V, Giri I. Intra-natal practices in rural Rajasthan. *Indian Journal of Public health*. 1989; 33 (1): 198-199.
10. Singh DR., Mishra CP, Malhotra A, Tandon J. Coverage evaluation survey of universal immunization programme in chiraigaon block of Varanasi district. *Indian Journal of Preventive and Social Medicine*. 1993; 24 (2): 64-68.
11. Jha N, Nirula SR, Singh R, Upreti D. Safe motherhood programme in Sunsari district. A survey from Nepal. *Indian Journal of Preventive and Social Medicine* 2002; 33: 11-17.
12. Dutta PK, Urmil AC, Gund SS, Dutta M. Utilization of health services by “High risk” pregnant women in a semi-urban community of Pune-An analytical study. *Indian J Maternal Child Health* 1990; 1(1): 15-19.
13. Rajeswari NV and Kulkarni AS. Utilization of maternal and child health services in rural Karnataka. *J of Institute of Economics Res*. 1992; 17(1) : 13-24.
14. Umesh Kapil, Bharel SM, Sood AK. Utilization of health care services by mothers in an urban slum community of Delhi. *Indian Journal of Public health* 1989; 33(2):79.
15. Venkatesh RR, Umakant AG, Yuvaraj J. Safe motherhood status in the urban slums of Davanagere city. *Indian Journal of Community Medicine*,2005; 30(1):6

# Thyroglossal Duct Anomalies: A Retrospective Analysis

**Basant Mohan Singhal<sup>1</sup>, Satender Kumar<sup>2</sup>, Sanjay Pandey<sup>3</sup>, Ashutosh Niranjana<sup>4</sup>**

<sup>1</sup>Assistant Professor,<sup>3</sup>Professor, Department of Surgery, Subharti Medical College, Meerut, <sup>2</sup>Assistant Professor,

<sup>4</sup>Professor, Department of Surgery, School of Medical Sciences & Research, Greater Noida

## ABSTRACT

Thyroglossal duct anomalies (TDA) must be considered in the diagnosis of head and neck masses in children as well as adults. TDA are the commonest cause of congenital cysts and sinus in neck in paediatric population. In authors experience 37 patients were diagnosed and treated for TGA. The objective of this study is to analyse clinical presentation pattern and final outcome of Sistrunk procedure in these patients. In our series TDA affected more male (72.98%) in comparison to females (27.02%) this ratio was much higher in comparison to previous reports. Site of lesion was as expected, more common in infrahyoid location (85%) and midline (94.59%). Classical presentation of asymptomatic lump was seen in only 35% of patients. Surprisingly incidence of sinuses (54%) was much higher than cysts (46%). This probably was result of misdiagnoses and inadequate surgical intervention at local level. No patient presented with complications like dyspnoea or dysphagia. In all patients, ultrasound (USG) neck and thyroid function test were standard protocol for confirmation of clinical diagnosis as well as exclusion of the possibility of ectopic thyroid tissue. In one patient of cystic swelling with mixed cystic solid consistency, FNAC excluded the suspicion of malignancy. In 2 cases of multiple recurrences MRI was done for evaluation of sinus tract. In all patients Sistrunk procedure was done with no recurrence till 2 years of follow up. In cases of multiple recurrences wide local excision of soft tissue in submental triangle was done in addition to Sistrunk procedure with favourable outcome.

We feel that through understanding of embryology of TDA and meticulous dissection along anatomical planes is essential for adequate treatment and prevention of recurrence in these patients.

**Keywords** – *Thyroglossal duct anomalies, Sistrunk Procedure, Congenital.*

## INTRODUCTION

Thyroglossal Duct Anomalies, a congenital disorder, is one of the common cause of anterior midline swelling comprising 75% in children and 7% in adults<sup>1-3</sup>. The thyroid gland develops from a diverticulum (median thyroid analogue) extruding in the floor of pharynx between anterior and posterior muscle complexes of the tongue at 3<sup>rd</sup> week of gestation. It descends caudally through the mesoderm and fuses with components from the 4<sup>th</sup> and 5<sup>th</sup> branchial pouches (lateral thyroid analogues). The descent continues anterior to or through hyoid bone with the median analogue elongating into the thyroglossal duct<sup>4</sup> By the 5<sup>th</sup> to 8<sup>th</sup> week of gestation the thyroglossal duct obliterates leaving a proximal remnant at base of tongue i.e. foramen caecum and a distal remnant i.e. pyramidal lobe of thyroid. If the duct fails to obliterate before the formation of the mesodermal analogue of the hyoid bone, it persists as a cyst.<sup>4</sup>

During normal development the thyroglossal tract get completely sequestered and obliterated before birth. Organogenesis of thyroid gland in human may be disturbed leading to a variety of morphological variations of the gland. If any part does not obliterate it may present as cyst, sinus or rarely a fistula. Arrest in development of thyroid gland may result in aberrant thyroid along the course of thyroid gland.<sup>5</sup> Very rarely a papillary carcinoma may arise in the remnant epithelium.<sup>6,7</sup>

TDA are rarely associated with ectopic thyroid tissue. Occasionally TDA are associated with lingual thyroid presenting as a lump at the base of tongue<sup>2</sup> Histologically it is known that these cysts are lined by stratified squamous or pseudostratified ciliary epithelium.<sup>2</sup>

Initial extensive studies of embryology of thyroid gland were done by Wengloski<sup>8</sup> in 1912 and Norris<sup>9</sup>



1918. Early reviews of this Thyroglossal Duct Anomalies (TDA) were presented in 1920 by Sistrunk<sup>9</sup> in Annals of Surgery regarding surgical treatment of 32 cases and described operative procedure which is still the gold standard in management of thyroglossal tract anomalies.<sup>2</sup>

**PATIENTS AND METHODS**

This is a retrospective analysis, which has been started only after permission from institutional ethical committee. We had analysed 37 patients of TDA, admitted from July 1999 to August 2010. The objective of this study is to analyse clinical presentation pattern, efficacy of sonography in confirming the diagnosis and final outcome of Sistrunk procedure in these patients. We also analyze the efficacy of sonography in excluding the possibility of ectopic thyroid tissue in the swelling.

**DISCUSSION**

Thyroglossal Duct remnants occur in approximately 7% of the population, but only a minority of these become symptomatic.<sup>1</sup> Although these anomalies can present at any age, about 70-75% present in 1<sup>st</sup> and 2<sup>nd</sup> decade of life.<sup>10</sup> TDA are the second most common paediatric neck mass, behind adenopathy in frequency.<sup>11</sup> A sum of 37 cases were reviewed, average age at diagnosis was 12yrs 3months, youngest child being 2 years old at time when neck swelling was noticed. Oldest patient in our review developed swelling at age of 25yrs 6 months, which was drained at some local hospital leading to development of discharging sinus and after 5 months of this episode he presented to us. (Table -1)

**Table-1 Age Incidence(Total no. of cases 'n' =37)**

Age Group	Cyst		Sinus		Fistula		Total
	No.	%age	No.	%age	No.	%age	
0 -10 years	13	35.13	11	29.73	0	0	15
11-20 years	4	10.81	6	16.22	0	0	13
21-30 years	0		3	8.1	0	0	9
30 years or >	0		0		0	0	0
Grand Total	17	45.94	20	54.06	0	0	37

In this serial review out of 37 total cases more males 27 (72.98%) presented with TDA in comparison to females 10 (27.02%). In Males incidence according to type of anomaly was for cysts 12 (32.43%) and sinuses 15(40.55%), while in females incidence was equal for sinus 5 (13.51%) and cyst 5 (13.51%). (Table-2). Out of 37 cases, 17 cases (45.95%) presented with cysts in the neck while 20 cases (54.05%) presented with external

sinus. We did not find any patient with true fistula i.e. having both external and internal communication. Out of 17 cases presenting with cyst on clinical and USG evaluation 16 (94.12%) were purely cystic while 1 was of mixed cystic and solid in nature. Of the 20 patients with sinus all has external communication only, none was present since birth (congenital), 7 (35%) were result of spontaneous drainage. Other 13 (65%) were due to earlier therapeutic intervention in form of either incision and drainage or attempt at local excision. (Table-3)

**Table - 2 Sex Incidence(Total no. of cases 'n' =37)**

Age Group	Cyst		Sinus		Fistula		Total	%age
	No.	%age	No.	%age	No.	%age		
Male	12	32.43	15	40.55	0	0	27	72.98
Female	5	13.51	5	13.51	0	0	10	27.02
Grand Total	17	45.94	20	54.05	0	0	37	

TDA can occur anywhere in the path of descent of the thyroglossal tract. About 60% of TDA are reported between hyoid bone and thyroid cartilage, rest are suprahyoid (24%), suprasternal (13%) and intralingual (2%).<sup>12</sup> Rare reported locations of TDA are intrathyroid, mediastinum, in submental area or as low cervical masses, but ectopic thyroid is rarely seen in same areas.<sup>10,13,14</sup> In our review cysts in all patients, were in infrahyoid region. Level of sinus was 3 (15%) in suprahyoid and 17(85%) in infrahyoid region. All cases were due to surgical intervention at other hospitals. No cyst or sinus was present in region of base of tongue, floor of mouth, cricoid or infra-cricoid region (including the thoracic region).

**Table -3 Type of anomaly**

Cyst	Sinus(Only external communication)					Fistula (if both external and intra- oral communication present)	
	Type	No	%age	Type	No		%age
Purely Cystic		16	94.12	Cong	0	0	0
Mixed Cystic Solid		1	5.88	Spontaneous Rupture Intervention	3	15	0
Total		17			20		0

Classically these anomalies are described to be in midline and these rarely present as lateral neck mass<sup>1</sup>, in our review all 17 (100%) of cystic lesions and 18 (90%) of sinuses were present in median position (within 1 cms of midline) which is 35 out of total 37 cases (94.60%). Only 2 out of 20 (10%) cases sinuses were in para-median location which comes out to be 2 out of 37 (5.40%). (Table - 4)

**Table 4 : Site of Anomaly**

	Cyst	%age	Sinus	%age	Fistula
Supra-hyoid	0		3	15	0
Pre-hyoid	0		0	0	
Infra-hyoid	17	100	17	85	0
Midline	17	100	18	90	0
Paramedian	0		2	10	0
Right	0		0		
Left	0		2		

Clinically patients of TDA are described to present with a painless gradually enlarging cystic swelling in the midline of neck.<sup>15,16</sup> Inflammation or infection may lead to pain and other complication like dyspnoea or dysphagia due to mass effect.<sup>1</sup> Thyroglossal fistula is considered a misnomer as it is a blind ended sinus which mostly develops due to spontaneous rupture or surgical intervention.<sup>2</sup> However rarely there might be true fistula communicating between foramen caecum and neck skin, which is thought to be a congenital condition.<sup>18</sup> Both Thyroglossal Fistula and Sinus will exhibit upward movement on protrusion of tongue and deglutition. Most frequent cause to seek medical advice in all cases was presence or development of painless lump in the neck in 30/37 patients (81%) but only 13 (35.14%) of these came to us directly with such swelling. Rest 17 (45.95%) presented with asymptomatic lump to other centres and after surgical intervention there developed sinus. These case presented to us at various interval after primary surgery, earliest being 5 months and longest at 2.5 years. Next common symptom was inflamed lump or abscess in 4/37 cases (10.81%).

Clinical diagnosis in patients presenting with lump was suggested by cystic consistency, situation in midline anteriorly, movement with swallowing as well as protrusion of tongue. Transillumination was present in only 5 of total 17 patients (29.41%). Least common presentation of this anomaly in our review was spontaneous rupture of a swelling in the neck leading to a discharging sinus, in 3/37 (8.1%). All these patients were children between 3-5 year age group, from lower income group. Guardians of these patients neglected their neck swelling and sought medical advice only after it has ruptured with persistent discharge for 3-4 months.

In patients presenting with sinus, clinical diagnosis was suspected on previous history of painless swelling in the neck followed by development of a sinus with persistent watery discharge due to surgical intervention or spontaneous rupture. In most of the cases skin opening of the sinus stretched upwards on protrusion of the tongue. In two patients, there was a

history of surgery at other hospitals 6 months -1 year back followed by recurrence in form of a discharging sinus which was operated at same hospital, but unfortunately patients developed 2<sup>nd</sup> recurrence in form of discharging sinus. In our review none of the lumps or abscess led to respiratory embarrassment or any other life threatening complication. (Table – 5)

**Table 5 : Clinical Presentation**

	No.	%age
Asymptomatic Lump	13	35.14
Inflamed Lump / Abscess	4	10.81
Sinus	20	54.05
Spontaneous Rupture Appearance after surgical intervention in a lump in neck	3	
Incision	2	
Local excision	15	

Ultrasound examination of neck has been recommended to replace routine radio iodine scan for identification of normal thyroid.<sup>19</sup> A normal appearing thyroid gland with normal thyroid function test is considered adequate preoperative imaging study.<sup>22,22</sup> Lin-Durham et al concluded that demonstration of an anatomically normal should be sufficient to confirm a source of thyroid hormone outside the TDA itself.<sup>19</sup> Radowski et al propose that only patients with clinical hypothyroidism or abnormal thyroid function tests should undergo thyroid scintigraphy as these patients are the patients at risk of having ectopic thyroid.<sup>21</sup> If a solid component within a thyroglossal cyst is recognised on sonography, ectopic thyroid tissue or thyroglossal duct carcinoma should be considered. CT Scan and MRI are useful for lesion which are present in unusual locations<sup>11</sup>, in cases with intralaryngeal involvement<sup>10</sup> and for recurrent TDA remnant.

Elective surgical excision is the treatment of choice for uncomplicated TDA to prevent infection of the cyst.<sup>1</sup> Earlier TDA was treated with simple excision or Incision and Drainage resulting in high recurrence rate of 50%.<sup>2</sup> In 1920 Sistrunk advise excision of a block of tissue between hyoid bone and foramen caecum, to Schlang procedure leading to significant fall in recurrence rates to 2.6-5%.<sup>1,22,23</sup> Infected cysts or sinuses are first managed by relieving the infection by antibiotics followed by elective Sistrunk procedure.<sup>1,10</sup> Formal incision & drainage should be avoided to prevent seeding of ductal cell outside the cyst which increases the risk of recurrence.<sup>1</sup> Recently Baskota proposed a modified Sistrunk Procedure designed to cover up and incorporate all possibilities of remnant cells which could be left behind during surgery.<sup>23</sup>

In this series, after confirmation of diagnosis all

patients were evaluated for normal thyroid function and position. All patients were subjected to surgery and Sistrunk procedure was done. During surgery all soft tissue deep to subcutaneous plane and superficial to myelohyoid muscle in submental triangle was thoroughly removed in addition to Sistrunk procedure. Post operative period was uneventful in all cases and patients were discharged on 7 and 8 post operative day. Diagnosis of TDA was confirmed by histopathology. During follow up thyroid function tests were done at 1 month and were within normal range in all patients. Fortunately no recurrence was reported up to 2 years of follow up

Recurrent Thyroglossal cysts and Sinuses have high risk of failure (20-35%) and require a wider en-block resection.<sup>1,10</sup> Some authors have suggested en-block central neck dissection as a logical and effective surgical technique for the removal of recurrent or multiply recurrent TDA.<sup>24,25</sup>

### CONCLUSION

TDA should always be considered in differential diagnoses of midline swellings of the neck in children and young adults. Any surgical intervention should be avoided, till TDA is ruled-out. Ultrasound of neck for identification of normal thyroid anatomy combined with thyroid function tests, are effective preoperative screening tools to exclude ectopic thyroid tissue in TDA. In uncomplicated TDA, Sistrunk procedure is still the best surgical option, and it can be combined with wide excision of all subcutaneous tissue in submental triangle, in cases with recurrence or repeated recurrence. A meticulous dissection along anatomical planes is essential for adequate treatment and prevention of recurrence in these patients.

### REFERENCES

1. Acierno SP, Waldhausen John HT. congenital Cervical cysts, sinuses and fistulas. *Otolaryngol Clin N Am.*2007; 40:161-76
2. Moorthy SN, Arcot R. Thyroglossal Duct Cyst – More than just an embryological remnant. *Ind J Surg.* 2011; 73(1):28-31.
3. Foley DS, Fallat ME. Thyroglossal duct and other congenital midline cervical anomalies. *Semin Paediatr Surg.* 2006;15:70-75
4. Agarwal H, Wadhwa S RS, Raikwar SS, Mathur RK. A rare case of incidentally diagnosed primary papillary carcinoma of thyroglossal duct cyst. *Ind J Surg.* 2007; 69:145-46.
5. Dedivitis RA, Guimaraes AV. Papillary thyroid carcinoma in thyroglossal duct cyst. *Int Surg.*2000;85(3)198-01.
6. Gupta P, Maddalozzo J. Preoperative sonography in presumed thyroglossal duct cysts. *Arch Otolaryngol Head Neck Surg.*2011;127:200-2.
7. Enepekides DJ. Management of congenital anomalies of the neck. *Facial Plast Surg Clin N Am.* 2001;9:131-45.
8. Ghaneim A, Atkins P. The management of thyroglossal duct cysts. *Int J Clin Pract.* 1997;51(8):512-13.
9. Tas A, Karasalioglu AR, Yagiz R, et al. Thyroglossal Duct cyst in hyoid bone: unusual location. *J Laryngol Otol* 2003;117(8):656-57.
10. Choon-Soon Ho, Shinn Sung Ho, Lee CB et al. Thyroglossal cyst within the mediastinum: an extremely unusual location. *J Thorac Cardiovasc Surg.* 2007; 133:1671-72.
11. Telender RL, Deane SA. Thyroglossal and branchial cleft cysts and sinuses. *Surg Clin N Am.*1977;57:779-91.
12. Fiston HC. Common lumps and bumps of the head and neck in infants and children. *Pediatr Ann.*1989; 18:180-86.
13. Madana J, Yolmo D, et al. true Thyroglossal fistula. *Laryngoscope.*2009; 119 (12) :2345-47.
14. Ahuja At, King AD, Metreweli C. Sonographic evaluation of thyroglossal duct cysts in children. *Clin radiol.*2000;55:770-74.
15. Som P, Smoker WRK, Curtin HD. Congenital lesions. *Head and Neck Imaging.* 4<sup>th</sup> ed. St Louis, MO: Mosby- Year Book.2003;21:315-19
16. Wadsworth DT, Siegel MJ. Thyroglossal duct cysts: variability of sonographic findings. *AJR Am J Roentgenol.* 1994;163:1475-77.
17. Lim-Dunham JF, Feinstein KA, Yousefzadeh DK, Ben-Ami T. Sonographic demonstration of a normal thyroid gland excludes ectopic thyroid in patients with thyroglossal duct cysts. *AJR Am J Roentgenol.* 1995;164:189-91.
18. Kaplan M, Kauli R, Lubin E. et al. Thyroid gland. *J Pediatr.* 1976;92:205-9.
19. Baatenburg de Jong RJ, Rogen RJ, Lameris JS. Et al. Ultrasound characteristics of thyroglossal duct anomalies. *ORL J otorhinolaryngol Relat Spec.* 1993;55:299-02.
20. Radkowski D, Arnold J, Healy GB. et al. thyroglossal duct remnants. *Arch Otolaryngol Head neck Surg.* 1991;117:1378-81.
21. Ducic Y, Chou S, Drkulec J. et al Recurrent thyroglossal duct cysts: a clinical and pathological analysis. *Int J peditr Otorhinolaryngol.*1998;44:47-50.
22. Brown PM, Judd Es. Thyroglossal duct cysts and sinuses: results of radical (Sistrunk ) operation. *Am J Surg.*1961;102:495-01.
23. Baskota DK. Modified Sistrunk Operation. *Nep J ENT Head Neck Surg,* 2010;1(1):34-5.
24. Howard DJ., Lund VJ. Thyroglossal ducts, cysts

- and sinuses: a recurrent problem. *Ann R Coll Surg Eng.* 1986;68(3):137-8.
25. Kim MK., Pawel BR., Isaacson G. Central neck dissection for treatment of recurrent thyroglossal cysts in childhood. *Otolaryngol Head Neck Surg* 1999; 121:543-47.

# Prevalence of HBV, HCV, and HIV Infections among Individuals Included in Premarital Screening Program at Jazan Province, Saudi Arabia

Zaki M. Eisa<sup>1</sup>, Saleh A. Eifan<sup>2</sup>, Basheer A. Al-Sum<sup>3</sup>

<sup>1</sup>Professor, Department of Virology, King Fahd Hospital, Jazan, Saudi Arabia, <sup>2</sup>Assistant professor, Botany and Microbiology Dep., College of Science, King Saud University. <sup>3</sup>Botany and Microbiology Dep., College of Science, King Saud University, Saudi Arabia

## ABSTRACT

**Objective:** In this study, were evaluated Infections among Individuals Included in premarital screening program at Jazan Province for the prevalence of hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV).

**Materials and Methods:** The study was carried out in Jazan, Saudi Arabia through year of 2009 and 2010. A total of 28134 people were subjected to premarital screening test in this study. Seroconversion panels, HBsAg positive/HBsAg negative (n=540/n=27594), anti-HCV positive/negative (n=59/n=28075), and anti-HIV positive/negative (n=9/n=28125) samples were used to evaluate the performance of Monolisa HBsAg ULTRA, Murex anti-HCV, and Genscreen ULTRA HIV Ag-Ab.

**Results:** Of the 28134 persons, 14073 were male (50%), and 4016 were female (49%). The detection of HBsAg, anti-HCV antibodies and HIV Ag-Ab, were 540 (0.07%), 63 (0.22%), and 9 (0.031%) respectively.

**Conclusion:** Male individuals showed very high incidence of HBV, HCV and HIV cases compare to female participant although the number of people participated from both gender was almost equivalent and with positive HIV were 7 cases while only two female were detected with HIV positive.

**Key Words:** Hepatitis B virus, Hepatitis C virus, Human immunodeficiency virus, premarital screening program.

## INTRODUCTION

Globally, hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) considered as the most blood-transmitted infections. According to WHO, 33 million patients infected with HIV and most of these cases (95 %) were registered in developing countries<sup>1</sup>.

It is known that 350 million were detected with chronic infection of HBV and at least half million of these cases developed liver malignancy and cirrhosis ended by death<sup>2</sup>. An estimation of 170 million cases of HCV worldwide was reported<sup>3</sup>.

In 2003, Saudi authorities introduced free mandatory premarital screening program in order the reduce the risks of such blood-transmitted diseases among

populations<sup>4</sup>. After one year, the Ministry of Health (MOH) of Saudi Arabia released that 11000 HIV carriers were detected and among these cases 2005 were Saudis citizens<sup>5</sup>.

In 2009, study showed that HBV cases was 0.8 % while HIV and HCV tests result were negative among 4090 individuals subjected to premarital screening in Jazan<sup>6</sup>.

The later study was conducted in the regions of Saudi Arabia and revealed that the highest prevalence was HBV cases (1.31 %), followed by HCV (0.33 %) and the lowest incidence was for HIV (0.03 %). El-Hazmi reported that the prevalence of HBV, HCV and retroviral infection among blood donors was 1.5, 0.4 % and Nail, respectively<sup>6</sup>.

The later study carried out in central region of Saudi Arabia and included Saudi and non Saudi.

**MATERIAL AND METHODS**

This is a cross-sectional descriptive study embedded in the existing national premarital screening program for thalassaemia and sickle cell disease to estimate the prevalence of HIV, HBV and HCV infections, followed by a case-control study to identify risk factors responsible for infection transmission. The study

was carried out in Jazan, Saudi Arabia through year of 2009 and 2010. A total of 28134 people were subjected to premarital screening test in this study.

All specimens were tested using commercially available EIAs for HBsAg using Murex HBsAg version 4(Abbott Laboratories, IL, USA), for HIV antibody and antigen using the Genscreen HIV Ab-Ag serological screening kit (Bio-Rad Laboratories, CA, USA) and for HCV using the anti- HCV version 4.0 (Bio- Rad Laboratories, CA, USA).

**OBSERVATION & RESULTS:**

**Table 1 : No. of hepatitis B, C, and HIV cases in premarital screening clinic in Jazan region 2009.**

Month	No. of persons			HIV			HCV			HBV		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Jan	272	272	544	10	0	10	2	0	2	0	0	0
Feb	572	572	1144	29	3	32	2	0	2	0	0	0
March	653	652	1305	22	0	22	2	0	2	0	0	0
April	574	573	1147	19	0	19	0	1	1	2	0	2
May	560	560	1120	18	0	18	1	0	1	0	1	1
June	655	655	1310	25	1	26	2	0	2	0	0	0
July	911	912	1823	39	0	39	3	0	3	0	0	0
August	861	861	1722	30	0	30	5	0	5	0	0	0
Sep	542	542	1084	18	0	18	5	0	5	1	0	1
Oct	514	413	1027	21	0	21	2	0	2	1	0	1
Nov	382	381	763	20	0	20	4	0	4	0	0	0
Dec	382	381	763	18	2	20	4	0	4	0	0	0
Total	6879	6873	13752	249	6	255	32	1	33	4	1	5

In total, 13752 specimens collected from two well defined population groups (Male and Female) in different geographical regions in Jazan, Saudi Arabia. Were analyzed for evidence of HIV, HBV and HCV infection through year of 2009, Of these, (n= 255) tested positive for HBsAg, (n= 33) tested positive for anti-HCV and (n= 5) tested positive for HIV, collected from all groups. have been summarized in **table no . 1**

In total, 14382 specimens collected from two well defined population groups (Male and Female) in different geographical regions in Jazan, Saudi Arabia. Were analyzed for evidence of HIV, HBV and HCV infection through year of 2010, Of these, (n= 285) tested positive for HBsAg, (n= 30) tested positive for anti-HCV and (n= 4) tested positive for HIV, collected from all groups. have been summarized in **table no . 2**

**Table 2 : No. of hepatitis B, C, and HIV cases in premarital screening clinic in Jazan region 2010.**

Month	No. of persons			HBV			HCV			HIV		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Jan	490	489	979	18	0	18	4	0	4	0	1	1
Feb	755	754	1509	25	0	25	1	0	1	0	0	0
March	572	571	1143	20	2	20	4	0	4	0	0	0
April	684	683	1367	45	0	45	3	0	3	1	0	1
May	651	651	1302	27	0	27	2	0	2	1	0	1
June	506	506	1012	15	0	15	1	0	1	0	0	0
July	675	675	1350	25	1	26	2	0	2	1	0	1
August	769	769	1538	26	0	26	2	0	2	0	0	0
Sep	577	576	1153	15	0	15	4	0	4	0	0	0
Oct	605	605	1210	22	0	22	3	0	3	0	0	0
Nov	501	501	1002	26	0	26	3	0	3	0	0	0
Dec	409	408	817	19	0	19	1	0	1	0	0	0
Total	7194	7188	14382	282	3	285	30	0	30	3	1	4

**Table 3 : Total of HBV , HCV and HIV in positive persons.**

	No. of persons	HBV	HCV	HIV
Male (%)	14073 (50%)	531 (3.8%)	62 (0.44%)	7 (0.049%)
Female (%)	4061(49.9%)	9 (0.64%)	1 (0.007%)	2 (0.014%)
Total (%)	28134 (100%)	540 (0.07%)	63 (0.22%)	9 (0.031%)

The result obtained On Prevalence of HBV, HCV, and HIV Infections among Individuals Included in premarital screening program at Jazan Province, have been summarized in **table no . 3**

Of the 28134 persons, 14073 were male (50%), and 4016 were female (49%). The detection of HBsAg, anti-HCV antibodies and HIV Ag-Ab, were 540 (0.07%), 63 (0.22%), and 9 (0.031%) respectively. Male individuals showed very high incidence of HBV, HCV and HIV cases compare to female participant although the number of people participated from both gender was almost equivalent and with positive HIV were 7 cases while only two female were detected with HIV positive.

**DISCUSSION**

Our results showed that the prevalence of HIV cases (0.03 %) is consistent with study were reported by Alsawaidi and O'Brien, 2009. The previous study revealed that the average prevalence for HBV was 1.31 % while current results showed HBV cases were 2.0 %. These differences might be due to total number of participants and period of time during study carried

out. Current study covers 28134 individuals through two years. While previous study included 4090 individuals through 6 months only. HBV frequency in this report was slightly different from that reported by El-Hazmi, 2004, which were 2.0 % and 1.5 %, respectively. The later study displayed HCV positive cases accounted for 0.4 % while current study showed HCV-positive samples 0.21%. El-Hazmi study involved Saudis and non-Saudis participants and this might reflect the differences. Similar study was conducted in Yemen, by Saghir *et al.* The later report showed that prevalence rates of HBV, HCV and HIV were 2.40%, 0.79% and 0.14 % respectively. The differences in frequency rates between the previous and current study could be justified through the differences in level of hygiene, education, socio-economic status and geographical location.

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**REFERENCES**

1. Adibi P, Rezailashkajani M, Roshkandel D. An economic analysis of premarriage prevention of hepatitis B transmission in Iran. *BMC infect Dis* 2004; 4:31.
2. Mukherjee S, Dhawan VK. Hepatitis C. 2006. eMedicine from WebMD. <http://www.emedicine.com / med / topic993.htm> (accessed 6 May 2009).

3. AI-Hamdan NA, AI-Mazrou YY, AI-swaidi FM, *et al.* Premarital screening for thalassemia and sickle cell disease in Saudi Arabia. *Genet Med* 2007; 9:372-7.
4. AI-Mazrou YY, AI-jeffri MH, Fidail A, *et al.* HIV/AIDS epidemic features and trends in Saudi Arabia. *Ann Saudi Med* 2005; 25:100-4.
5. Alswaidi FM, O'Brien SJ. Is there a need to include HIV, HBV and HCV viruses in the Saudi premarital screening program on the basis of their prevalence and transmission risk factors. *J Epidemiol Community Health* 2010;64:989-997.
6. EI-Hazmi MM. Prevalence of HBV, HCV, HIV - 1, 2 and HTLV-I/II infections among blood donors in teaching hospitals in the central region of Saudi Arabia. *Saudi Med J* 2004; 25:26-33.



# Factors Affecting the Efficiency of Public Private Partnerships for Healthcare Delivery in India

Bharti Birla<sup>1</sup>, Udit Taneja<sup>2</sup>

<sup>1</sup>Ph. D. Scholar, <sup>2</sup>Associate Professor, University School of Management Studies, GGS Indraprastha University, Dwarka, Delhi, India.

## ABSTRACT :

**Objective :** The present study aims to identify the factors that are considered important while assessing the efficiency of healthcare delivery units which are operating as Public Private Partnerships, as well as to rank these factors.

**Materials and Methods :** A literature survey was done to identify various input and output factors used in different studies for measuring the efficiency of healthcare units. A pilot questionnaire was developed to test these amongst a group of healthcare professionals and 9 input factors and 9 output factors were selected. The healthcare professionals were asked to rank these factors in the order of their importance in increasing the efficiency of healthcare partnerships.

**Result :** The ranking obtained in the study shows that in terms of input factors, the strength of human resources is the most important factor for efficient functioning of a PPP. In terms of output factors, the number of healthy deliveries, discharges because of recovery, the number of medical admissions, and occupancy rates are important factors. With the given resources or inputs in terms of human, capital, and technology, these PPPs need to deliver the best possible outputs and outcomes.

**Conclusion :** The top ranking input and output factors, if improved, can help achieve higher efficiency. The more efficient the PPP model, the more the chances for sustainability of the model.

**Key Words :** Public Private Partnerships, Healthcare, Efficiency, Factors.

## INTRODUCTION

The Government of India (GOI) Report of the National Commission on Macroeconomics and Health (2005)<sup>1</sup> states that the public expenditure on health is an important determinant of the health status of the population. The WHO World Health Statistics Report (2011)<sup>2</sup> states that for India, the total expenditure on health as percentage of Gross Domestic Product (GDP) for the year 2008 is 4.2 percent, which is 0.4 decrease from the year 2000, though the total general government expenditure on health as a percentage of total expenditure on health has increased from 27.5 percent to 32.4 percent during this time (Figure 1).

According to the Strategy Paper (2010-2011) of the Ministry of Health and Family Welfare (MoHFW),

GOI<sup>3</sup>, this public spending on healthcare has remained more or less close to a meagre 1% of the Gross Domestic Product (GDP) as seen over the last few years.

India has built a vast healthcare infrastructure and delivery system with a range of service providers engaged in healthcare delivery and healthcare financing. These service providers include public, private (for-profit), civil society (non-profit) organizations, as well as services provided or funded by international and bilateral donor organizations. The services are delivered at different levels of primary, secondary and tertiary healthcare. Even with this huge structure, healthcare is still a challenge in India. This is because the healthcare players, including the government, private, corporate and non-profits operate in isolation resulting in an absence of continuum of health services to patients.

**Figure 1: Healthcare Expenditure**

Health Expenditure Ratios (Source: World Health Statistics 2011, World Health Organization)		
	Year 2000	Year 2008
Total expenditure on health as % of gross domestic product	4.6	4.2
General government expenditure on health as % of total expenditure on health	27.5	32.4
Private expenditure on health as % of total expenditure on health	72.5	67.6
General government expenditure on health as % of total government expenditure	3.9	4.4
External resources for health as % of total expenditure on health	0.5	1.6
Social security expenditure on health as % of general government expenditure on health	16.9	17.2
Out-of-pocket expenditure as % of private expenditure on health	92.2	74.4
Private prepaid plans as % of private expenditure on health	1	2.3

**Figure 2: Different levels at which PPPs operate**



In this context, Public Private Partnerships (PPPs) are becoming an important player in the healthcare arena. Such partnerships operate at different levels. For example, PPPs are engaged in basic research with universities or research organizations; or drug and medical technology development, which is generally a collaborative effort of the pharmaceutical and biotechnology companies with state institutions and not-for-profit initiatives; or at the level of actual healthcare delivery, at the level of primary, secondary and tertiary healthcare services. At this level, such partnerships operate in diverse forms ranging from distribution of medicines and provision of services for specific diseases, strengthening healthcare delivery at primary,

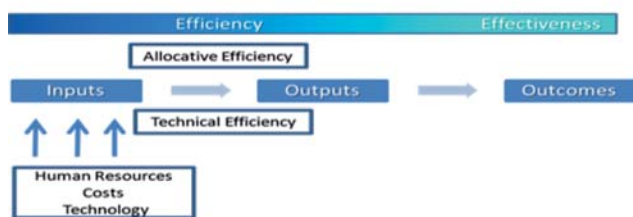
secondary and tertiary levels, health insurance or diagnostic services. These also include partnerships for health awareness and social marketing of products and services (Figure 2).

According to the GOI's Planning Commission's Task Force on Public Private Partnerships (2007)<sup>4</sup>, the current health infrastructure is insufficient to meet the health goals or to provide adequate healthcare services to the Indian population. With the advent of PPPs, there is an amalgamation of the traditional role of the state in providing health services with the profit making market driven ideology of the private sector. At the same time, PPPs are assumed to provide health services in an efficient, effective and equitable manner, especially in reaching the otherwise unreachable population.

The PPP mechanisms are also being criticized in equally charged debates. The questions as to whether these PPPs can address the health goals of the country in a sustainable manner rather than a mere short-term arrangement where the state is leaving the entire matter of service delivery to the private sector are constantly being deliberated. There has also been a growing concern to analyze the performance in terms of efficiency and effectiveness of these PPPs. An efficient healthcare system, which can deliver maximum outputs by judiciously utilizing the required inputs becomes crucial. Efficiency assessment is essential as it can help formulation or adoption of suitable policies and programmes by the government, donor agencies, and private partners and for monitoring and evaluation of such partnerships. The identification of the critical factors contributing to the efficiency can help the partners design optimal strategies and business plans for maximum returns.

There are several studies done across the globe to look at the efficiency of hospitals and health systems. The report of the Australian Steering committee for the Review of Commonwealth/State Service Provision (1997)<sup>5</sup>, defines the efficiency of a healthcare unit as the degree to which the observed use of resources to produce outputs of a given quality matches the optimal use of resources to produce outputs of a given quality. The effectiveness is a measure of the input or the output to the outcome or the goal. According to Worthington (1999)<sup>6</sup>, there can be three main measures of the efficiency of healthcare units. These are *technical efficiency*, *allocative efficiency* and *productive efficiency* (Figure 3).

Figure 3: Different types of efficiencies



Technical efficiency, as the name suggests, pertains to the use of productive resources in the most technologically efficient manner, i.e. getting maximum possible output from a given set of inputs (Worthington, 1999). This type of efficiency is technology and resource specific and producer centric i.e. whether the producer maximizes outputs with given inputs and technology. If the technology is obsolete or there is poor management, there will be inefficiency in the system (Kam Yu, 2011)<sup>7</sup>.

Allocative efficiency on the other hand measures the ability of the organization to select different efficient combinations of inputs to produce the maximum possible outputs (Worthington, 1999). Allocative efficiency thus ensures that the product mix attains maximum social welfare (Kam Yu, 2011) and is more consumer-centric and helps to meet the state goals of providing healthcare to the general or targeted population.

Farrell and Worthington, state that technical and allocative efficiency taken together determine the degree of productive efficiency (also called economic efficiency) (Farrell, 1957<sup>8</sup>; Worthington, 2004<sup>9</sup>

Worthington, AC. (2004): Frontier efficiency measurement in healthcare: a review of empirical techniques and selected applications, *Medical Care Research and Review* 61(2), pp. 1-36.

Worthington points out that an organization is said to have achieved total productive efficiency (economic efficiency) if its resources are used completely allocatively and technically efficiently. Conversely, if there is either allocative or technical inefficiency, then the organisation will be operating at less than total economic efficiency (Worthington, 2004).

Apart from the three types of efficiencies, described above, another form of efficiency is the cost efficiency, which involves minimizing total cost of production for a given output level. The producer of services, using technology can choose the optimal combination of inputs to produce required outputs by minimizing costs and the cost efficiency is achieved only when the maximum or best possible outputs are achieved with

the lowest possible costs (Kam Yu, 2011).

To calculate the efficiency of a healthcare unit operating under the PPP mode, it is necessary to first define the input and output factors. A number of studies have been conducted worldwide, and a few in India, to calculate the efficiency of healthcare units in general. Different input factors, such as number of doctors, number of nurses/paramedical staff, cost of supplies, and cost of expensive technical machinery have been identified. Some of the outputs selected are number of regular admissions, number of surgeries, case mix categories, and number of discharges. Apart from these quantifiable factors, Kooreman states that efficiency is also a measure of some hard to quantify factors, such as improved health status or improved quality of life (Kooreman, 1994)<sup>10</sup>.

Studies available describe the factors that are essential for efficient working of a healthcare unit but the relative importance of these factors has, however, not been assessed. Based on the above, the objective of this study is twofold. The first objective is to determine the factors that are considered important while assessing the efficiency of healthcare delivery units based on PPPs, and the second is to rank these factors.

## MATERIAL AND METHODS

Efficiency is calculated as the ratio of outputs to inputs. A literature survey was done to identify the various input and output factors used in earlier studies for measuring the efficiency of healthcare units.

FIGURE 4: RESEARCH METHODOLOGY



For the literature survey, different databases, such as Medline, Pubmed, Indian Medlars Centre, Nisclair and online versions of journals on healthcare and health policy were searched. Titles and abstracts of journals were also searched using Google Scholar. Proceedings of past conferences related to the topic were also accessed. In addition, the websites of World Health Organization (WHO), The World Bank, Ministry of Health and Family Welfare, Planning Commission, National Rural Health Mission (NHRM), and other relevant GOI portals were searched to gain access to reports, policies, white papers, recommendations and proceedings of conferences. Different keywords were selected, such as efficiency, input, output, data envelopment analysis, public private partnership/mix, healthcare delivery. It was found that different studies had used different factors.

Based on this literature survey, key input and output factors were identified. The factors most commonly used in the earlier studies were shortlisted. A pilot questionnaire was developed based on these factors. This was tested on a group of healthcare professionals (Figure 4). Based on this, and on initial interviews, with some of the healthcare professionals, 9 input factors (Table 1) and 9 output factors (Table 2) were selected, which could contribute to the efficiency of a PPP based healthcare delivery unit. The explanatory variables, such as accessibility of the unit, distance to the nearest hospital, impact on overall health of the community, and level of community participation have not been considered in this study.

A cross-sectional exploratory study was then conducted to rank these factors using a survey instrument. Data was collected using a self-administered questionnaire. A five-point Likert scale (anchored at 5 = strongly agree, 4 = agree, 3 = does not matter, 2 = disagree and 1 = strongly disagree) was used to rank the factors. The higher the numerical value of a factor, the higher its importance in contributing towards the efficiency of a healthcare delivery unit. The score for a particular input or output was obtained by totalling the scores for all respondents for that factor.

**Table 1: List of Input Factors Selected for the Study**

Input Factors	
1.	Number of doctors in a healthcare unit
2.	Number of nurses in a healthcare unit
3.	Number of technical services personnel (paramedical staff)
4.	OPD hours per week/lab hours per week
5.	Number of beds in a healthcare unit (in-patient facility)
6.	Total cost of material and equipment (capital expenditure)
7.	Total cost of consumable items, such as drugs, sanitary utilities etc. (variable cost)
8.	Cost of specialized infrastructure/specialized equipment
9.	Cost of purchased services/General Practitioner's fees

**Table 2: List of Output Factors Selected for the Study**

Output Factors	
1.	Number of Medical admissions
2.	Number of Surgical admissions
3.	Average length of stay
4.	Occupancy rate
5.	Teaching variables: Number of residents/nursing staff receiving 1 year of training at a hospital
6.	Average case mix categories (Internal Medicine, General Surgery, Gynaecology, Paediatrics, Intensive Care, and other) as indexes
7.	Discharges because of recovery (Medicine, Surgery, Obstetrics, Paediatrics and Intensive Care)
8.	Number of healthy deliveries
9.	Number of lab cases

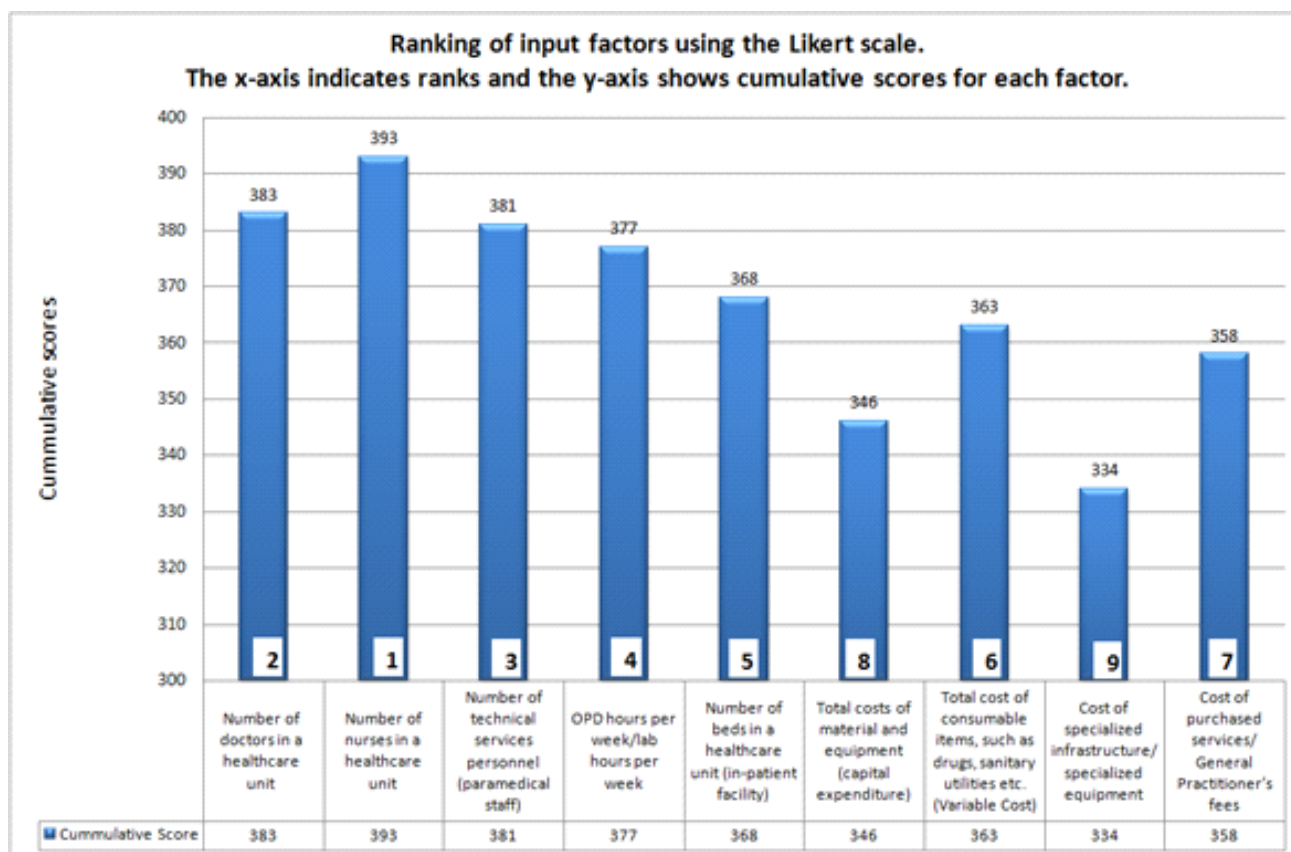
Questionnaires were emailed or hand-delivered to various stakeholders in healthcare delivery and planning. The sample size consisted of 85 respondents including healthcare professionals/social workers in civil society organizations, policy makers/influencers, corporate social responsibility wings of business houses providing healthcare services, government officials, and doctors from both government and private practice. The geographical scope included mainly the National Capital Region of Delhi and a few responses from other states in India.

An MS Excel sheet was programmed to analyze the results obtained. Responses received for each selected input and output factor were assigned values, as stated above. Cumulative scores for each factor were calculated. The factors were then arranged in decreasing order of the cumulative scores obtained. The responses received were also analyzed, based on the profile of the respondents (as community outreach professionals, medical doctors and researchers) and their view points were captured in terms of ranking of these factors.

## FINDINGS

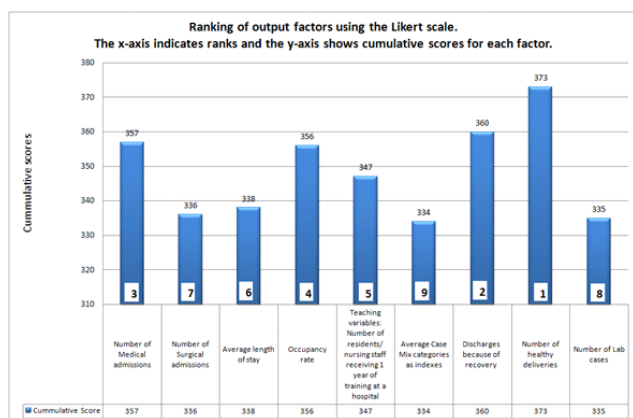
Figure 5 shows the ranking of the input factors based on the cumulative scores obtained for each factor. The results show that the number of nurses and doctors in the healthcare unit are most important, while the cost of specialized equipment is of least importance, out of the 9 input factors considered for calculating the efficiency of a healthcare delivery unit.

Figure 5: Ranking of Input Factors



Similarly, Figure 6 shows the ranking of the output factors based on the cumulative scores obtained for each factor. For the 9 output factors, the most important factors are the number of healthy deliveries, discharges because of recovery, the number of medical admissions, and occupancy rates. The factors which were considered as least important were the number of lab cases and average case mix categories.

Figure 6: Ranking of Output Factors



**Ranking of the factors by different stakeholders:**  
The responses received were analyzed to see if the perceptions of different stakeholders varied in ranking these factors.

Figure 7: Ranking of Input Factors by Different Stakeholders

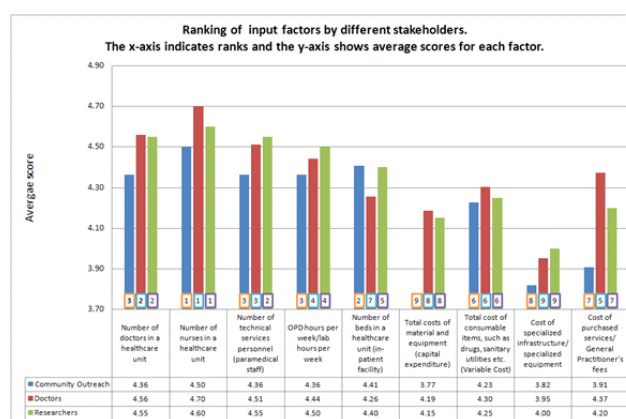
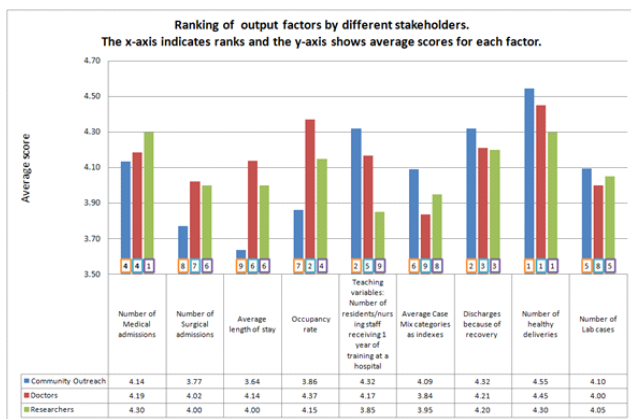


Figure 7 shows the ranking of the input factors by different stakeholders. All the stakeholders agreed that number of nurses in the healthcare units is of crucial importance. The second factor that was considered important is the number of doctors, except for the

community outreach professionals, who felt that the number of beds was more important. Community outreach professionals also ranked number of doctors, number of technical service professionals and number of OPD hours as equally important factors and ranked them third. Doctors felt that the numbers of beds was not that crucial, but number of technical service staff and number of OPD hours was important. There was a general consensus that total cost of consumable items, cost of specialized infrastructure and cost of purchased services is of least importance in calculating the efficiency of a healthcare unit based on public private partnerships.

**Figure 8: Ranking of Output Factors by Different Stakeholders**



Similarly, Figure 8 shows the ranking of the output factors by different stakeholders. All stakeholders agreed that the number of healthy deliveries is one of the most important factors for assessing the efficiency of a healthcare unit. Researchers felt that number of medical admissions is an equally important factor at rank one. All of them ranked discharges because of recovery as an important factor. Doctors ranked occupancy rate as a more important factor compared to discharges, but for community outreach professionals and researchers, this factor was not that crucial. All stakeholders agreed that the number of surgical admissions, average case mix, and number of lab cases are least important to measure the efficiency of a healthcare delivery unit.

**CONCLUSIONS**

For a PPP, shared goals and visions between the public and private partner are important. Once these are clearly stated and understood, the performance of a PPP can be measured in terms of effectiveness i.e. how successful is the PPP in realizing the objectives and goals envisaged by both partners. It can also be measured in terms of efficiency, i.e. by making the best

use of available resources. The PPP must be sustainable beyond the initial funding and should continue to deliver outcomes in the long run. The PPP must bring about the intended impact for which it has been established. Lastly, the PPP must be relevant and its outputs and outcomes must match with the healthcare requirements of the country. Each PPP may have a unique context, product, services or delivery mechanism. Yet, each of these is constrained by the same parameters of scope, money, quality and time. Within these constraints, each PPP must operate at the most efficient level producing tangible outputs and definite outcomes.

The efficiency of a PPP should be given due importance and efficiency measurements must be done as part of regular monitoring and evaluation exercises. The results of such exercises can impact future collaborations seeking sustainable efficient enterprises. Though efficiency is most crucial for the sustenance of PPPs, there is a need for these PPPs to have a shared vision, a collaborative and synergistic relationship amongst the partners, and a defined outcome for the intended beneficiaries.

**REFERENCES**

- 1 Government of India (2005): Report of the National Commission on Macroeconomics and Health, National Commission on Macroeconomics and Health, Ministry of Health & Family Welfare, Government of India available at [http://www.who.int/entity/macrohealth/action/Report % 20 of % 20 the % 20 National % 20 Commission .pdf](http://www.who.int/entity/macrohealth/action/Report%20of%20the%20National%20Commission.pdf)
- 2 World Health Organization (2011): World Health Statistics 2011, available at <http://www.who.int/whosis/whostat/2011/en/index.html>
- 3 Government of India (2010): Strategy Paper, Ministry of Health and Family Welfare, available at [http://performance.gov.in/ Best\\_Strategy\\_Papaers\\_Musoorie/3% 20 Health % 20 & % 20 Family%20Welfare%20\(I\).pdf](http://performance.gov.in/Best_Strategy_Papaers_Musoorie/3%20Health%20&%20Family%20Welfare%20(I).pdf).
- 4 Government of India (2007): Report of the working group on public private partnership to improve healthcare delivery for the eleventh five-year plan (2007-2012). Planning Commission of India, available at [planningcommission.nic.in/aboutus/committee/wrkgrp11/wg11\\_heasys.doc](http://planningcommission.nic.in/aboutus/committee/wrkgrp11/wg11_heasys.doc).
- 5 Steering Committee for the Review of Commonwealth/State Service Provision. (1997): Data envelopment analysis: a technique for measuring the efficiency of government service delivery, AGPS, Canberra, Australia, available at [http://www.pc.gov.au/\\_data/assets/pdf\\_file/](http://www.pc.gov.au/_data/assets/pdf_file/Worthington,AC.(1999):Anempiricalsurveyoffrontierefficiencymeasurementtechniquesinhealthcareservice,SchoolofEconomicsandFi)
- 6 Worthington, AC. (1999): An empirical survey of frontier efficiency measurement techniques in healthcare service, School of Economics and Fi-

- nance discussion papers and working papers series 067, School of Economics and Finance, Queensland University of Technology, available at [http://www.bus.qut.edu.au/faculty/schools/economics/documents/discussionPapers/1999/Worthington\\_67.pdf](http://www.bus.qut.edu.au/faculty/schools/economics/documents/discussionPapers/1999/Worthington_67.pdf).
- 7 Kam Yu. (2011): Measuring efficiency and cost-effectiveness in the health care sector, Lakehead University, Thunder Bay, Ontario, Canada, available at <http://flash.lakeheadu.ca/~kyu/Papers/HealthProductivity.pdf>.
- 8 Farrell, MJ. (1957): The measurement of productive efficiency. *Journal of the Royal Statistical Society* 120(3), pp.253-290.
- 9 Worthington, AC. (2004): Frontier efficiency measurement in healthcare: a review of empirical techniques and selected applications, *Medical Care Research and Review* 61(2), pp. 1-36.
- 10 Kooreman, P. (1984): Nursing home care in the Netherlands: a nonparametric efficiency analysis. *Journal of Health Economics*, 13:93, pp. 301-316.

# Multiple Supernumerary Teeth: A Review of Literature and Report of Two Cases

Mohd. Faisal<sup>1</sup>, Iqbal Ali <sup>2</sup>, Chetan Chandra<sup>3</sup>, Vikas Kumar<sup>4</sup>, Yogendra Kr. Singh<sup>5</sup>

<sup>1</sup>Senior Lecturer in Oral & Maxillofacial Surgery Department, Career PGIDSH, Lucknow. <sup>2</sup>HOD, Oral & Maxillofacial Surgery Department, Career PGIDSH, Lucknow. <sup>3</sup>Senior Lecturer in Periodontology and Implantology

Department. Sardar Patel Dental College, Lucknow. <sup>4</sup>Junior Resident in Oral & Maxillofacial Surgery Department, Career PGIDSH, Lucknow. <sup>5</sup>Junior Resident in Oral & Maxillofacial Surgery Department, Career PGIDSH, Lucknow.

## ABSTRACT

Supernumerary teeth are qualified as a disorder of odontogenesis characterized by an excess number of teeth possibly causing different dental and occlusal irregularities. These teeth may remain embedded in the alveolar bone or can erupt into the oral cavity. When it remains embedded, it may cause disturbance to the developing teeth. The erupted supernumerary tooth might cause aesthetic and/or functional problems especially if it is situated in the maxillary anterior region. It is rare to find multiple supernumerary teeth in individuals with no other associated diseases or syndromes. A review of the literature relating to supernumerary teeth is presented along with two case reports to illustrate some possible presentations, diagnostic features, and treatment options.

**Key words:** Non-syndrome, supernumerary teeth, supplemental teeth, impacted teeth.

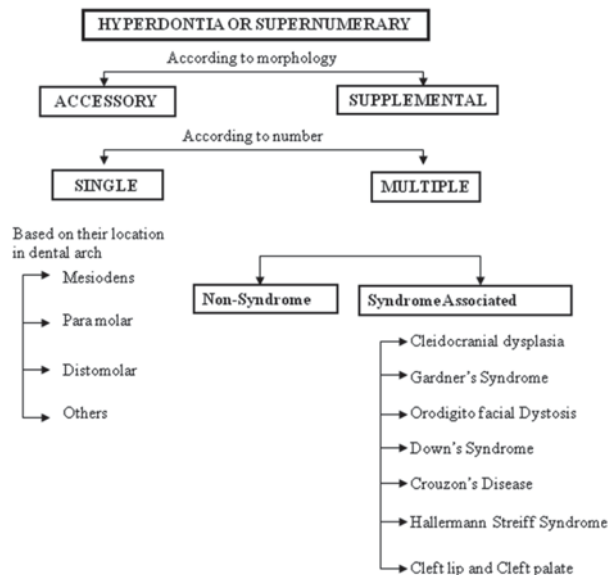
## INTRODUCTION

Teeth serve an important role in chewing, phonetics, & morphological make-up of the face<sup>1</sup>. Development of an increased number of teeth in primary / permanent dentition leads to supernumerary teeth.

Supernumerary teeth are qualified as a disorder of odontogenesis characterized by an excess number of teeth possibly causing different dental and occlusal irregularities<sup>2</sup>. Supernumerary teeth result from disturbances during the initiation and proliferation stages in dental development<sup>3-5</sup>.

Supernumerary teeth have been reported in the literature over the years as a well-recognized clinical phenomenon. Multiple supernumerary teeth are associated with cleidocranial dysplasia and Gardner syndrome. However, it is rare to find multiple supernumeraries in individuals with no other associated disease or syndrome. In such cases the maxillary anterior region is the common site of occurrence.

## CLASSIFICATION<sup>6</sup>:



Prevalence of supernumerary teeth varies between 0.1% and 3.6% of populations<sup>7</sup>. Supernumeraries are encountered more frequently in male than females in ratio of 2:1<sup>8</sup>.



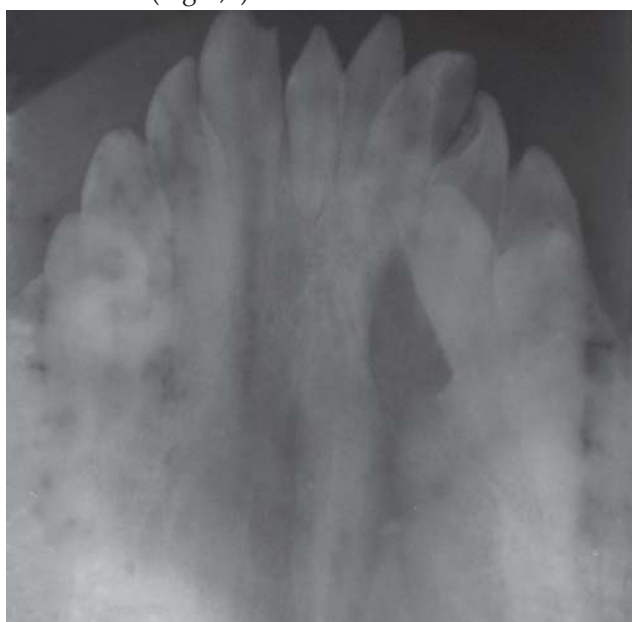
**Complications:**

- Local disorders: impaction, delayed eruption, displacement of permanent incisors, development of dentigerous cyst, resorption of adjacent roots, or the supernumerary teeth may fail to erupt or erupt into the nasal cavity<sup>9-18</sup>.
- Other disorders: root dilaceration, or delayed root formation<sup>12, 14</sup>.
- Present cases describe another risk factor associated with delayed removal of supernumerary teeth such as malocclusion of teeth.

**Case reports:**

The following two cases were referred to the oral and maxillofacial surgery department (Career PGI Dental Sciences and Hospital, Lucknow) for routine control and represent some of the possible presentations of a non syndrome male patient with multiple impacted supernumerary teeth.

**Case 1:- (Fig 1,2)**



**Fig.1.** Occlusal radiograph showing Supernumerary teeth & cystic lesion (Case 1)



**Fig 2.** Panoramic radiograph showing Supernumerary teeth. (Case 1)

A 14-year-old non-syndrome male presented with a chief complaint of crowding in upper front teeth. Family medical history was non-contributory. Two visible and one impacted supernumerary teeth were diagnosed in area of maxillary permanent central incisors causing crowding and malocclusion. Panoramic radiograph and occlusal radiograph were taken to confirm initial diagnosis and to find out the precise location and anatomical feature. The position of two visible supernumerary teeth were in between 11 and 21 and the impacted tooth was at mesial angulation in between right supernumerary teeth and 11, and dentigerous cyst in relation to impacted supernumerary tooth. The visible supernumerary teeth were peg shaped with complete crown and root formation.

Treatment plan called for extraction of all the supernumerary teeth and enucleation of the dentigerous cyst then followed by orthodontic correction.

**Case 2:- (Fig 3,4)**



**Fig.3** IOPA radiograph showing supernumerary teeth (Case 2)



**Fig.4** Occlusal radiograph showing supernumerary teeth (Case 2)

A 24-year-old male non-syndrome patient reported to the department with a chief complaint of crowding in right upper front teeth. Family medical history was non-contributory. One impacted supernumerary teeth were diagnosed in between of right maxillary central and lateral permanent incisors and one impacted supernumerary teeth were diagnosed palatally in left premolar region causing crowding and malocclusion. IOPA and occlusal radiograph were taken to confirm initial diagnosis and to find out the precise location and anatomical feature, thus the position of one impacted tooth in between right maxillary central and lateral permanent incisors and one impacted supernumerary teeth was at palatally diagnosed in left premolar region.

Treatment plan called for extraction of all the impacted supernumerary teeth then followed by orthodontic correction.

### DISCUSSION

It is rare to find multiple supernumerary teeth with no associated diseases or syndromes<sup>7</sup>. The few studies have found the prevalence of supernumerary teeth in permanent dentition to range from 0.15% to 3.8%.<sup>19</sup> Scheiner<sup>20</sup> reported an occurrence of 11.1% for multiple supernumerary teeth, while Asaumi<sup>21</sup> found the prevalence for multiple supernumerary teeth to be 1%, and Arx<sup>22</sup> found it to be 2%. However, where 'multiple supernumerary teeth' is taken to mean five or more supernumerary teeth, the prevalence has been reported as less than 1%<sup>23</sup>.

The exact etiology of supernumerary teeth is still unknown although many theories have been suggested<sup>24</sup>.

Two popularly accepted theories are as follows:-

- The dichotomy theory of tooth germs is a concept in which the tooth bud is thought to split into two or different sized parts, resulting in two teeth of equal size or one normal and one dismorphic tooth, respectively. This hypothesis is supported by animal experiments in which split germs have been cultivated in vitro<sup>25</sup>.
- The other theory suggests supernumerary teeth are formed as a result of local, independent, or conditioned hyperactivity of dental lamina<sup>25</sup>.

Supernumerary teeth may occur singly, multiply, unilaterally or bilaterally in the maxilla, mandible or both<sup>26</sup>. Supernumerary teeth in the premaxillary region have been divided into two main classes: one containing teeth of normal morphology known as supplemental teeth and the other abnormal shape. The later class has been further categorized into the conical type (peg-

shaped) and the tuberculate type.

Matching the above characteristics with the cases presented, the supernumerary teeth in Case 1 showed the features of the two supernumerary teeth peg shaped type and one impacted supernumerary supplemental tooth type while those in Case 2 exhibited the features of impacted supernumerary supplemental tooth type were found. The peg shaped Supernumerary teeth does not usually affect the eruption of adjacent permanent incisor but may cause there displacement<sup>27</sup>. This displacement may involve the crown, the root or the whole tooth<sup>28</sup>.

It has been stated development of supernumerary teeth may cause various pathologies. Approximately 75% of supernumerary teeth are impacted and asymptomatic, and most of these teeth are diagnosed coincidentally during radiographic examination. Early diagnosis is important in order to minimize the risk of complications resulting from supernumerary teeth. If they have caused delay or non-eruption of permanent teeth, displacement of permanent teeth, root resorption of adjacent teeth due to the pressure and cystic formations, then extraction is recommended. However, extraction of asymptomatic supernumerary teeth that do not affect the dentition may not always be necessary, but they should be followed through periodic examinations. Since there is a risk of tooth bud recurrence, extraction in these patients is still a remote possibility and follow-up on these patients is recommended<sup>24</sup>.

### REFERENECES

1. Kokten G, Balcioglu H, Buyukertan M. Supernumerary fourth and fifth molars: a report of two cases. *J Contemp Dent Pract.* 2003 Nov 15;4(4):67-76.
2. Agnieszka N., Joanna A. Management of double supernumerary teeth- case report. *Dent. Med. Probl.* 2007, 44, 2, 271-274.
3. Bergstrom K. An orthopantomographs study of hypodontia, supernumeraries and other anomalies in school children between the ages of 8-9 years. An epidemiological study. *Swed Dent J* 1977; 1:145-57.
4. Bodin I, Julin P, Thomsson M. Hyperodontia I. Frequency and distribution of supernumerary teeth among 21,609 patients. *Dentomaxillofac Radiol* 1978; 7: 15-17.
5. Luten JR. The prevalence of supernumerary teeth in primary and mixed dentition. *J Dent Child* 1967; 34: 346-53.
6. Kalra N. et al. Non- syndrome multiple supplemental supernumerary teeth. *J Indian Soc Pedo Prev Dent-* March 2005.

7. Yusof WZ. Non-syndromal multiple supernumerary teeth: literature review. *J Can Dent Assoc* 1990;56:147-9.
8. Scheiner M. A., Sampson W. J., Supernumerary teeth: A review of the literature and four case reports. *Australian Dental Journal* 1997;42:(3):160-5.
9. Weber FN. Supernumerary teeth. *Dent Clin North Am* 1964;7:509-17.
10. Jarvinen S. Supernumerary and congenitally missing permanent upper anterior teeth in 7-year-old Finnish children. A radiological study. *Proc Finn Dent Soc* 1976;72:99-102.
11. Huang WH, Tsai TP, Su HL. Mesiodens in the primary dentition stage: A radiographic study. *J Dent Child* 1992;59:186-89.
12. Nazif MM, Ruffalo RC, Zullo T. Impacted supernumerary teeth: a survey of 50 cases. *J Am Dent Assoc* 1983;106:201-04.
13. Kaler LC. Prevalence of mesiodens in a pediatric Hispanic population. *ASDC J Dent Child* 1988;55:137- 38.
14. Zilberman Y, Malron M, Sbteyer A. Assessment of 100 children with supernumerary teeth in the premaxillary region. *ASDC I Dent Child* 1992;59:44-47.
15. Primosch RE. Anterior supernumerary teeth assessment and surgical intervention in children. *Pediatr Dent* 1981;3:204-15.
16. Brin I, Ziiberman Y, Azaz B. The unerupted maxillary central incisor: review of its etiology and treatment. *ASDC J Dent Child* 1982;49:352-56.
17. Tay F, Pang A, Yuen S. Unerupted maxillary anterior supernumerary teeth: report of 204 cases. *ASDC J Dent Child* 1984;51:289-94.
18. Lustmann J, Bodner L. Dentigerous cysts associated with supernumerary teeth. *Int J Oral Maxillofac Surg* 1988;17:100-02.
19. Açıkgöz A, Açıkgöz G, Tunga U, Otan F. Characteristics and prevalence of non-syndrome multiple supernumerary teeth: a retrospective study. *Dentomaxillofac Radiol* 2006; 185-190.
20. Scheiner MA, Sampson WJ. Supernumerary teeth: a review of the literature and four case reports. *Aus Dent J* 1997; 42: 160-165.
21. Asaumi JI, Shibata Y, Yanagi Y, Hisatomi M, Matsuzaki H, Konouchi H, Kishi K. Radiographic examination of mesiodens and their associated complications. *Dentomaxillofac Radiol* 2004; 33: 125-127.
22. Arx T. Anterior maxillary supernumerary teeth: a clinical and radiographic study. *Aus Dent J* 1992; 37: 189-195.
23. Rajab LD, Hamdan MAM. Supernumerary teeth: a review of the literature and a survey of 152 cases. *Int Pediatr Dent* 2002; 12: 244-254.
24. Gündüz K, Mugalali M. Non-syndrome Multiple Supernumerary Teeth: A Case Report. *J Contemp Dent Pract* 2007 May;(8)4:081-087.
25. Liu JF. Characteristics of premaxillary supernumerary teeth: A survey of 112 cases. *ASDC J Dent Child* 1995; 62:262-265.
26. Refoua Y., Arshad M. An Unusual Case of Bilateral Maxillary and Mandibular Supernumerary Teeth. *Journal of Dentistry, Tehran University of Medical Sciences* 2006; Vol. 3, No. 3:140-142.
27. Foster TD, Taylor GS. Characteristics of supernumerary teeth in the upper central incisor region. *Dent Pract Dent Rec* 1969;20:8-12.
28. Proffit WR. *Contemporary orthodontics*. 2nd ed. St. Louis: CV Mosby Co, 1992:405.

# A Retrospective Study of Changing Clinical Pattern of Malaria in Western UP, India

Subhash Chandra<sup>1</sup>, Yogesh Kumar Goel<sup>2</sup>, Daya Chand<sup>3</sup>, Deepak Gupta<sup>4</sup>

<sup>1</sup>Assistant Professor, Department of Pediatrics, School of Medical Science & Research, Sharda University, Greater Noida, U.P., India. <sup>2</sup>Assistant Professor, <sup>3</sup>Associate Professor Department of Pediatrics, <sup>4</sup>Assistant Professor, Department of Microbiology, Saraswathi Institute of Medical Sciences Hapur, Ghaziabad, U.P., India.

## ABSTRACT

**Background & objectives:** The incidence of malaria is on the rise in western UP, India in the recent years and there is not much information on malaria from this region. This study was under taken to analyze and introspect the presentation of this disease in a tertiary referral centre.

**Methods:** This retrospective case analysis was done on patients between the age group of 2-15 years admitted with diagnosis of malaria to the Pediatrics Department of SIMS, Hapur and School of Medical Science & Research, Greater Noida, U.P. India. The records from April 2010 to March 2012 were retrieved and scrutinized using a prepared case sheet Performa on the basis of patient's demographic profile, clinical findings, investigations, treatment and complications.

**Results:** A total of 343 patients were diagnosed and treated for malaria, out of them, males (62.68%) outnumbered females (37.32%) and many were below the age of 7 years (69.05%). Plasmodium vivax was the major parasite (68.51%), followed by P. falciparum (20.99%), and mixed malarial infection (10.49%). Fever was the most common symptom observing 96.2% cases and thrombocytopenia was the commonest lab hematological abnormality seen in 46.6% cases of plasmodium vivax.

**Conclusion:** Malaria is a common disease but severe and complicated vivax malaria is an emerging recognized clinical entity and challenges the perception of vivax malaria as a benign disease.

**Keywords:** Cerebral, Complications, Malaria, Plasmodium vivax, Thrombocytopenia,

## INTRODUCTION

Malaria is a major health problem in India and other tropical countries<sup>1</sup>. WHO estimates 300-500 million cases of malaria annually, with estimated mortality attributed to malaria ranging from 0.7 to 2.7 million per year worldwide<sup>2</sup>. Plasmodium falciparum (Pf) is considered responsible for severe malaria and malaria mortality in literature. Hence most of the published research and literature focuses on Pf and much less on P. vivax. However, there is growing evidence that Pv is responsible for a significant burden of disease globally<sup>3</sup>. Most of the published literature consists of case reports or small clinical series, that to mainly for adult population. Hence present study was planned to look for profile of severe malaria and contribution of vivax related morbidity in children of Western UP, India.

## MATERIAL & METHODS

This was a retrospective study done on confirmed 343 malaria cases between age group of 2- 15 years admitted from 1<sup>st</sup> April 2010 to 31 March 2012 in department of pediatrics SIMS, Hapur and School of Medical Science and Research, Greater Noida UP India. A case sheet Performa was prepared and the data (demographic profile, clinical features, investigation, treatment and complications) from all the case records were filled up and later on were analyzed. Presence of malaria parasite on thick and thin smear and / or positive rapid malaria antigen test was considered as diagnostic for malaria. Patients were divided in 3 categories complicated Pv, Pf and mixed infection. Cerebral malaria was defined as patient having altered sensorium, seizures or other neurological signs with normal CSF findings. Shock was defined as systolic

blood pressure less than 5<sup>th</sup> percentile for age and sex. Severe anemia and severe thrombocytopenia were defined as hemoglobin less than 5% gm / dl and platelet count less than 20,000/nm<sup>3</sup>, respectively <sup>4</sup>. Patients presenting with fever (malaria smear negative), but treated empirically for malaria were excluded from the study and patients presenting with clinical features mimicking malaria (malaria parasite test negative), as in viral, dengue fever and sepsis had been excluded.

### RESULTS

A total of 343 cases were admitted over 2 years with clinical diagnosis of severe malaria. Out of 343 patients, 215 (63.26%) were males and 90 (26.23%) were females (Table 1).

**Table 1: Gender distribution of total Patient (n=343)**

Total	Male	Female
343	217 (63.26%)	90 (26.23%)

Age & Sex wise distribution and their proportion are shown in (Table 2 & 3).

**Table 2: Age wise distribution of Pv and Pf patients**

Age	Pv	Pf
2-7 year	172 (73.19%)	40 (55.55%)
7-15 year	63 (26.80%)	32 (44.44%)

**Table 3: Sex wise distribution of Pv and Pf patients**

Sex	Pv	Pf
Male	165 (70.2%)	52 (72.22%)
Female	70 (29.78%)	20 (27.77%)

Out of 343 cases, 235 (68.51%) cases were plasmodium vivax positive and 72 (20.91%) cases were of plasmodium falciparum and 36 (10.49%) cases of mixed infection (Table 4).

**Table 4: Plasmodium Species wise Distribution of Patients**

Plasmodium Vivax	235	68.51%
Plasmodium Falciparum	72	20.99%
Mixed Infection	36	10.49%

Cerebral malaria, and severe anemia were significantly more frequently observed in Pf group, while hepatic, renal, and bleeding complications were more commonly seen in Pv patients. Malaria mortality was highest in mixed infection (13.8%), followed by Pf (6.8%) and Pv (2.55%) group (Table 5).

**Table 5: Complications in Patients of Malaria (Pv & Pf)**

	Pv (n=235)	Pf (n=72)
Severe anemia	102 (43.4%)	34 (47.22%)
Cerebral symptoms	40 (17.02%)	21 (29.16%)
Renal	21 (8.93%)	5 (6.94%)
Hepatic	5 (2.34%)	14 (19.44%)
CHF	7 (2.97%)	4 (5.55%)
Bleeding/DIC	35 (14.89%)	7 (9.72%)
Hemoglobin		
<5gm%	80(34.04%)	30 (41.66%)
5-11gm%>	130 (55.31%)	35 (48.61%)
11gm%	25 (10.63%)	7(9.7%)
Thrombocytopenia		
<1 lakh	170 (72.34%)	40 (55.5%)
<20,000	35 (14.89%)	9 (12.5%)
Mortality	6 (2.55%)	5 (6.9%)

Symptoms analysis on admission showed that almost all the cases (96.2%) had fever, with range of 1 to 14 days with a mean duration of 6.25 days. Nausea and vomiting were reported in 39.35% cases and headache in 32.07% cases. Jaundice was reported in 20.11% cases and altered level of consciousness in 17.78% (Table 6).

**Table 6: Symptoms in Patients of Malaria (n=343)**

Fever	96.2%
Duration	1-14 days
Nausea / Vomiting	39.35%
Headache	32.07%
Jaundice	20.11%
Altered Sensorium	17.78%

### DISCUSSION

This retrospective study shows males (63.26%) were more affected as compare to females (26.23%). Many of the patients were below the age of 7 years. The present results are in conformity with the incidence pattern as reported by earlier workers in different parts of India<sup>5,6</sup>. *P. vivax* was the major parasite species (68.51%), followed by *P. falciparum* (20.91%) and mixed infections (10.49%). In this study malaria parasite test was done using quantitative buffy coat (QBC) method and studies have found it to be more sensitive and specific in detecting the parasite compared to the routine smear (thick and thin) method<sup>7</sup>. Fever is the most common symptom<sup>6,8</sup> and majority of the patients presented within a week of onset of symptoms (mean duration of 6.25 days). Clinical presentations revealed splenomegaly and hepato-splenomegaly and the severity of the disease in this area with complications like hepatopathy, acute renal failure, cerebral malaria etc, which is of great concern. Such severe complications were also reported in several studies carried out in a

tertiary care and referral hospitals<sup>8-15</sup>. Very less information is available in literature on the contribution of Pv to severe disease. As the term “benign tertian malaria” implies Pv malaria, is usually an uncomplicated disease that runs a benign course and is rarely fatal, but sporadically, all complications associated with Pf malaria have also been reported in Pv Malaria<sup>16</sup>. Recent studies from India and Indonesia, have also reported all complications of severe malaria with Pv infections<sup>17,18</sup>. It is concluded that severe and fatal vivax malaria is an emerging recognized entity and challenges the perception of Pv as a benign disease. Further clinical studies and molecular research is required to understand emergence of severe malaria in vivax mono-infection.

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#### REFERENCES

1. Annual Report, 2003-04. New Delhi: Ministry of Health and Family Welfare, Govt of India.
2. World Health Organization. Development of south asia surveillance network for malaria drug resistance. Report of an informal consultative meeting, New Delhi, January 2002. WHO Project No.ICP CPC 400.
3. Yadav .D, Chandra J, Datta AK . Benign tertian malaria: how benign is it today? *Ind. J. Pediatr* 2011 June 25[ Epub ahead of print] PubMed PMID: 21706239.
4. WHO Guidelines for treatment of malaria, 2006. Accessed on March 2012.
5. Sharma VP. Current scenario of malaria in India. *Parasitologia*1999; 41: 349–53.
6. Hazra BR, Chowdhury RS, Saha SK, Ghosh MB, Mazumder AK. Changing scenario of malaria: a study at Calcutta. *Indian J Malariol*1998; 35: 111–6.
7. Nandwani S, Mathur M, Rawat S. Evaluation of the direct acridine orange staining method and QBC test for diagnosis of malaria in Delhi, India. *J Com Dis* 2003; 35: 279–82.
8. Murthy GL, Sahay RK, Srinivasan VR, Upadhaya AC, Shantaram V, Gayatri K. Clinical profile of falciparum malaria in a tertiary care hospital. *J Indian Med Assoc* 2000; 98: 160–2.
9. Sitalakshmi S, Srikrishna A, Devi S, Damodar P, Mathew T, Varghese J. Changing trends in malaria: a decade’s experience at a referral hospital. *Indian J PatholMicrobiol*2003; 46: 399–401.
10. Harris VK, Richard VS, Mathai E, Sitaram U, Kumar KV, Cherian AM, Amelia SM, Anand G. A study on clinical profile of falciparum malaria in a tertiary care hospital in south India. *Indian J Malariol*2001; 38: 19–24.
11. Srivastava A, Khanduri A, Lakhtakia S, Pandey R, Choudhuri G. Falciparum malaria with acute liver failure. *Trop Gastroenterol*1996; 17: 172–4.
12. Mohanty N, Satpathy SK, Nanda P. Hepatopathy in complicated falciparum malaria: report from eastern India. *Trans R Soc Trop Med Hyg*2004; 98: 753–4.
13. Jadhav UM, Patkar VS, Kadam NN. Thrombocytopenia in malaria correlation with type and severity of malaria. *J Assoc Phys Ind*2004; 52: 615–8.
14. Prakash J, Singh AK, Kumar NS, Saxena RK. Acute renal failure in Plasmodium vivax malaria. *J Assoc Phys Ind* 2003; 51: 265–7.
15. Garg RK. Cerebral malaria. *J Assoc Phys Ind*2000; 48: 1004–13.
16. Genton B, D’Acremont V, Rare L, et al. Pv and mixed infections are associated with severe malaria in children: a prospective cohort study from papua New Guinea. *Plos Med.* 2008;5:881–9.
17. Kochar DK, Tanwar GS, khatri PC et al. clinical features of children hospitalized with malaria- a study from Bikaner, north west india. *Am.J Trop Med Hyg.* 2010;83:981-9.
18. Tjitra E, Anstey NM et al. multi drug- resistant Pv malaria associated with high morbidity and mortality. *PLos Me.* 2007;5:e128. Doi:10.1371/journal. Pmed.0050128.

# Evaluation of the Health Awareness Package for the Improvement of Knowledge, Attitudes and Practices (KAP) of Secondary School Students at Rural Areas of Paschim Medinipur, West Bengal

Soumyajit Maiti, Kausik Chatterjee, Kazi Monjur Ali, Kishalay Jana, Tushar Kanti Bera, Debidas Ghosh

*Department of Bio-Medical Laboratory Science and Management*

*(U.G.C Innovative Department) Vidyasagar University, Midnapore – 721 102, West Bengal, India.*

## ABSTRACT

Children are the most important natural resource of our community. Their survival, protection and development are the prerequisite for the future development of humanity. The present study explored the school-based, preventive approach of diseases and also evaluates the acceptability and effectiveness of health awareness programme of secondary schoolers. The programme was organized in the three rural secondary schools of Paschim Medinipur district of West Bengal from April 2009 to December 2009. Eight hundred twenty seven school students from VII to IX standard (age group 10-15 years) were included in the study. The study was carried out to assess the knowledge, attitude and practice (KAP) of school students at rural sectors before and after the delivery of awareness package regarding communicable diseases like malaria, tuberculosis, diarrhoea and cholera by questionnaire method. The study showed that majority of the participants had poor knowledge regarding the concerned diseases at pre-awareness stage. Poor health knowledge of students may be due to their less exposure to different health awareness programmes. An informative and attractive awareness package was formulated covering the various domains of diseases such as the cause, symptoms, mode of infection and prevention of above diseases. Poster, visual presentation, group discussions were used to aware and educate the participants. After disseminating health awareness package, significant change in the knowledge, attitude and practice of participants were assessed regarding malaria ( $p \leq 0.05$ ), tuberculosis ( $p \leq 0.05$ ), diarrhoea ( $p \leq 0.05$ ) and cholera ( $p \leq 0.05$ ). Thus, comprehensive health awareness package is effective in to improve the KAP of rural school students.

**Keywords:** *Health Awareness, School Children, Communicable diseases, KAP.*

## INTRODUCTION

Today's children are the citizens of tomorrow's world. Their survival, protection and development are the prerequisite for the future up-gradation of community. Empowerment of the younger generation with knowledge about healthcare is helpful to grow their health friendly life style. Their development and social contributions will change our society (WHO, 1996). The health supervision of children in the age group of 5 to 15 years is extremely important, because at this period they are exposed to the school environment with its possibilities for infection to communicable diseases (Jain, 1968). Prevention of the disease through knowledge and awareness is the appropriate way to keep

disease away and to lead a long and healthy life (Tyagi, 2005). Promotion of health care for prevention of diseases should be initiated from school going stage. Value based learning in organized form can be acquired much more effectively in schools (GoI, 1961). In addition, schools are central place in the community for disseminating health message through children by providing a safe and supportive environment, access to information about health care that affect their lives which contributing to social change (WHO,1999). The National Health Policy of India intends to target school children for promoting healthy behaviors among the general population (Ministry of Health and Family Welfare, 2002). It has been suggested that well-developed school health awareness programme is effective

in encouraging children to adopt health-enhancing knowledge and attitudes and in reducing health-compromising behaviors (Vir, 1987). According to Hiroshi Nakajima “Educating children at school on health should be given the highest priority, not for their health per se, but also from the perspective of education, since if they are to learn they need to be in good health”.

India has one of the largest group of school going children. Communicable diseases like malaria, tuberculosis, diarrhoea, dysentery, cholera etc are major health problems in remotes areas of India. The majority of schoolers in India are affected by these communicable diseases (Ministry of Health, GoI; 1961). The knowledge, attitude and practice on above mentioned diseases are not satisfactory among high school students especially at rural areas (Vir, 1987). Many study showed that school health education act as the vehicle for the improvement of health knowledge, attitude and practice in the students. A study by S Meena (2009) noted that health knowledge, attitude and practice of the rural students significantly improved after education. Which is supported by the study of Biswas et al. (1990).

With this background, the present study was formulated to assess the health awareness level of rural school students and also evaluate the acceptability and effectiveness of health awareness package for the improvement of community healthcare by the empowerment of knowledge, attitude and practice.

**OBJECTIVES**

1. To assess awareness level regarding communicable diseases among rural school children.
2. To evaluate the feasibility, acceptability and effectiveness of health awareness package in the rural schoolers.
3. To implement efficient health care delivery system for school students at rural sectors.

**METHODOLOGY**

**Study Settings**

The awareness package was conducted at three rural blocks of Paschim Medinipur district, West Bengal, from the months of April 2009 to December 2009. Three co-education secondary schools were selected for the study. The study was carried out on 827 schoolers belonging to age group 10-15 years. Both boys and girls from class VII to XI of these schools were included in the study. School authority consent was also taken prior to the conduction of the package by focusing the nature and purpose of the said study.

**Pre-awareness phase**

The knowledge regarding communicable diseases like malaria, tuberculosis, diarrhoea, dysentery, cholera was assessed by a self-administered, peer reviewed questionnaire method. Questionnaire was prepared by local language and MCQ in type. Questionnaire of each disease covered mainly on the following domains – causes, signs, symptoms, complications, mode of transmission, method of prevention and role of children to control the diseases. The purpose and importance of health awareness programme were explained to them.

To assess the primary knowledge level about health care, the students were directed to fill in the questionnaire independently. For this purpose they were given 45 mins and the filled forms were collected for evalu-



Fig 1: Health awareness programme design to promote healthy lifestyle in rural students of Paschim Medinipur district

**DISSEMINATION OF AWARENESS PACKAGE**

The informations obtained in the pre-awareness phase were utilized for the formulation of an attractive and informative awareness package covering correct the answers of the said questions address to the schoolers. The above mentioned diseases were discussed separately in each class of the concern school by visual presentation and movie picture through animation (LCD projector). Some informative leaflets were provided to the students in this connection. Posters on the specific diseases were also displayed in the classroom. This was followed by an interactive session in which all the students were encouraged to participate in the session where the wrong idea about various myths and misconceptions about the diseases were focused (Fig 2). The complete session took 1 hour for each disease in each class. A total of 24 sessions were organized to cover all aspect of above diseases in each school.

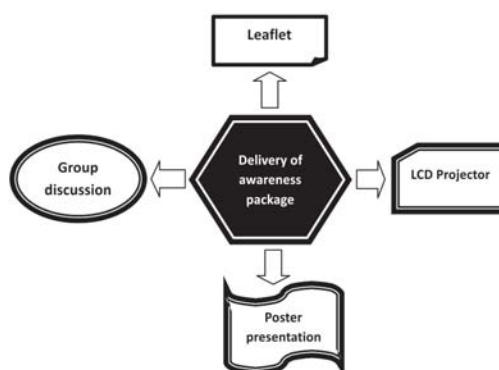




Fig 2: Different audio-visual methods for the dissemination of information of the awareness package to school students

### POST-AWARENESS PHASE

After disseminating the knowledge of the health awareness package, each school was revisited six month later. Improvement of knowledge and change in their attitude were assessed by fresh questionnaire method. Comparison was made between the result of pre-awareness and post-awareness to assess the impact of health awareness package.

### ANALYSIS OF DATA

The obtained data was statistically analyzed to see the effect of awareness programme. Mean and standard error of mean were calculated. Comparison of the pre-awareness and post-awareness evaluation was done by paired t test of significance (p < 0.05).

### RESULTS

#### General information

The general information were collected from 827 school students of which 433 (52.36%) were boys and 394 (47.64%) were girls. The data showed that 38.82%, 33.13% and 28.05% students were in class VII, VIII and IX respectively. The participants belong to age group 10-15.

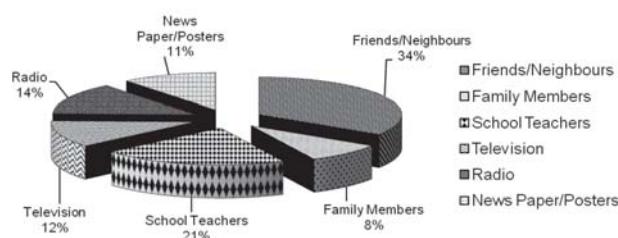
Table 1: General information of participants in this programme

Characteristics	N (827)	%
Gender		
Male	433	52.36
Female	394	47.64
Class		
VII	321	38.36
VIII	274	33.13
IX	232	28.05

#### Source of health information

The fig. 3 showed that the children got about health information from various sources like family members of their own, friends, television, radio, news paper etc. Most of the children got health information through friends (34%), school teacher (20.9%) and mass media (Radio 13.7%, television 11.7%, and news paper 10.7%). But only 8.7% children obtained health message through their family members.

Fig 2: Source of health information of school students



#### Changes on knowledge, attitudes and practices of school students

Health awareness is one of the major tools which influence the students' knowledge, attitude and safe practice about health problems. During the pre-awareness phase, very less percentage of students had knowledge about malaria. Regarding malaria 1054 schoolers got correct answer but 4001 schoolers failed to right answer at pre-awareness stage. Where only 32.2% of children had known the cause of malaria and 27.9% of children had idea about modes infection. About 25.2% children were aware about malaria preventive method while 74.7% children got incorrect answer (Table 2). In a study by Goel (2007), reported that 68.5% of students were aware about malaria.

After imparting awareness package students knowledge improved where 2509 children got correct answer. Majority of the participants' i.e 70.4% of schoolers answered correctly regarding cause of malaria. Effect of malaria education at pre and post awareness phase was compared this was found to be significant (p < 0.05).

Table 2: Effect of health awareness programme on knowledge, attitude and practice of students regarding malaria (n = 827)

Diseases	Pre-awareness		Post-awareness	
	Correct answer	Incorrect answer	Correct answer	Incorrect answer
<b>Malaria</b>	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>
Cause	267 (32.28)	560 (67.71)	583(70.49)	244 (29.50)
Modes of infection	231(27.93)	596 (72.06)	544 (65.77)	283 (34.22)
Signs and symptoms	223 (26.96)	604 (73.04)	506 (61.19)	321 (38.81)
Modes of Prevention	209 (25.27)	618 (74.73)	487 (58.88)	340 (41.11)
Role of children to control diseases	124 (14.99)	703 (85.0)	389 (47.08)	438 (52.96)
Total	1054	4001	2509	1671

Mean correct answer at pre-awareness 1.27 t = 6.84

Mean correct answer at post-awareness 3.03 ≤ 0.05

Knowledge of study subject regarding tuberculosis pre and post awareness showed in table 3. The results also indicated lack of knowledge about tuberculosis at pre-awareness stage, where only 21.5% students had the perception about mode of infection but after imparting awareness programme it increased to 58.1%. Most of the students are not adequately aware of how to prevent the tuberculosis (23.7%) but after six months it increased (60.7%). This programme had much better understanding about tuberculosis ( $p \leq 0.05$ ). Similarly, in a study by *Gopichandran et al* (2010), found that significant effect of health awareness on students regarding tuberculosis.

**Table 3: Effect of health awareness programme on knowledge, attitude and practice of students regarding tuberculosis (n = 827)**

Diseases	Pre-awareness		Post-awareness	
	Correct answer	Incorrect answer	Correct answer	Incorrect answer
<b>Tuberculosis</b>	n (%)	n (%)	n (%)	n (%)
Cause	206 (24.90)	621 (75.09)	567(68.56)	260 (31.43)
Modes of infection	178 (21.52)	649 (78.47)	481 (58.16)	346 (41.83)
Signs and symptoms	214 (25.87)	613 (74.12)	526 (63.60)	301 (36.39)
Modes of Prevention	196 (23.70)	631 (76.29)	502 (60.70)	325 (39.29)
Role of children to control diseases	111 (13.42)	716 (86.57)	406 (49.09)	421 (50.90)
Total	905	3230	2482	1653

Mean correct answer at pre-awareness 1.09  $t = 9.59$   
 Mean correct answer at post-awareness 3.0  $p \leq 0.05$

It has been observed in our study that children had slightly higher level of concept about diarrhoea than other diseases (Table 4). At pre-awareness stage about 27.9% of students knew the modes of infection of diarrhoea. Only 25.27% of students had idea about prevention and control of diarrhoea, where they had no knowledge the best treatment for dehydration is oral rehydration therapy by oral rehydration salt (ORS) solution. This is consistent to the report of *Nath et al* (1997). But after imparting awareness package, knowledge level improved significantly in all aspect.

**Table 4: Effect of health awareness programme on knowledge, attitude and practice of students regarding diarrhoea (n = 827)**

Diseases	Pre-awareness		Post-awareness	
	Correct answer	Incorrect answer	Correct answer	Incorrect answer
<b>Diarrhoea</b>	n (%)	n (%)	n (%)	n (%)
Cause	274 (33.13)	553 (66.67)	643 (77.75)	184 (22.25)
Modes of infection	215 (27.93)	612 (72.06)	548 (66.26)	279 (33.34)
Signs and symptoms	241 (26.96)	586 (73.04)	616 (74.49)	211 (25.51)
Modes of Prevention	209 (25.27)	618 (74.73)	525 (63.48)	302 (36.52)
Role of children to control diseases	146 (17.65)	681 (82.35)	412 (49.82)	415 (50.18)
Total	1085	3050	2744	1391

Mean correct answer at pre-awareness 1.31  $t = 7.27$   
 Mean correct answer at post-awareness 3.31  $p \leq 0.05$

Knowledge of cholera at pre and post awareness stage showed in table 5. Although 23.9% of students at pre-awareness did not know about modes of infection but at post-awareness stage 63% of students answered. Percentage of students knowing about prevention of diseases was 22.8% but it increased to 60.8% at post-awareness stage.

**Table 5: Effect of health awareness programme on knowledge, attitude and practice of students regarding cholera (n = 827)**

Diseases	Pre-awareness		Post-awareness	
	Correct answer	Incorrect answer	Correct answer	Incorrect answer
<b>Cholera</b>	n (%)	n (%)	n (%)	n (%)
Cause	251 (30.35)	576 (69.65)	593 (71.70)	234 (28.30)
Modes of infection	198 (23.95)	629 (76.05)	521 (63.0)	306 (37.0)
Signs and symptoms	209 (25.27)	618 (74.73)	546 (66.03)	381 (46.07)
Modes of Prevention	189 (22.85)	638 (77.15)	503 (60.82)	324 (39.18)
Role of children to control diseases	131 (15.84)	696 (84.16)	392 (47.40)	435 (52.59)
Total	978	3157	2555	1779

Mean correct answer at pre-awareness 1.18  $t = 8.17$   
 Mean correct answer at post-awareness 3.08  $p \leq 0.05$

## DISCUSSION

This study enlightened health promotion to rural children by implementing a awareness program. This awareness program based on the preventive approach of communicable diseases which have been more effective in changing the knowledge, attitude and practice of rural schoolers. Special care is needed about their health and well being. They need to be well informed about preventive aspect of communicable diseases such as malaria, tuberculosis, diarrhoea, cholera etc. Because majority of the rural schoolers have been suffering from these types of diseases. But it was observed from the present study that very less percentage of students had knowledge, attitude and practice about said diseases at the pre-awareness stage. For information collection it has been noted that only 32.2% students knew about cause of malaria, 21.5% students answered about modes of infection of tuberculosis and 27.9% students had knowledge about transmission of diarrhoea. As well as majority of the students did not know about preventive aspects of diseases. Regarding malaria 74.7%, tuberculosis 76.2%, diarrhoea 74.7% and cholera 77.1% students had no proper knowledge about preventive aspects. The school children in the present study were found less health aware than the study of Goel (2007). Before imparting awareness package, majority of the study participants got health related information through their friends (34%) and class teacher (20.9%). Similar observations were collected by Sangole et al (2003). It was very interesting to note that in spite of the students studying in class VII, VII, and IX they did not have knowledge about cause, signs and symptoms, modes of infection and prevention of common diseases. This may be due to the rural students are less exposed to different health awareness programme which improve their health knowledge, attitudes and practices. It is important to increase their knowledge and awareness level on the concern subject using school environment.

After delivering the awareness package, knowledge, attitude and practice levels of schoolers were increased significantly in connection with sound health. There was a statistically significant change in the level of knowledge in all domains such as cause, signs and symptoms, mode of transmission, prevention and role of children on above mentioned diseases which indicated the role of awareness package. The study showed that the efficacy of awareness package which significantly changed the way of students perceived about the diseases and its prevention. Health awareness programme plays a pivotal role in motivating the students to favorable attitude about preventive knowledge and practices of diseases. The students play a key role in rural sectors that has been supported by M

Siwach (2009). Participatory learning through the use of active learning methods, such as visual impression, small group discussions and interactive sessions, which can go beyond the classroom and can help the children to explore and practice positive health behaviors. Such active learning allows schoolers as a potent agent to change the community (WHO, 1991).

The importance of providing health education to the schoolers cannot be over emphasized and this has been included as one of the important activities under school health schemes. In our country where universalization of elementary education is top priority, using school infrastructure to disseminate messages of health in the community through the school children has tremendous scope (Dongre, 2006). Better outcome in the present study suggests that school-based health awareness strategy would have greater impact in rural areas. The school health awareness programs is one approach to community health education that is effective in change knowledge, attitudes and practices towards prevent communicable diseases as well as lead healthy lifestyle. The present study provided health awareness approaches which could be useful to governmental and non-governmental organizations working in rural school settings of developing countries. It would be a real investment in health and development of future citizens.

## ACKNOWLEDGEMENT

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## REFERENCES

- 1 Biswas AB, Roy AK, Sen AK, Biswas R 1990. A Study of the Impact of Health Education Imparted to School Children on their Knowledge, Attitude and Practices in regard to Personal Hygiene. *Ind. J. Pub. Health*, 34(2):87-92.
- 2 Dongre AR, Deshmukh PR, Garg BS 2006. The Impact of School Health Education Programme on Personal Hygiene and related Morbidities in Tribal School Children of Wardha District, *Ind. J. Commu. Med.*, 31:2.
- 3 Goel S, Sing A 2007. Health Awareness of High School Students. *Ind. J. Commu. Med.*, 32:192-194.

- 4 Gopichandran V, Roy P, Sitaram A, Karthic, John KR 2010. Impact of a Simple Educational Intervention on the Knowledge and Awareness of Tuberculosis among High School Children in Vellore, India. *Ind. J. Commu. Med.*, 35(1):174-175.
- 5 Govt. of India 1961. School Health Committee, New Delhi; Ministry of Health.
- 6 Harrabi I, Maatoug J, Gaha M, Kebaili R, Gaha R, Ghannem H 2010. School-based Intervention to Promote Healthy Lifestyles in Sousse, Tunisia. *Ind J Commu Med*, 35(1):94-99.
- 7 Jain AM 1968. Planning and Organization of Child Health Services in Rural India, II School Health Services. *Ind. J. Pediatr.*, 35(3):150-155.
- 8 Ministry of Health and Family Welfare 2002. National Health Policy of India Retrieved September 27, 2007, from: <http://www.mohfw.nic/2002.htm>.
- 9 Ministry of Health, Govt. of India, 1961-1960. Report of the School Health Committee Part-I & II, New Delhi; Govt. of India.
- 10 Nath SR, Mohsin M, Chowdhury AM 1997. Health Knowledge of Children in Bangladesh: An Exploratory Study. *Public Health*, 111:311-5.
- 11 Sangole S, Tandale BV, Bagde PS, Thorat DM 2003. Evaluation of Impact of Health Education regarding HIV/AIDS on Knowledge and Attitude among Persons Living with HIV. *Ind. J. Commu. Med.*, 28(1):30-33.
- 12 Siwach M 2009. Impact of Health Education Programme on the Knowledge and Practices of School Children regarding Personal Hygiene in Rural Panipat. *Int. J. Edu. Sci.*, 1(2):115-118.
- 13 Tyagi P, Roy A, Malhotra MS 2005. Knowledge, Awareness and Practices towards Malaria in Communities of Rural, Semi-rural and boarding Areas of East Delhi (India). *J. Vect. Borne. Dis.*, 42: 30-35.
- 14 Vir S 1987. School Health Education Programme in India. *Hygiene*, 6: 12-6.
- 15 WHO 1991. Comprehensive School Health Education: WHO/UNESCO/UNISEF Consultation on Strategies for Implementing Comprehensive School Health Education/Promotion Programme, P.11, Nov.25-29; Geneva.
- 16 WHO 1996. Global School Health Initiative: Research to Improve Implementation and Effectiveness of School Health Programme. Prepared by Health Education and Promotion unit, Division of Health promotion, Education and Communication, WHO, P.1, Geneva.
- 17 WHO 1999. Information Series on School Health: Improving Health through Schools National and International Strategies, P.47, Geneva.

# Histomorphological Study of Malignant Tumours of Liver

Deepti.P<sup>1</sup>, Hiremath.S.S<sup>2</sup>, H.R.Chandrashekhra<sup>3</sup>, P.Shashikala<sup>4</sup>, Anitha.M.R<sup>5</sup>, Vijayanath.V<sup>6</sup>

<sup>1</sup>Associate Professor, Department of Pathology, S.S.Institute of Medical Sciences & Research Centre, Davangere-577005, Karnataka. <sup>2</sup>Professor, Department of Pathology, J.J.M.Medical College, Davangere-577004, Karnataka. <sup>3</sup>Principal, J.J.M.Medical College., Davangere-577004 Karnataka. <sup>4</sup>Professor & Head, Department of Pathology, S.S.Institute of Medical Sciences & Research Centre, Davangere-577005, Karnataka. <sup>5</sup>Assistant Professor, Department of anatomy S.S.Institute of Medical Sciences & Research Centre, Davangere-577005, Karnataka. <sup>6</sup>Associate Professor, Department of Forensic Medicine & Toxicology, S.S.Institute of Medical Sciences & Research Centre, Davangere-577005, Karnataka.

## ABSTRACT

Histomorphological study of primary and metastatic malignant tumours of liver was undertaken during the period of January 1993 to December 2002.

Primary malignant epithelial tumours were hepatocellular carcinoma (79.2%); cholangiocarcinoma (4.8%) and hepatoblastoma (0.8%). Hepatocellular carcinoma formed 79.2% of malignant liver tumours. They formed 0.19% of the surgical specimens; 45.21% of liver biopsies and 11.42% of the malignant lesions at different sites detected during the same period.

**Key words:** Liver; Metastasis; Tumor;

## INTRODUCTION

Liver tumours are usually detected either by routine physical examination or by different imaging techniques<sup>1</sup>. In spite of the rapid development of these diagnostic tools; histo-pathological study of liver tissue has retained its central place.<sup>2</sup>

The majority of the primary tumours can be classified according to the indigenous cells of the liver (hepatocytes; bile duct epithelium and endothelium) from which they arise. Among the primary malignant tumours, hepatocellular carcinoma (HCC) is the most frequent worldwide male cancer<sup>3</sup>. There is marked disparity in the incidence of HCC based on geographic region which suggests the role of environmental and hereditary causative factors. The different histological patterns and cytologic variants of the primary malignant tumours of liver and their association with certain diseases makes their study, more challenging and interesting<sup>1,3,4,5</sup>. The metastatic malignant tumours in the liver may produce the histology of the primary lesions. At times, they may be extremely anaplastic and give no hint of their origin.<sup>6</sup> These problems in histological interpretation of liver biopsy, emphasize the need to take up this study.

## MATERIALS AND METHODS

This study was undertaken to observe the histomorphological features in primary and metastatic malignant tumours of the liver from the Pathology Department, J.J.M. Medical College, Davangere, during the period, from January 1993 to December 2002. The study material consisted a total of 125 liver tissue samples with histologically proven malignancy. It includes 124 ultrasound guided needle biopsies and one wedge biopsy. Benign tumours and non neoplastic lesions of the liver are excluded from this study.

Clinical details are obtained by studying the hospital records in 77 old cases during the period of eight years from January 1993 to December 2000. In the remaining two years, from January 2001 to December 2002, 48 patients were examined and clinical details were noted. Ultrasonography findings of the liver were available for scrutinization in only 24 cases. Liver tissue sampling and method of obtaining liver tissue were at the discretion of the clinician. Liver tissue samples were subjected to naked eye examination and were fixed in 10% formalin. They were routinely processed to obtain 5-7 micron thick paraffin sections. They were routinely stained with Haematoxylin and Eosin stain.

Von Gieson’s stain; Gomori’s reticulin stain; Periodic acid schiff stain (with or without diastase) and Prussian blue stain.

Patients were subjected to routine haematological and urine investigations. Liver function tests including tests for HBsAg and HCV antibodies were done depending on the clinical requirement. All the cases were subjected to detailed study.

**Results**

**TABLE I: Showing Incidence Of Hepatocellular Carcinoma From 1993 To 2002**

Year	No. of Biopsies	No. of HCC's	Percentage of HCC's
1993	5177	3	0.05
1994	5643	4	0.07
1995	6007	5	0.08
1996	5007	7	0.13
1997	5555	10	0.18
1998	5220	15	0.28
1999	5135	2	0.03
2000	5081	12	0.23
2001	4929	11	0.22
2002	5519	30	0.54
Total	53,273	99	0.19

**TABLE II: Showing Age And Sex Distribution In Hepatocellular Carcinoma**

Age in years	Males	Percentage	Females	Percentage	Total	Percentage
21 – 30	4	4.81	-	-	4	4.05
31 – 40	17	20.49	4	25.00	21	21.21
41 – 50	27	32.53	3	18.75	30	30.30
51 – 60	14	16.87	4	25.00	18	18.18
61 – 70	15	18.08	4	25.00	19	19.19
71 – 80	6	7.22	1	6.25	7	7.07
Total	83	100	16	100	99	100

**TABLE III: SHOWING FREQUENCY OF DIFFERENT CLINICAL FEATURES OF HCC IN 99 CASES (100%)**

Sl. No.	Clinical Features	No. of Cases	Percentage
1	Loss of appetite	63	63.63
2	Loss of weight	40	40.40
3	Weakness and lassitude	20	20.20
4	Distension of abdomen	32	32.32
5	Pain abdomen	30	30.30
6	Fever	15	15.15
7	Nausea and vomiting	13	13.13
8	Pedal oedema	15	15.15
9	Diffuse hepatomegaly	45	45.45
10	Jaundice	13	13.13
11	Ascites	20	20.20

**TABLE IV: SHOWING THE FREQUENCY OF DIFFERENT HISTOLOGICAL PATTERN IN HEPATOCELLULAR CARCINOMA (99 CASES = 100%)**

Sl. No.	Histological Pattern	No. of Cases	Percentage
1	Trabecular	64	64.65
2	Trabecular and pseudoglandular	16	16.16
3	Compact or solid pattern	14	14.14
4	pseudoglandular	5	5.05
	<b>Total</b>	<b>99</b>	<b>100</b>

**TABLE V: SHOWING THE INCIDENCE OF TUMOUR CELL TYPES IN HCC**

Sl. No.	Clinical Features	No. of Cases	Percentage
1	Hepatic type	82	82.83
2	Pleomorphic type	10	10.10
3	Clear cell type	4	4.04
4	Anaplastic cell type	2	2.02
5	Spindle cell type	1	1.01
	<b>Total</b>	<b>99</b>	<b>100</b>

**TABLE VI : SHOWING INCIDENCE OF HISTOLOGICAL GRADE OF HCC**

Sl. No.	Grade	No. of Cases	Percentage
1	I	18	18.18
2	II	67	67.68
3	III	11	11.11
4	IV	3	03.03
	<b>Total</b>	<b>99</b>	<b>100</b>

**TABLE VII: SHOWING HISTOLOGICAL TYPES IN PRIMARY LESION IN METASTATIC TUMOURS OF LIVER**

Sl. No.	Histological type	Primary site	No. of Cases	Percentage
1	Well differentiated adenocarcinoma	Stomach	1	5.27
2	Well differentiated adenocarcinoma	Oesophagus	1	5.27
3	Well differentiated adenocarcinoma	Unknown	12	63.16
4	Poorly differentiated carcinoma	Unknown	4	21.03
5	Embryonal tumour	Unknown	1	5.27
	<b>Total</b>		<b>19</b>	<b>100</b>

**TABLE VIII: SHOWING FREQUENCY OF CLINICAL FEATURES IN METASTATIC TUMOUR IN THE LIVER IN 19 CASES (100%)**

Sl. No.	Clinical Features	No. of Cases	Percentage
1	Loss of appetite	6	31.57
2	Loss of weight	1	5.26
3	Weakness and lassitude	9	47.36
4	Distension of abdomen	9	47.36
5	Pain abdomen	7	36.84
6	Fever	9	47.36
7	Nausea and vomiting	7	36.80
8	Pedal oedema	6	31.57
9	Diffuse hepatomegaly	1	5.26
10	Ascites	5	26.31

### DISCUSSION

Among 219 liver biopsies received during the period of 10 years, HCC was detected in 99 patients (45.21%), which was of high incidence compared to other studies. This may be attributed to the more number of guided biopsies which have been studied in this study.

**TABLE IX: SHOWING THE INCIDENCE OF HEPATOCELLULAR CARCINOMA AMONG LIVER BIOPSY SPECIMENS**

Authors	Place	Total liver biopsy	No. of HCC	Percentage
Sant and Vaidya (1962) <sup>13</sup>	Mumbai	227	3	0.7
Gupta et al (1964) <sup>13</sup>	Lucknow	1800	17	0.7
Reddy et al (1965) <sup>13</sup>	Guntur	556	20	4.6
Surnarayana et al (1974) <sup>13</sup>	Vishakapatnam	2600	185	7.4
S. Patil et al (1981)	Berhampur	1114	93	8.3
Present study (2003)	Davangere	219	99	45.21

These parameters are indicative of the need for further investigations and should never be used as sole criteria for the diagnosis of liver tumours. Albumin to globulin ratio was reversed in two cases, where ultra-

sonography revealed the evidence of cirrhosis with multifocal HCC. Cirrhosis regardless of its cause, is the main pathogenetic factor in HCC.<sup>13</sup> HBs Ag was positive in 6 patients, among 16 patients who were tested for HBs Ag. There is a striking correlation between the incidence of HCC and the prevalence of the chronic hepatitis B virus carrier state in different studies.<sup>14</sup>

Histological patterns of tumour cells observed in this study were trabecular (64.65%) followed by trabecular and pseudo glandular, compact and only pseudo glandular patients. In other studies also, the commonest histological pattern observed was trabecular pattern, followed less frequently by other patterns.<sup>15</sup>

**TABLE X: SHOWING THE INCIDENCE HISTOLOGICAL PATTERNS OF HEPATOCELLULAR CARCINOMA IN DIFFERENT STUDIES**

Histological Pattern	Smalley S.R. et al (1988) <sup>15</sup>	Chu P.G. et al (2002) <sup>18</sup>	Present study 2003
Trabecular	48	54	64
Pseudo glandular	7	9	5
Compact	8	27	14
Trabecular and pseudoglandular	-	-	16
Schirrhouis	-	5	-
Sarcomatoid	-	1	-
Total No. of cases	63	96	99

Tumour cells were commonly of hepatic type (82.83%) and less frequently encountered tumour cell types were pleomorphic type; clear cell type, anaplastic cell type and spindle cell type. Similar observations were made in other studies<sup>3,4,16,17</sup>. In the present study intra-nuclear cytoplasmic inclusions, intra-cytoplasmic, Mallory's hyaline inclusions and globular hyaline bodies were seen in a few cases. The commonest type of inclusion was eosinophilic intranuclear inclusion which was showing characteristics of liver cell cytoplasm. Mallory's hyaline inclusions are said to be always intra-cytoplasmic and PAS negative.<sup>16,17</sup> These inclusions have been reported in HCC but not in other tumours. Intracellular and extracellular globular hyaline bodies of varying sizes were observed in this study.

Although this grading method is disputed, there is no widely accepted method for grading analplasia other than this. Okuda K. et al (1980)<sup>8</sup> correlated between the degree of analplasia and capacity of tumour cells to produce AFP. Their results suggest that well differentiated HCC (Grade I) and highly analplastic HCC (Grade IV) tend to have lower AFP values. AFP were not estimated in HCC, in this study.<sup>19</sup>

In this study variants of HCC having improved prognosis with prolonged survival, which includes, minute, small or encapsulated HCC, pedunculated HCC and fibrolamellar HCC were not encountered.<sup>17</sup>

Six patients of cholangiocarcinoma were detected by ultrasound guided needle biopsy in this study. They belonged to the age group of 40 to 70 years. This tumour is derived from bile-duct epithelium and it is less frequent than HCC in most parts of the world.<sup>20</sup> This is a disease of older individuals affecting both sexes equally. In this study there was marked female preponderance with the male to female ratio of 1:5. Ultrasonography in two of these cases showed finger like extension in the periphery of the solid mass occupying the right lobe of the liver. These fingers like extensions represent spread along portal lymphatic channels.<sup>16</sup> The invasiveness of cholangiocarcinoma within the liver appeared to be more active than that of metastatic colonic adenocarcinoma, in that proliferation of cholangiocellular tumour cells infiltrated between hepatic plates more readily than metastatic tumours which tended to be rather sharply confined by atrophic liver plates.<sup>20</sup>

Hepatoblastoma was diagnosed in 2½ year old boy on ultrasound guided needle biopsy, who was having diffuse enlargement of liver. This tumour is frequently seen in males and the majority of the cases in literature are less than 2 years.<sup>21,22</sup> This is known to be associated with various congenital anomalies. In this case there were no congenital anomalies<sup>3,4</sup>.  $\alpha$ -fetoprotein is invariably high in these patients<sup>1,3,4</sup>. But it was not done in this patient. On ultrasonography hepatoblastoma in this study showed a large heterogenous mass occupying the left lobe of liver, with areas of necrosis but its usual location is said to be in the right lobe of the liver. The hepatoblastoma is one, in a unique category of malignant tumours that occur in children, and whose histopathologic features recapitulate the developmental stages of the organs in which they arise.<sup>23</sup> In the present study microscopy of hepatoblastoma showed mixed epithelial and mesenchymal components. However extramedullary haematopoiesis was not observed. Hass J.E. et al (1989)<sup>24</sup> suggested that the presence of osteoid, chondroid or squamous epithelium was associated with improved prognosis. These features were not observed in this case. Other malignant epithelial tumours like bile duct cyst adenocarcinoma, combined HCC and cholangiocarcinoma, undifferentiated carcinoma and malignant mesenchymal tumours were not encountered in this study.<sup>1</sup>

Metastatic tumours are more frequent than primary metastatic tumours. In the present study metastatic tumours in the liver were less frequent. This may be attributed to the fact that, most of the malignant

tumours after histological examination are referred to referral cancer hospitals for further management. Most of the metastatic lesions in this study were routinely detected when ultrasonography was done for unrelated clinical presentation. Ultrasound guided needle biopsies in these cases, showed well differentiated adenocarcinoma in 14 patients, of whom primary was subsequently identified in stomach in one case and oesophagus in another case, and in the remaining 12 cases, primary remained unknown. Needle biopsies showed poorly differentiated carcinoma in four cases where primary was unknown. In a 11 year old boy hepatic lesion showed metastatic embryonic tumour and primary could not be located. As primary remained unknown in majority of these metastatic lesions, examination by ultrasound guided needle biopsy became essential for establishing the lesion. The strategy of etiological diagnosis of hepatic metastases is based on histological features of these lesions. In these studies involvement of liver by leukemia, lymphoma and malignant mesenchymal tumours were not observed.

With increasing use of guided needle biopsies in the diagnosis of malignant liver tumours, histopathological study has become an important diagnostic tool. The clinician may now choose from a variety of imaging techniques. It is recommended that these patients have base line and serial liver scans, liver function tests and tumour marker estimations. There is no doubt that rapid technologic improvements will continue to alter our diagnostic approach to this disease.<sup>3</sup>

## CONCLUSION

Commonest clinical features in HCC were loss of appetite, diffuse hepatomegaly and loss of weight. In HCC, increase in unconjugated bilirubin, increase in transaminases and alkaline phosphates' levels were observed in varying number of cases. A:G ratio was reversed in two cases. There was ultrasonographic evidence of cirrhosis in two cases. Histological patterns observed in HCC were trabecular; trabecular and pseudoglandular, compact and pseudo glandular patterns in the decreasing order of frequency. Tumour cell types observed in HCC, in the decreasing order of frequency were hepatic type; pleomorphic type; clear cell type; anaplastic type; and spindle cell type. Intracellular inclusions observed in this study were intranuclear cytoplasmic inclusions globular hyaline bodies and Mallory's hyaline inclusions in varying number of cases. Diffuse hepatomegaly was seen in all the six cases of cholangiocarcinoma. Tumour cells in cholangiocarcinoma were arranged in tubular pattern and compact masses. They were associated with abundant fibrous stroma. In the recent years there are rapid advances in the diagnostic imaging technology. This



has led to differences in experiences and results among investigators. Liver biopsy has become an essential tool and diagnostic efficiency can be further improved when combined with immunohistochemistry, electron microscopic study and molecular biology techniques, coupled with serological marker study.

#### BIBLIOGRAPHY

1. Crawford, J.M. "The liver and the biliary tract". Chapter 19 in *Robbins Pathologic basis of disease*, Ed. 6, Edt. by Kumar Cotran Robins, Singapore, Har Court – Asia, 1999, 845-901.
2. Scheuer, P.J. "Neoplasms and nodules", Chapter 11, *Liver biopsy interpretation*, Ed. 5, Edt. by Peter J. Scheur and Jay H Leekowitch, London, W.B. Saunders, 1994, 152-182.
3. Gibson, J.B. "Histological typing of tumours of the liver, biliary tract and pancreas". In *International Histological Classification of Tumours*, No. 20, Geneva, WHO, 1978, 15-29.
4. Ishak, K.G. and Rodney S. Marking. "Liver". Chapter 57 in *Anderson's Pathology*, Ed. 10, Edt. by Damjanov Ivan and James Linder, Philadelphia, Mosby, Vol. 2, 1996, 1779-1858.
5. Kenneth W. Barwick and Rosai J. "Liver". Chapter 13, in *Ackermans surgical Pathology*, Ed. 8, Edt. by Juan Rosai, Singapore, Harcourt Brace and Co., Asia PTE Ltd., Vol. 1, 1996, 857-943.
6. Sherlock, S and James Dooley. "Hepatic tumours". Chapter 28 in *Diseases of the liver and biliary system*, Ed.10, Edt. by Sherlock S and James Dooley, London, Blackwell Science, 1996:531-560.
7. The liver cancer study group of Japan. 1984 "Primary liver cancer in Japan" *Cancer*, 54: 1747-1755.
8. Okuda, K and The Liver cancer study group of Japan. 1980 "Primary liver cancers in Japan". *Cancer*, 45: 2663-2669.
9. Habibullah, C.M. et al. 1981 "Primary liver cell carcinoma – A study of 50 cases". *J. Asso Phys Ind*, 29: 921-925.
10. Patil, S. et al. 1982 "A study of ninety three cases of primary carcinoma of liver". *Indian J Pathol Microbiol*, 25: 135-138.
11. Kishi, K. et al. 1983 "Hepatocellular carcinoma – A clinical and pathologic analysis of 57 hepatectomy cases". *Cancer*, 51: 542-548.
12. Nakashima, T. et al. 1983 "Pathology of hepatocellular carcinoma in Japan – 232 consecutive cases autopsied in ten years". *Cancer*, 51: 863-877.
13. Giarelli, L. et al. 1991 "Primary liver cancer in non-cirrhotic liver, epidemiological study based on autopsies performed in Trieste, Italy and Kurume, Japan". *J. Gastroenterol & Hepatology*, 6: 278-282.
14. Beasley, R.P. 1987 "Hepatitis B Virus- the major etiology of hepatocellular carcinoma". *Cancer*, 61: 1942-1956.
15. Smalley, S.R. et al. 1988 "Hepatoma in the non cirrhotic liver". *Cancer*, 62: 1414-1424.
16. Anthony, P.P. "Tumours and Tumour like lesions of the liver and Biliary tract: Etiology epidemiology and Pathology". Chapter 15 in *pathology of the liver*, Ed. 4, Edt. by Macsween R.N.M et al, Edinburgh Churchill Livingstone, 730-955.
17. Anthony, P.P. "Tumours of the liver" in *Recent advances in histopathology*, No. 10, Chapter 10, Edt. by P.P. Anthony and N. Wool, Edinburgh, 2002: Churchill Livingstone, 214-222.
18. Chu, P.G. et al. 2002 "Hepatocyte antigen as a marker of hepatocellular carcinoma – An immunohistochemical comparison to Carcinoembryonic antigen, CD 10 and Alpha-fetoprotein". *Am J Surg Pathol*, 26: 978-988.
19. Paradinas, F.J. "Liver, biliary tract and exocrine pancreas". Chapter 11, *Symmers systemic pathology*, Ed. 3, Edt. by Derek G.D. Wight, Edinburgh, Churchill livingstone, Vol. 11; 1994: 485-486.
20. Weinbren, K. and S.S. Mutum. 1983 "Pathological aspects of cholangiocarcinoma". *J Pathol*, 130: 217-238.
21. Cariappa, John A. Thomas and K.R. Srimurthy. 1981 "Hepatoblastoma – an attempt at characterization". *Indian J Cancer*, 18: 69-73.
22. Pati, S., B.K. Bhuyan and B.K. Nanda. 1986 "Liver tumours of infancy and childhood in South Orissa". *Indian J Pathol and Microbiol*, 29: 129-132.
23. Manivel, C. et al. 1986 "Teratoid hepatoblastoma – The nosologic dilemma of solid embryonic neoplasms of childhood". *Cancer*, 57: 2168-2174.
24. Haas, J.E. et al. 1989 "Histopathology and prognosis in childhood hepatoblastoma and hepatocarcinoma". *Cancer*, 64: 1082-1095.

# Efficacy of Ebastine 5 mg in the Treatment of Children with Allergic Rhinitis: A Post Marketing Surveillance Study

Harsha K.P.<sup>1</sup>, Gurudutt Nayak<sup>2</sup>, Vasudeva Murthy C.R.<sup>3</sup>

<sup>1</sup>Senior Manager, <sup>2</sup>Manager Medical Services, Department of Medical Services, Micro Labs Limited, Bangalore <sup>3</sup>Department of Forensic medicine and Toxicology, S.S. Institute of Medical Sciences and research centre, Davangere, Karnataka

## ABSTRACT :

Allergic rhinitis is associated with decreased learning, performance and productivity at school. 1st generation anti histamines have become unpopular due to adverse effect profile. Due to convenient dosing & less adverse effects, newer anti histamines are becoming popular. Ebastine, 2<sup>nd</sup> generation anti histamine marketed in over 50 countries & data of use in children is limited.

**OBJECTIVE:** To evaluate efficacy of Ebastine 5 mg in treatment of children with allergic rhinitis through postmarketing surveillance study.

**PATIENTS & METHODS:** Children of either sex suffering from allergic rhinitis were evaluated for efficacy of ebastine in a 2 week treatment period. Total of 40 pediatricians were chosen & each given 10 pretested forms to quantify reduction in parameters: Total symptom score, running nose, sneezing, and nasal congestion, to determine efficacy of ebastine in allergic rhinitis. The incidence of sedation with ebastine during 2 week study period was taken as secondary end point.

**RESULTS:** In final analysis, 122 patients were evaluated based on completion of questionnaire & quality of data. Data was analyzed by Paired t-test using SPSS 12. Ebastine reduced all parameters tested: Total symptom score (TSS), nasal congestion, & running nose in patients at end of 2 week study period. Only 9 patients complained of mild sedation. Percentage reduction in parameters tested from baseline at end of study period was 72% for TSS, 72.5% for running nose, 72% for sneezing, & 69% for nasal congestion.

**CONCLUSION:** Ebastine is an efficacious 2<sup>nd</sup> generation anti histamine in treatment of allergic rhinitis in pediatric patients with minimal incidence of sedation.

**KEY WORDS:** *Ebastine, Allergic Rhinitis, Post-Marketing Surveillance.*

## INTRODUCTION

Allergic rhinitis (AR) is associated with decreased learning, performance and productivity at work and school, as well as a reduced quality of life. With a staggering annual economic impact between \$6 billion and \$8 billion, AR affects up to 40% of child population<sup>(1)</sup>.

Allergic rhinitis itself is not life-threatening (unless accompanied by severe asthma or anaphylaxis), but morbidity from the condition can be significant. Allergic rhinitis often coexists with other disorders, such as

asthma, and may be associated with asthma exacerbations. Allergic rhinitis is also associated with otitis media, Eustachian tube dysfunction, sinusitis, nasal polyps, allergic conjunctivitis, and atopic dermatitis. It may also contribute to learning difficulties, sleep disorders, and fatigue<sup>(2)</sup>.

Onset of allergic rhinitis is common in childhood, adolescence, and early adult years, with a mean age of onset 8-11 years, but allergic rhinitis may occur in persons of any age. In 80% of cases, allergic rhinitis develops by age 20 years. The prevalence of allergic rhinitis has been reported to be as high as 40% in

children, subsequently decreasing with age. In the geriatric population, rhinitis is less commonly allergic in nature <sup>(3)</sup>.

The prevalence of allergic rhinitis was 12.55%, 10.6% and 11.97%, among adults of rural, urban city and urban slum population of Delhi <sup>(4)</sup>.

In spite of their efficacy, the 1<sup>st</sup> generation anti histamines have become unpopular due to their adverse effect profile. On the other hand, due to their convenient dosing & lack of adverse effects, the newer anti histamines like ebastine, astemizole & levocetirizine are becoming increasingly popular. The data on such newer anti histamines like ebastine in children are limited.

Hence the present study is conducted to study the effect of newer generation anti histaminic drug ebastine 5 mg in the pediatric age group.

### OBJECTIVES

#### PRIMARY OBJECTIVE

Change from baseline in Total Symptom Score at the end of 2 weeks therapy.

#### SECONDARY OBJECTIVE

- Change from baseline in individual symptom scores of Sneezing, Running nose & Nasal Congestion.
- To evaluate sedative effect of ebastine based on a pre-tested questionnaire.

#### METHODOLOGY

A total of 40 pediatricians were chosen for the survey & were provided with a pretested questionnaire <sup>(5)</sup>.

The patients were included based on the following criteria

#### INCLUSION CRITERIA

- Children between the ages of 5-12 years of either sex.
- Clinically diagnosed with Allergic rhinitis, either perennial or seasonal.

#### EXCLUSION CRITERIA

- Patients currently on treatment with other drugs
- Immunodeficient patients
- Concurrent asthma.

All patients included in the study were prescribed 5 mg of Ebastine Dispersible tablets for 2 weeks.

At the beginning of the study, the Total Symptom

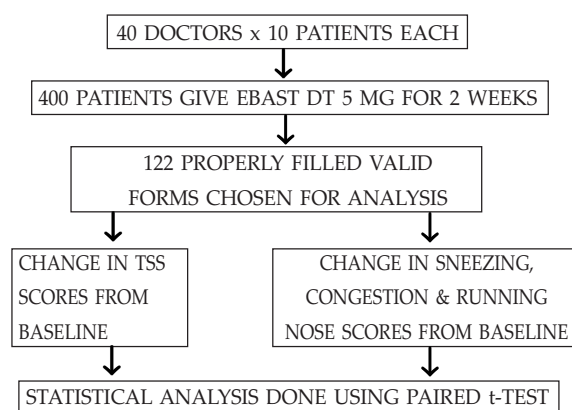
Score was calculated by using a 0-7 scoring system for each symptom.

The Total Nasal Symptom, Sneezing, Running Nose & Congestion scores were calculated separately at beginning & end of the study.

At the end of 2 weeks, all patients returned for a review of total symptom score & individual symptom scores.

400 forms were returned at the end of the study of which 122 forms were filled properly & completely, & were utilized for the final statistical analysis.

### STUDY DESIGN



### STATISTICAL ANALYSIS

Change in Total Symptom Score, Sneezing, Congestion & Running Nose Scores from baseline was calculated using SPSS 12.0 Statistical Software. The analysis to determine change from baseline was done using the paired t-test. A P value of <0.05 was considered to be significant for the results.

### RESULTS

At the end of 2 weeks of treatment with Ebastine dispersible tablets, the following results were obtained after statistical analysis.

#### PRIMARY END POINT

##### TOTAL SYMPTOM SCORE (TSS)

At the end of 2 weeks of treatment, the TSS was 3.46 compared to 12 at baseline. There was a significant reduction (with a P value of 0.001) in TSS scores at end of 2 weeks when compared to baseline values. (Table & Figure 1)

**FIGURE 1: REDUCTION IN TSS SCORES AT END OF 2 WEEKS COMPARED TO BASELINE**

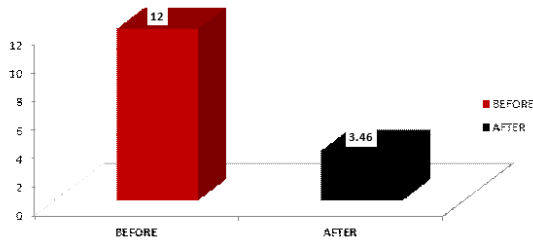


TABLE 1: TOTAL SYMPTOM SCORE - Paired Samples Test					% change from baseline score
	N	MEAN ± SEM	Paired Differences		
BEFORE	122	12 ± 0.4	95% Confidence Interval of the Difference		72 %
AFTER	122	3.4 ± 0.08	Lower	Upper	
			7.8	9.3	

**SECONDARY END POINTS**

**RUNNING NOSE**

At the end of 2 weeks of treatment, the Running Nose Score was 1.11 compared to 4 at baseline. There was a significant reduction (with a P value of 0.001) in Running Nose scores at end of 2 weeks when compared to baseline values. (Table & Figure 2)

**FIGURE 2: REDUCTION OF RUNNING NOSE SCORES AT END OF 2 WEEKS COMPARED TO BASELINE**

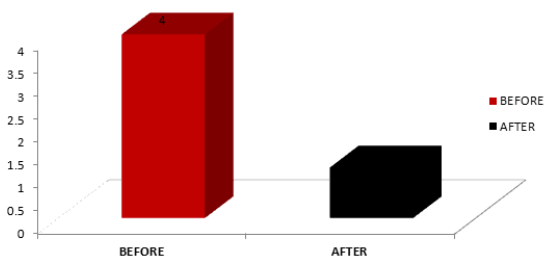


TABLE 2: RUNNING NOSE - Paired Samples Test					% change from baseline score
	N	MEAN ± SEM	Paired Differences		
BEFORE	122	4.0 ± 0.13	95% Confidence Interval of the Difference		72.5%
AFTER	122	1.1 ± 0.03	Lower	Upper	
			2.7	3.2	

**SNEEZING SCORES**

At the end of 2 weeks of treatment, the Sneezing Score was 1.14 compared to 4.12 at baseline. There was a significant reduction (with a P value of 0.001) in Sneezing scores at end of 2 weeks when compared to baseline values. (Table & Figure 3)

**FIGURE 3: REDUCTION IN SNEEZING SCORES AT END OF 2 WEEKS FROM BASELINE**

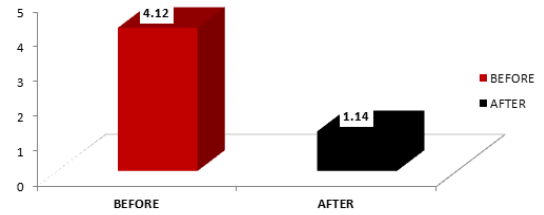


TABLE 3: SNEEZING - Paired Samples Test					% change from baseline score
	N	MEAN ± SEM	Paired Differences		
BEFORE	122	4.12 ± 0.15	95% Confidence Interval of the Difference		72 %
AFTER	122	1.14 ± 0.03	Lower	Upper	
			2.6	3.2	

**NASAL CONGESTION**

At the end of 2 weeks of treatment, the Congestion Score was 1.26 compared to 4.04 at baseline. There was a significant reduction (with a P value of 0.001) in Congestion scores at end of 2 weeks when compared to baseline values. (Table & Figure 4)

**FIGURE 4: REDUCTION IN CONGESTION SCORES AT 2 WEEKS FROM BASELINE**

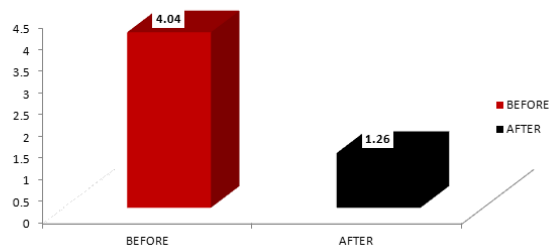


TABLE 4: NASAL CONGESTION – Paired Samples Test					% change from baseline score
	N	MEAN ± SEM	Paired Differences		
BEFORE	122	4.04 ± 0.16	95% Confidence Interval of the Difference		Sig 69 %
AFTER	122	1.26 ± 0.04	Lower	Upper	
			2.5	3.1	.001

### SEDATION

The following scale used to evaluate sedation with Ebastine over the 2 week treatment period

0	no sedation
1	Slight sedation
2	moderate sedation
3	high sedation

Of the 122 patients evaluated in the study for sedation, only 9 complained of slight sedation, with the rest having no sedation.

### DISCUSSION

Ebastine has not been studied much in the pediatric age group. Only few studies have proven that ebastine can be used safely & effectively in children. The Total Symptom Score (TSS) in our study at the end of 2 weeks therapy decreased from 12 to 3.46 with a significant P value.

Several other studies have also compared reduction in TSS from baseline. One such study in comparison with astemizole showed a 51% reduction in TSS from baseline, whereas in our study it was a 72% reduction in TSS from baseline. Other studies in comparison with cetirizine have also been done where the reduction in TSS from baseline was 56%. Overall analysis of various studies using ebastine in adults at a dose 10-20 mg both in blinded & non-blinded studies showed reduction in TSS ranging from 50-56% (6).

Our literature search revealed individual symptom scores like sneezing, running nose & nasal congestion have not been compared in the past with use of anti histaminic but in our study we found that individual symptom scores also had significantly decreased scores from baseline at the end of 2 weeks therapy. This was true for all 3 major symptoms like running nose, sneezing & nasal congestion.

Unlike other studies we wanted to analyze if role of anti histamines was specific to any symptomatology but our study revealed that ebastine reduced all

symptoms like sneezing running nose & congestion, similarly.

Few studies have been conducted with ebastine in children. A study conducted by Van Cauwenberge *et al* that ebastine 2.5, 5 & 10 mg was safe & effective in children aged 1-2 years suffering from allergic rhinitis & idiopathic urticaria (7).

Another study was done to evaluate effect of ebastine in 30 children with perennial rhinitis found positive with skin test. At end of 10 days of therapy, there was significant reduction in allergic response for specific antigens in nasal & conjunctival mucosa for 22 patients. There was also no CNS related adverse effects in this study(8).

A study done in Japan in which 377 children younger than 15 years of age were surveyed for the role of ebastine in allergic rhinitis & urticaria. The efficacy of ebastine in these patients with seasonal allergic rhinitis was 77.8% & for urticaria was 95.3%(9).

Since ours was a similar study, the results are comparable with this Japanese study in allergic rhinitis.

### LIMITATIONS OF THE STUDY

- We did not have a control group for placebo or other anti histaminic which could have improved the results.
- There was a distinct possibility of investigator bias due to absence of blinding & lack of randomization.
- The sample size of 122 is still a small size in a post marketing surveillance study where a large sample could have provided more authentic data.

### CONCLUSION

The present study shows that Ebastine 5mg dispersible tablet is safe, efficacious & convenient for the treatment of allergic rhinitis in children aged between 5 to 12 years of age.

More randomized, placebo controlled, blinded studies with proper methodology with ebastine in allergic rhinitis are further required to reconfirm efficacy & safety of newer generation anti histaminic drugs like ebastine.

### End piece

Old: The Efficacy & Safety of Ebastine in children with allergic rhinitis is not well established because of the limited number of such studies. The use of newer anti histaminic drugs in children is still questionable

New: Newer generation anti histamines like

ebastine is safe & effective in the treatment of allergic rhinitis in children.

#### REFERENCES

1. Berger, William E. Allergic Rhinitis in Children: Diagnosis and Management Strategies. *Pediatric Drugs* 2004;6(4):233-250.
2. Nayak AS. The asthma and allergic rhinitis link. *Allergy Asthma Proc.* Nov - Dec 2003 ; 24 (6) : 395 - 402.
3. Settupane RA. Demographics and epidemiology of allergic and nonallergic rhinitis. *Allergy Asthma Proc.* Jul-Aug 2001;22(4):185-9.
4. S.N. Gaur. Prevalence of bronchial asthma and allergic rhinitis among urban and rural adult population of Delhi. *Indian J Allergy Asthma Immunol* 2006;20(2):90 – 97.
5. Spector SL. Symptom severity assessment of allergic rhinitis: part 1. *Ann Allergy Asthma Immunol.* 2003;91(2):105-14.
6. Miriam Hurst & Caroline M Spencer. Ebastine: An Update of its use in Allergic Disorders. *Drugs* 2000;59(4):981-1006.
7. Paul Van Cauwenberge et al. A review of the second-generation antihistamine ebastine for the treatment of allergic disorders. *Expert Opin. Pharmacother.* 2004 5(8):1807-1813.
8. Benavente V. Ebastine: Treatment of perennial rhinitis in the child. *Allerg Immunol (Paris).* 1996 Oct;28(8):277-81.
9. Hachiya Hiroyuki. Drug Use Investigation of Ebastine in Pediatric Patients with Allergic Rhinitis, Urticaria and Skin Disorder Accompanied with Itch. *Journal of Clinical Therapeutics & Medicines* 2003;19(9):1029-1046.

# Knowledge and perception of community regarding mosquito-borne diseases in a coastal rural area of South India

SHN Zaidi<sup>1</sup>, P Sukla<sup>2</sup>, J Ramasamy<sup>3</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Associate Professor, <sup>3</sup>Professor, Department of Community Medicine, S.S.S. Medical College & RI, District Kancheepuram, TN.

## ABSTRACT

**Objective:** A knowledge, attitude and practice (KAP study) was carried out in a rural area in Tamilnadu state of India to ascertain the level of knowledge and the perceived risk by the community of mosquito-borne infectious diseases.

**Methods:** A cross sectional survey was conducted among the consenting residents of rural areas registered under department of community medicine attending out-patient department at rural health centre, sembakkam.

**Results:** More than 94% of the people interviewed perceived mosquitoes as a problem. Malaria was known as the main disease transmitted by mosquitoes. Regarding breeding sites, a significant number of people had no knowledge about the breeding sites of mosquitoes. Those who were aware mentioned open drains and stagnant water in the paddy field as the main breeding sites. More than one third of the interviewees did not know of any preventive measures against mosquitoes at the household and community level.

**Conclusion:** Mass media is an important means of conveying health messages to the public even among the rural population, thus approaches based on social mobilization and communication aimed at bringing behaviour change in the communities are stressed.

**Keywords:** mosquitoes, perceived risk, paddy fields, KAP.

## INTRODUCTION

India accounts for approximately two thirds of the confirmed cases reported in the South-East Asia Region. In 2008, 96 million slides were examined, from which 1.5 million cases were confirmed. The number of cases has fallen from more than 2 million confirmed in 2000 to 1.5 million cases in 2008. About half the cases confirmed are due to *P. falciparum*. Five states account for 60% of cases: Orissa, Chhattisgarh, Madhya Pradesh, Jharkhand and West Bengal. Other highly endemic states include Arunachal Pradesh, Assam, Meghalaya and Tripura<sup>[1]</sup>.

The mosquito-borne diseases result in avoidable ill-health and death which also has been emphasized in National Health Policy<sup>[2]</sup> and Millennium Development

Goals (MDGs)<sup>[3]</sup> under the aegis of National Rural Health Mission (NRHM)<sup>[4]</sup>.

Incidence of malaria in the Tamil Nadu has been contained. However, Japanese Encephalitis cases have been reported regularly from Tamil Nadu. In the year 2008, 46 suspected a Chikungunya fever case with no death was reported. Capacity building for case management and strengthening of health facilities need to be taken on priority basis for diagnosis and case management (Source: State Health Department, Tamilnadu).

In Tamil Nadu State during 90's a total of 1,20,029 cases were recorded for malaria, out of which 59.6 % were recorded from the urban areas and 40.4% in rural. The factors contributing for the persistence of malaria

in rural areas are numerous breeding places in the river beds, puddles, rocky pits, sandy pits casuarina pits, etc. Migration of the population for fishing, as labourers for construction and as quarry workers to other endemic states and non acceptance for indoor residual spray could be another explanation [5].

The knowledge gap with regard to the disease and prevailing attitudes and perceptions towards any programme may be the source of the major causes of lower compliance. Any strategy intended to bring change will have to take into account the range of people's knowledge and perceptions and how strongly these are rooted for the acceptance or rejection of such strategy. Hence, the present study intends to assess the people's perceptions and knowledge with regard to causation and transmission of mosquito-borne disease. Correct assessment of community attitudes, knowledge and behaviour can assist the reformulation of malaria control strategy and can form the basis of appropriate health education messages [6].

## MATERIALS AND METHODS

The study was carried out in the field practice area of Rural Health Centre (RHC), Sembakkam, district Kancheepuram, Tamil Nadu, run by Shri Satya Sai Medical College and Research Institute. It was a cross-sectional study on a sample of 165 fever cases attending Rural Health Centre's OPD. The interviews were conducted during the months of June to August 2011. Study was carried out using a pre-tested, pre-designed, semi-structured questionnaire. Prior to the start of the study, the questionnaire was discussed and explained to pre-final year medical students, Auxiliary Nurse Midwives (ANMs) and social workers who were well-versed with the local language. They were trained in data collection and continuously supervised by authors from department of community medicine. Attempt was made to fully cover all the areas falling in the geographical jurisdiction of field practice of the department. The information was collected from available respondents on socio-demographic characteristics, awareness and knowledge regarding selected mosquito-borne diseases including causative agents of the selected diseases, modes of disease transmission, breeding places of mosquitoes and their control measures. The respondents were also asked about the source of information regarding mosquito-borne diseases and whether they were aware of the seriousness of the diseases in the study area as well as measures taken by the government for prevention and control of these diseases. The final results are based on 165 available adults who were interested to participate in the study and gave informed verbal consent.

## RESULTS & DISCUSSION

**Sociodemographic status:** A total of 165 fever cases (Table 1) were interviewed where 35 (22%) were females and 130 (78%) were males. Overall 54% patients were in the age group of 15–45 years. All the male and female respondents were adults. A significant number of respondents were literate.

**Table 1. Sociodemographic profile of patients (n = 165)**

Age (yrs.)	Male		Female		Total	
	(n)	(%)	(n)	(%)	(n)	(%)
<15	17	13%	4	11%	21	13%
15-45	71	55%	18	51%	89	54%
46-60	28	21%	5	15%	33	20%
> 60	14	11%	8	23%	22	13%
Total	130	78%	35	22%	165	100%

Religion	Male		Female		Total	
	(n)	(%)	(n)	(%)	(n)	(%)
Hindu	113	87%	35	100%	148	90%
Christian	17	13%	-	-	17	10%
Muslim	-	-	-	-	-	-
Others	-	-	-	-	-	-
Total	130	78%	35	22%	165	100%

Education of respondent	Male		Female		Total	
	(n)	(%)	(n)	(%)	(n)	(%)
Illiterate	58	45%	33	94%	91	55%
Primary School	25	19%	1	3%	26	16%
Higher Secondary	36	28%	1	3%	37	22%
Senior Secondary	8	6%	-	-	8	5%
Graduate and above	3	2%	-	-	3	2%
Total	130	78%	35	22%	165	100%

To begin with, accessibility of communication media and the source of the available knowledge were ascertained from each respondent. Majority of patients provided television 89 (54%) as a solo available mean of information media in their houses followed by radio 31 (19%), as shown in Table 2. However, Study from Nepal<sup>[7]</sup> showed that respondents labelled radio (58.1%) and television (25.4%) as the major media sources for information regarding malaria. Easy availability of television through governmental efforts for the poor in the Tamilnadu state might be the probable reason for higher number of television users in the study areas. The media enlisted above acts as an effective tool for disseminating appropriate information, education and communication materials to achieve social mobilization.



**Table 2: Availability of communication media in the house and source of information for the respondent**

Media	(n)	(%)
Television	89	54%
Television & Newspaper	23	14%
Radio	31	19%
Radio & Television	13	8%
Radio, Television & Newspaper	2	1%
Radio & Newspaper	2	1%
None	5	3%
Total	165	100%

Source of knowledge	(n)	(%)
Experience/Observation	110	67%
Neighbours	5	3%
School/College	21	13%
Television/Cinema/Radio	10	6%
Doctors/Health workers	17	10%
Family members	2	1%
Total	165	100%

They were further questioned about the existing information they were having about the mosquito borne diseases, most of the patients 110 (67%) quoted their life time experiences and observations, as shown in table 2. Similar study<sup>[8]</sup> showed moderate to high awareness level among the respondents. Prevalence of high awareness levels among the various respondents is understandable as malaria being an oldest disease of mankind and various control programmes run by the Government agencies, such as DDT spraying in 1970–76 played an important role in spreading awareness<sup>[8]</sup>. Only a few number of patients 17 (10%) were explained and motivated with information on mosquitoes, mosquito borne diseases and their prevention by doctors or health workers. A significant improvement is needed for proper interpersonal communication between the doctors/health workers and people as they were observed to be an infrequent source of information.

**Table 3: Knowledge regarding vector borne diseases**

Knowledge about breeding places of mosquitoes	(n)	(%)
Drains	14	8%
Stagnant water	8	5%
Drains & Stagnant water	29	17%
Garbage	3	2%
Drains & Garbage	3	2%
Green plants	-	0%
Drains & green plants	-	0%
Cattle shed/ Cow dung	15	9%
Clean water	1	1%
Combination of all	18	11%
Do not know	74	45%
Total	165	100%

Knowledge about the time of mosquitoes bite	(n)	(%)
Night-time	144	87%
Day-time	21	13%
Cannot say	-	-
Total	165	100%

Knowledge about diseases transmitted by mosquitoes	(n)	(%)
Malaria	104	63%
Filariasis	20	12%
Dengue	13	8%
Japanese encephalitis	8	5%
Combination of above	13	8%
Others	5	3%
Do not know	2	1%
Total	165	100%

When enquired about the knowledge regarding vector borne diseases, 74 (45%) of patients had no idea about the breeding places of mosquitoes. A fewer number of respondent 29 (17%) expressed their concerns for drains and stagnant water.

When asked for the biting time of mosquitoes, a large number of individuals replied with night-time, as an ideal time, what majority had experienced.

Thus, the current study revealed that overall awareness and knowledge about selected mosquito-borne diseases was higher for malaria 104 (63%), followed by filariasis and dengue. Similar results were observed by a study<sup>[9]</sup> done on perceptions on mosquito borne diseases, provided that 61% of individuals in India attributed malaria to a mosquito vector; however less than 1% of individuals were familiar with the fact that mosquitoes also transmit dengue. A study in Uganda found that many people believe that in addition to mosquitoes, drinking dirty water, inhaling bad air, witchcraft, and eating fresh fruit can cause malaria<sup>[10]</sup>. In Ghana, while symptoms of lymphatic filariasis are well known, the cause is not<sup>[11]</sup>.

**Table 4: Knowledge about malaria**

Knowledge about symptoms of malaria	(n)	(%)
Fever + Chills	37	22%
Fever + Chills + Bodyache	87	53%
Fever + Chills + Bodyache + Headache	20	12%
All the above symptoms + Vomiting	21	13%
No comments	-	-
Total	165	100%

**Knowledge about symptoms of malaria:** As shown in table-4, majority of patients, 87(53%) enumerated three symptoms of malaria (fever/chills/bodyache) followed by 37(22%) patients who could enumerate

two symptoms (fever/chills). Many studies have shown [12,13,14] that respondents have an idea about 2–3 symptoms of malaria.

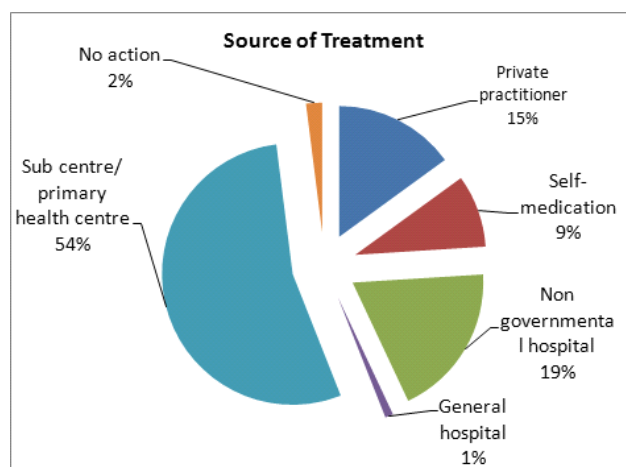
**Table 5: Knowledge and attitudes towards preventive measures against mosquitoes**

Types	(n)	(%)
Keep surroundings clean	18	11%
Proper drainage	110	67%
Spraying chemicals on water	17	10%
Keep surroundings clean and proper damage	3	2%
Combination of above	5	3%
Do not know	12	7%
Total	165	100%

Personal measures being taken by the respondents	(n)	(%)
Mosquito coil	13	8%
Mosquito mats	10	6%
Using fans	8	5%
Covering with blankets /bedsheets	-	-
Bednets	12	7%
Applying smoke	2	1%
Combination of above	89	54%
Nothing	31	19%
Total	165	100%

An analysis on practices regarding prevention and control of mosquito borne diseases revealed that majority of all 110 (67%) respondents were in view for proper drainage of stagnant water from the variable collection sites. A study by Joshi and Banjara in Nepal<sup>[7]</sup> also revealed almost similar results where 66.7 and 48.1% of the respondents respectively reported removal of the collected water from ditches and spraying insecticides can control mosquito-borne diseases. Observation regarding personal protection measures to avoid mosquito bite, showed 89 (54%) of study subjects were using combination of the available personal preventive methods against mosquito borne diseases. The use of mosquito repellent coil and bednets was commonest among personal preventive methods; being used on 8% and 7% occasions respectively as a single measure of personal preventive methods. A significant number of adults 31 (19%) practised none of the personal measures.

**Figure 1: Attitudes towards health care utilization**



**Health seeking behaviour of patients:** On the health seeking behaviour, Government hospitals (esp. primary health centre at sembakkam and subcentres) were found to be the most commonly (54%) used treatment source for most of the respondents residing in rural areas. However, some preferred to visit non-governmental (19%) & private clinics (15%), respectively.

**Table 6: Awareness to the governmental efforts and measures**

Response	(n)	(%)
Spraying chemicals	2	1%
Drainage cleaning	12	7%
Spraying chemicals and drainage cleaning	13	8%
Spraying chemicals on water	-	-
Govt. Paying pancayat for drainage cleaning	26	16%
Combination of above	-	-
Do not know	112	68%
Total	165	100%

The perception of these people about the governmental efforts was enquired by asking about the measures they know that helps in the uprooting of various vector borne diseases from their areas. As shown in table-6, a large number of patients 112 (68%) do not aware of any of the measures implemented by either government or panchayat in their area. Thus, there is a need to intensify health measures by these authorities for prevention and control of mosquitoes along with IEC activities through all available means.

## CONCLUSION

The findings of the study suggest that there are generally low levels of awareness of mosquito-borne disease in the study region. As most of the people were not aware of the association of vector mosquito with the disease, the risk perception was low in this community. The prevention and control of vector-borne diseases is beset with many challenges and requires high political commitment, multi-sectoral collaboration and community participation. Intensified efforts towards creating public awareness and mobilizing the community regarding the preventive measures they can take and regarding the early seeking of medical attention by those suffering from vector-borne disease are crucial. Communication messages using the mass media as well as inter-personal approaches can help bring about a change in the behaviour of the population. The services of a communications expert may be employed to formulate effective risk communication strategies. Similarly, school children can be involved in prevention activities through school health programmes.

## ACKNOWLEDGEMENTS

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None

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None

## REFERENCES

1. Country profile – World Malaria report 2009. [http://www.who.int/malaria/publications/country-profiles/2009/mal2009\\_india\\_0023.pdf](http://www.who.int/malaria/publications/country-profiles/2009/mal2009_india_0023.pdf), accessed 13 August, 2011.
2. Park K. Park's textbook of preventive and social medicine. XX edn. Jabalpur: Bannout Publication 2009; p. 775–6.
3. United Nations Development Programme. Millennium development goals. Available from: <http://www.undp.org/mdg/goal6.shtml> MDGs.
4. Kishor J. National Health Programmes of India, VI edn. New Delhi: Century Publication 2006; p.186.
5. Disease Burden <http://www.tnhealth.org/dphdbmal.htm>, accessed 13 August, 2011.
6. John Govere, David Durrheim, Kobus la Grange, Aaron Mabuza, Marline Booman. Community knowledge and perception about malaria and practices influencing malaria control in Mpumalanga province South Africa. *South African Med J* 2000; 90 : 611–6.
7. Joshi AB, Banjara MR. Malaria related knowledge, practices and behaviour of people in Nepal. *J Vector Borne Dis* 2008;45: 44–50.
8. Tyagi P, Roy A & Malhotra M.S. Knowledge, awareness and practices towards malaria in communities of rural, semi-rural and bordering areas of east Delhi (India). *J Vect Borne Dis* 42, March 2005, pp 30–35
9. Boratne et al: kap of mosquito-borne diseases. Predictors of knowledge of selected mosquito-borne diseases among adults of selected peri-urban areas of Puducherry. *J Vector Borne Dis* 47, December 2010, pp. 249–256.
10. Nuwaha, F. 2001. People's Perception of Malaria in Mbarara, Uganda. *Tropical Medicine and International Health* 7 (5): 461-470.
11. Ahorlu, C., Dunyo, S., Koram, K., Nkrumah, F., Aagaard-Hansen, J., and Simonsen, P.1999. Lymphatic Filariasis related perceptions and practices on the coast of Ghana. Implications for prevention and control. *Acta Tropica* 73: 251-261.
12. Ongore D, Kamunvi F, Knight R, Minawa A. Study of knowledge, attitude and practice (KAP) of a rural community on malaria and the mosquito vector. *East African Med J* 1989; 66(2): 79–89.
13. Singh TG, Singh RKN, Singh EY. A study of knowledge about malaria and treatment seeking behaviour in two tribal communities of Manipur. *Indian J Pub Hlth* 2003; 47(2) : 61–5.
14. Rasania SK, Bhanot A, Sachdev TR. Awareness and practices regarding malaria of catchment population of a primary health center in Delhi. *J Com Dis* 2002; 34(1): 78–84.

## Unicystic Ameloblastoma : A Case Report

**Heena Zainab**

Senior Lecturer, Department of Oral and Maxillofacial Pathology, Al-Badar Dental College & Hospital, Gulbarga (Karnataka)

### ABSTRACT

Ameloblastoma the most common aggressive benign odontogenic tumor of the jaw is categorized broadly into three biologic variants: cystic (uni-cystic), solid, and peripheral. Although the histology suggests that cystic ameloblastoma follow a biologically low-grade course, recent evidence suggests that they may often behave clinically as biologically aggressive tumors. This is supported by the high incidence of cortical perforation, tooth resorption, lesion size, bony destruction, and a high rate of recurrence after simple enucleation. Few cases with malignant change & distant metastasis have been reported. It is seen in all age group but the lesion is mostly diagnosed in the third and fourth decades of life.

**Keywords:** Unicystic Ameloblastoma, Solid Ameloblastoma

### INTRODUCTION

The ameloblastoma is a true neoplasm of enamel organ type which does not undergo differentiation to the point of enamel formation. It has been described by Robinson as a tumor that is usually unicentric, non-functional, anatomically benign and clinically persistent.<sup>3</sup> Hence consists of proliferating odontogenic epithelium, which has a follicular or plexiform pattern, lying in a fibrous stroma.<sup>4</sup> The WHO histological typing of odontogenic tumor classifies ameloblastoma as intraosseous, central, extra osseous and peripheral types.<sup>5</sup> The small number of ameloblastoma arising directly from the surface epithelium or from residues of the dental lamina lying outside the bone constitutes the peripheral type. The intraosseous ameloblastoma of the jaws occurs most often in the fourth and fifth decades of life. Its occurrence in children and adolescents younger than 18yrs is seen only in 14.6% of 206 cases of ameloblastomas so far. Within the central type, the unicystic variant is recognized as a clinically, radiographically and pathologically distinct entity with prognostic significance that warrants alternative management to the classical type. Unicystic ameloblastoma, a rarer variant was first described by Robinson and Martinez in 1977, which refers to those cystic lesions that show clinical and radiologic characteristics of an odontogenic cyst but histologically shows typical cystic epithelium, with or without luminal and/or mural proliferation.<sup>1,2</sup> The unicystic ameloblastoma is considered a variant of the solid or multicystic ameloblastoma, accounting for 6%to15% of all intraosseous ameloblastomas.<sup>5</sup> This lesion occurs in a younger age

group, with slightly more than 50%of cases, occurring in patients in the second decade of life. In more than 90% of the cases, the unicystic ameloblastoma is located in the mandible, with 77% located in the molar region.<sup>6</sup> Various treatment modalities for UA have been us however, more conservative treatments have been reported frequently, including enucleation, curettage and marsupialization.<sup>7</sup>

### Case Report

A 28 year old male patient reported to the Department of Oral Medicine and Radiology with a swelling for 2years on the left side of the jaw (fig1).



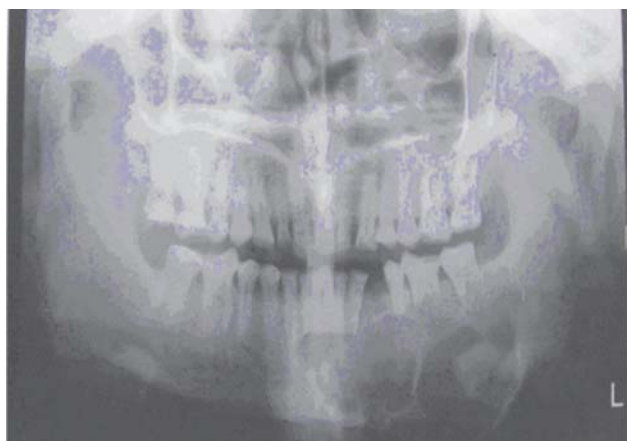
Fig (1) Extraoral view with a well defined solitary swelling arising from left lower jaw

The contra-lateral side was normal extra oral examination revealed a well defined solitary swelling arising from the lower jaw to the present size (fig1). Intraoral examination showed a large, hard and tender mass, smooth and glossy surface with no appreciable change in the color of the mucosa(fig2).



fig(2)intraoral photograph showing large,hard & tender mass on the left side of the jaw

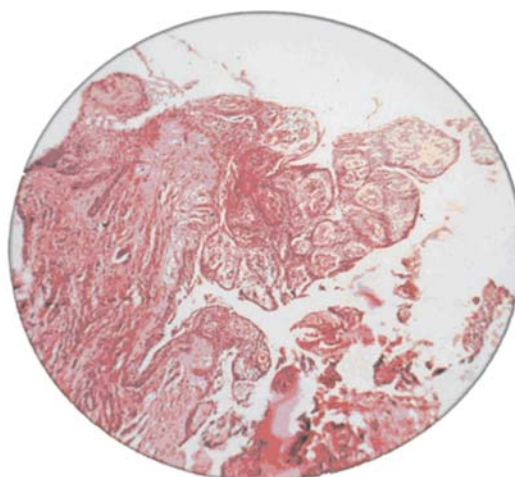
Lymph nodes were enlarged, soft, tender and mobile. Past dental and medical history was unremarkable. Radio-logically there was a well defined multilocular radiolucency extending from right central to left molars with scalloped margins along with resorption of roots. Expansion of buccal cortical plates was also appreciated (fig3).



fig(3)shows a well defined multilocular radiolucency from right central to left molars

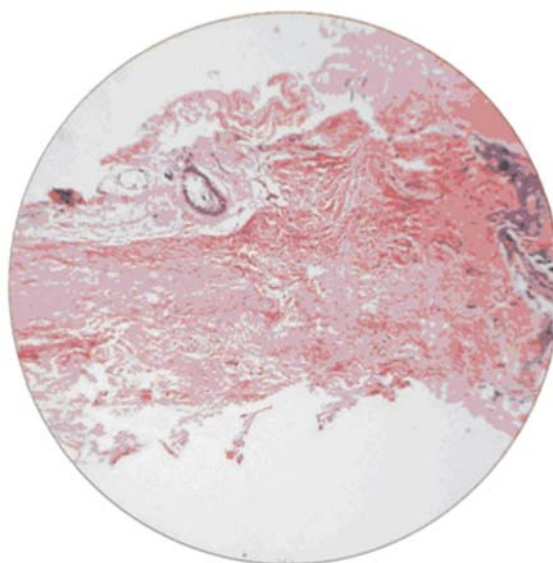
Fine needle aspiration cytology (FNAC) revealed a straw colored fluid. Hence provisional diagnosis of odontogenic cyst was made. Enucleation was performed to completely extirpate the lesion and the

specimen was sent for histo-pathological examination. The tissue was processed and multiple sections were stained with Hematoxyllin and Eosin. Microscopically, sections revealed a cystic capsule lined with reduced enamel epithelium with few areas showing odontogenic epithelial islands. Epithelium showed cuboidal to columnar basal cells with hyper chromatic nuclei, nuclear palisading with polarization, cytoplasmic vacuolization with intercellular spacing and sub epithelial hyalinization in few areas. At one end of the section, epithelium showed intra luminal proliferation(fig4).



fig(4)intraluminal proliferation of odontogenic epithelium

Intramural nodules were appreciated as free islands in few areas followed by cystic degeneration in other (fig 5).



Fig(5)shows intramural nodules

The histological examination confirmed the diagnosis of unicystic ameloblastoma.

### DISCUSSION

The unicystic ameloblastoma the cystic variant of ameloblastoma deserves separate consideration based on its clinical, radiographic and pathologic features and its response to treatment.<sup>8</sup> The second and far less growth pattern seen in the intraosseous ameloblastoma is the unicystic type. The growth pattern is seen in approximately 6% of ameloblastomas.<sup>9</sup> Unicystic ameloblastomas are most often seen in younger patients, with about 50% of all such tumors diagnosed during the second decade of life.<sup>5</sup> The average age is 23 years which is in accordance with our case.

The location of cystic ameloblastomas in the posterior mandible accounts for 86% of cases. The clinicopathologic features are benign with a slow growing pattern, but locally invasive. The lesion is often asymptomatic, although large lesions may cause painless swelling of the jaws.<sup>10</sup> The clinical behavior may be regarded as lying somewhere between benign and malignant.<sup>8</sup> Radiographically, appears as unilocular or multilocular pattern with clear predominance of the unilocular configuration in all studies where this feature was evaluated. More than 90% of UA are found in the mandible, usually in the posterior region. UA is often misdiagnosed as an odontogenic keratocyst or a dentigerous cyst. Konouchi et al performed contrast enhanced CE-MRI to diagnose 13 cases of unilocular, round radiolucent lesions visualized by panoramic radiography and /or computed tomography. In the case of UA, low signal was observed on T1 weighted images and a markedly high SI was observed on T2WI; and relatively thick enhancement with/or without small intra luminal nodules was observed on CE-T1W1s. CE-MRI was considered to be useful in the diagnosis of UA.<sup>7</sup> The histologic features of UA have been established by several authors all of whom recognize various subtypes determined by the pattern and the extent of ameloblastomatous proliferation in relation to the cyst wall. The luminal type of tumor is called UA subgroup 1 and is defined as having an epithelial lining of which parts may show transformation from cuboidal to columnar basal cells with hyperchromatic nuclei, nuclear palisading with polarization, cytoplasmic vacuolization with intercellular spacing and subepithelial hyalinization. Subgroup 1.2, shows simple and intraluminal features. UA subgroup 1,2,3 covers cases where there is an occurrence of intramural ameloblastoma tissue as well as subgroup 1,3 exhibits a cyst with a luminal lining in combination with intramural nodules of SMA tissue. Modified Ackerman et. al. <sup>4</sup> Unicystic ameloblastoma is less aggressive with a lower

recurrence rate after conservative treatment.<sup>11</sup> Various treatment modalities for UA have been used, such as segmental or marginal resection as normally used for conventional ameloblastoma. However more conservative treatment has been reported frequently including enucleation, curettage and marsupialization.<sup>12</sup> Akasara et. al. investigated the immunohistochemical discrepancy between UAs and other types. Expression of PCNA was markedly observed in the tumor cells of other types of ameloblastomas, whereas there was no expression of PCNA in the cells of any variants of UA. Moreover, b-catenin was characterized by a more positive marked expression in UA than in other types of ameloblastoma, and the cells that expressed this substance were not PCNA positive cells. For this reason mentioned above, UA should be treated with a conservative therapy. In the present case, we selected enucleation and the patient was able to avoid facial deformity and oral dysfunction.<sup>7</sup>

### CONCLUSION

The unicystic ameloblastoma deserves separate consideration based on its clinical, radiographic and pathologic features and its response to treatment. The second and far less frequent growth pattern seen in the intraosseous ameloblastoma is the unicystic type. This growth pattern is seen in approximately 6% of all ameloblastomas. It tends to occur in a younger population (average age in one large study, 22.1 years) compared with patient population with conventional ameloblastomas. A high percentage of these lesions are associated with an impacted tooth, and the most common cited provisional diagnosis is dentigerous cyst. Cystic areas nearly always are noted grossly at the time of surgery. Recognition of this growth pattern is important, because it is well accepted that the unicystic type has a considerably better overall prognosis and a much reduced incidence of recurrence compared with conventional ameloblastoma.

### REFERENCES

1. Takahashik, Miyauchi k, Sato k. Treatment of Ameloblastoma in children. *Br j Oral Maxillofac Surg* 1998;36:453-456.
2. Robinson L, Martinez MG. Unicystic ameloblastoma. A prognostically distinct entity. *Cancer* 1977;40:2278-2285.
3. William G Shafer, Kiplinger M Hine, Barnet M Levy. Text book of Oral Pathology 4<sup>th</sup> edn Prism book (pvt) ltd. 276-285.
4. Reichart PA, Philipsen OHP. Odontogenic tumors and allied lesions. 2004 quintessence publishing co, ltd, London.
5. Gulden unlu, Vedat tari, Hilan alan. Unicystic

- Ameloblastoma in 8 years old child: A case report. Review of unicystic ameloblastoma. *International Dental and Medical Disorders* 2008;1:29-33.
6. Ackerman GL, Altini M, Shear M: The unicystic ameloblastoma: A clinicalpathological study of 57 cases, *J oral Pathol* 1988;17:541.
  7. Satoshi ITO, Toshiko Mandai, Kosei Ishida, Naoyo Kitamura, Hiroyo Deguchi, Tsuyoshi Hata et.al. Unicystic ameloblastoma of the maxilla: A case report. *Kawasaki Medical Journal* 2009;35(1):95-98.
  8. Neville ,Damm, Allen, Bouquot *Oral and Maxillofacial Pathology* 2<sup>nd</sup> edn: Elsevier publication.616-618
  9. Shafer, Hine, Levy Shafer's Text book of oral pathology 6<sup>th</sup> edn:2009 Elsevier Publication:276-279.
  10. Neville Damm Allen Bouquot *Oral and Maxillofacial Pathology* 1<sup>st</sup> edn 1995 W.B.Saunders Company.516-519.
  11. Norifumi Nakamura, Yoshinori Higuchi, Takeshi Mitsuyf Ionu, ohishi, Comparison of long term results between different approaches to ameloblasticoma. *Triple o* 2002;93:13-20.
  12. Lav SL, Samman N: Recurrence related to treatment modalities of unicystic ameloblastoma: A systematic review: *Int J Oral Maxillofac Surg.* 2006;35:681-690.

# Role of Collagen in Vestibuloplasty – A Comparative Study

Hemavathy Osuraman<sup>1</sup>, Jaya Prasad. N. Shetty<sup>2</sup>, Chandan Prabhakar<sup>3</sup>, A.R. Pradeep<sup>4</sup>

<sup>1</sup>M.D.S #693, "Shyam Nivas", 5<sup>th</sup> main, 6<sup>th</sup> cross, H.A.L 3<sup>rd</sup> stage, Bangalore 560 075, Karnataka <sup>2</sup>M.D.S, Professor and Head of Department Oxford Dental College, Former Dean and Director of G.D.C.R.I, Bangalore, #1066, 7<sup>th</sup> 'A' main road, 3<sup>rd</sup> block, Koramangala Layout, Bangalore 560 034. <sup>3</sup>M.D.S #4/1, Komalavathy, Jeevanhalli, New main road, Cox town, Bangalore 560 005., <sup>4</sup>M.D.S, Professor and Head of Department of Periodontics, G.D.C.R.I, Bangalore. Department of oral and maxillofacial surgery., Government Dental College and Research Institute, Bangalore, Karnataka, India.

## ABSTRACT

The ridge extension procedures are required to improve the denture stability and retention. Vestibuloplasty is a procedure performed to gain more amount of clinical ridge where there is adequate basal bone, by uncovering it surgically and repositioning the overlying mucosa and muscle attachment. In the present study, a comparison of "kazanjian technique with collagen" and "kazanjian technique without collagen" was done to evaluate the efficiency of collagen in maintaining the vestibular depth, in a follow up period of 3 months. 20 patients who were referred to department of oral and maxillofacial surgery for ridge extension were treated with kazanjian technique, in 10 patients raw labial surface of wound was covered with collagen and in the other 10 patients it was left to heal by secondary epithelialisation. Vestibular depth and complications if any were reviewed and recorded on 1st day, 1st week, 1st month and 3 months post operatively. The total increase in vestibular depth after 3 months in technique with collagen is 9.5 - 11 mm where as in technique without using collagen 5.5 - 8 mm. Reviewing the results with regard to maintainance of vestibular depth and complications, we recommend the "kazanjian technique with collagen" over the "kazanjian technique without collagen".

**KEY WORDS:** Mandible anterior sulcus depth, Vestibuloplasty, Sulcoplasty, Kazanjian technique.

## INTRODUCTION

Vestibuloplasty is a surgical procedure where by the oral vestibule is deepened changing the soft tissue attachment. This creates a larger bony base by repositioning the muscle attachment and increases the denture bearing area that is capable of supporting and retaining a denture.<sup>1-5</sup> Mucosal grafts and split thickness grafts have conventionally been used in vestibular extension.<sup>6-11</sup> Because these methods involves a secondary donor site,<sup>7-11</sup> various biomaterials have been recently used most of these protect wound and reduce pain. Omura et al reported a newly developed collagen silicon bilayer as mucosal substitute in 1997.<sup>12</sup>

## PATIENTS AND METHODS

Twenty patients (12 male and 8 female) were treated from year 2006-2007 within an age group of 48-62 years for denture prosthesis with inadequate mandibular anterior vestibular depth. Inclusion (table.1) and ex-

clusion (Tabel 2) criteria were considered in the selection of patients.

**Table 1: Criteria for inclusion**

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Shallow labial vestibule  
Radiographic evidence of 15mm- 20mm basal bone of anterior region of mandible  
No local pathology of bony or soft tissue

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**Table 2: Criteria for exclusion**

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Patients who have undergone previous vestibuloplasty procedure  
Medically compromised patients  
Patient with inadequate amount of healthy mucosa

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The collagen used in this study is purified bovine (serosa) reconstituted collagen. Purified collagen refers to collagen which is free from components normally associated with its native state. Reconstituted collagen refers to collagen, which has been reassembled into individual triple helical molecules with or without their telopeptide extensions, brought into solution and then regrouped into the desired form and is then cross linked with tanning agents like glutaraldehyde or chromium sulphate, to improve the tensile strength, make it insoluble, decrease rate of resorption, and lower antigenicity.

Prophylactic antibiotics with analgesics were given to all patients preoperatively and continued thrice daily for the succeeding three days postoperatively.

All patients were operated under local anaesthesia, a transverse mucosal incision was given extending bilaterally just short of mental foramen in the mucosal surface of lower lip at approximately twice the desired additional vestibular depth, vertical release incisions were given extending from the crest of alveolar ridge proximal to mental nerve bilaterally taking care not to damage the mental nerve (fig.1).



Fig 1: Incision marking

A full thickness mucosal flap was elevated and extended till the crest of alveolar ridge (fig.2).



Fig 2: Raising of mucoperiosteal flap

Supra periosteal dissection was carried out and the muscle attachments were moved inferiorly to achieve the extended sulcus depth. The elevated mucosal flap was sutured to the periosteum with interrupted silk sutures (fig.3).

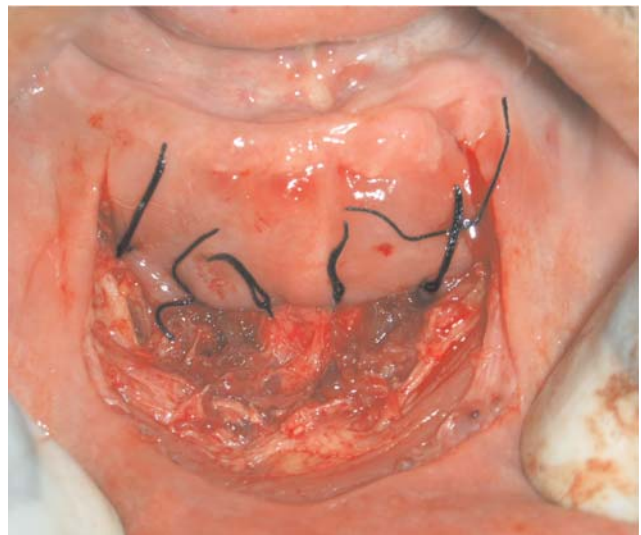


Fig 3: Suturing of mucoperiosteal flap to the periosteum

In 10 patients, the raw surface of lip was covered with collagen and quilt sutures were given with vicryl (fig.4).

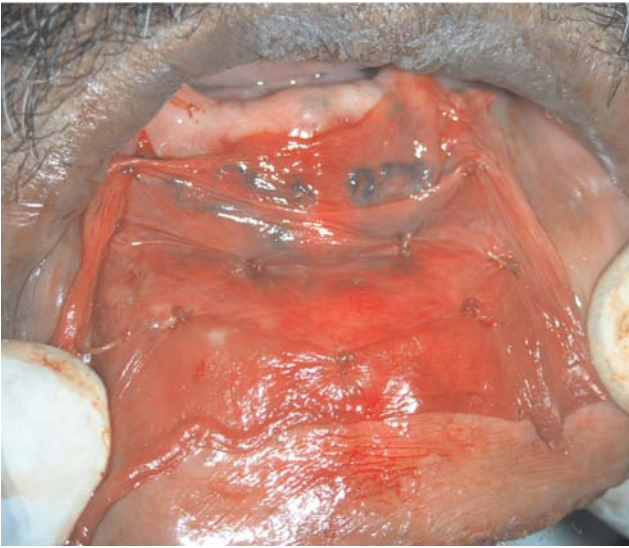


Fig 4: Suturing of raw labial wound with collagen sheet

In another 10 patients, the raw labial surface was left to heal by secondarily epithelisation and granulation tissue formation.

Post operative pain relief, oedema, haemostatic effect, granulation tissue formation, epithelisation, and wound contracture were evaluated after 1<sup>st</sup> post operative day, 1<sup>st</sup> week, one month and three months following surgery (fig.5, table 3).



Fig 5: Three months post operative

Table 3: Vestibular depth during follow up

	Kazanjian technique without collagen	Kazanjian technique with collagen
Pre operative	2.5 - 4.5 mm	2.5 - 3.5 mm
First post operative day	13 - 15 mm	14 - 15 mm
First week	13 - 15mm	13 - 15 mm
Month 1	11.5 - 13.5 mm	13.5 - 14.5 mm
Month 3	9.5 - 11.5	12 - 14 mm

**STATISTICAL ANALYSIS**

The following methods of statistical analysis have been used in this study i.e. student ‘t’ test, Chi-square test of significance and Analysis of Variance. In all above test ‘p’ value of less than 0.05 was accepted as indicating statistical significance.

**RESULTS**

The study was designed to evaluate the clinical advantage of collagen as biological dressing material in promoting haemostasis, inducing granulation tissue formation, assisting in rapid epithelialisation at raw wound site, contracture and preventing scar formation. The total increase in vestibular depth after 3 months in ‘kazanjian technique with collagen’ was 9.5 - 11 mm where as in ‘kazanjian technique without collagen’ was 5.5 - 8 mm. Reviewing of results with regard to maintenance of vestibular depth and complications we recommend the kazanjian technique with collagen over the kazanjian technique without collagen.

**DISCUSSION**

In edentulous patients, as the alveolar resorption takes place, the attachment of mucosa near the denture bearing area exerts a greater influence on retention and stability of denture, by decreasing the vestibular depth as well as the amount and quality of fixed tissue over the denture bearing area. In most patients, problems with lower denture are more than upper denture since the alveolar ridge resorption is four times greater in mandible than in maxilla.

In our study conducted on 20 patients, none had an ideal denture supporting mandibular ridge and the muscle attachment to the mandibular ridge was high. In our study comparison of vestibuloplasty techniques i.e. ‘kazanjian technique without the use of collagen’ and ‘kazanjian technique with the use of collagen’ was used to evaluate the increase in vestibular depth, (table.4) which showed increase in vestibular depth in ‘kazanjian technique with collagen’, which was statistically significant.

**Table 4: Total increase in vestibular depth**

Kazanjian technique with collagen	Kazanjian technique without collagen
9.5 – 11 mm	5.5 – 8.5mm

The results of the present study is in accordance with H. David Hall who demonstrated increased vestibular depth with palatal mucosal grafts than with skin grafts,<sup>6</sup> though palatal grafts showed good results there was donor site morbidity. There are various surgical technique that are used to treat the problem of reduced vestibular depth i.e. autogenous overlay grafts,<sup>7-11</sup> osteotomy procedures,<sup>15,16</sup> alloplastic grafts,<sup>17</sup> implant procedure and vestibuloplasty extension procedures.

Kazanjian described a secondary epithelisation vestibuloplasty technique for deepening the mandibular labial vestibule in which a labial mucosal flap was pedicled off from alveolar process and was used to cover the newly exposed bone while the lip was permitted to re-epithelialise.

To overcome the disadvantages of original technique like avoiding scar formation and contracture, other techniques were described to cover the raw surface of vestibuloplasty wound like skin grafts,<sup>8-11</sup> mucosal grafts,<sup>6</sup> and recently collagen.<sup>12-13</sup> Mucosal graft is an excellent intra oral graft material, but is available in a limited supply. Skin is the next best, but when grafted in the mouth it becomes macerated and never attains the texture or resiliency of oral mucosa and complicated by growth of adnexal structure like hair and sweat glands. Dermis consists of almost entirely of collagen and as an autogenous graft it can be used successfully. However all these grafts require a second surgical intervention and are associated with donor site morbidity. Our study compared the “kazanjian technique without collagen” and “kazanjian technique with collagen”. All the patients showed excellent compatibility to collagen, there was one incidence of infection, and in one case there was excess increase in the vestibular depth due to early breakdown of collagen. Post operative follow up was done for three months. Patients were referred to Department of Prosthodontics for early denture construction around 4 weeks to maintain the newly developed vestibular depth.

**REFERENCES**

- 1) Kazanjian V H. Surgery as an aid to more efficient service with prosthetic dentures, J.A.D.A 1935; 566- 582.
- 2) Macintosh RB, Obwegwser HL. Pre prosthetic surgery: A scheme for its effective employment. J Oral surg 1967; 25: 397-413.
- 3) Bruce Donoff R. Biological basis for vestibuloplasty procedures. J Oral Surg 1976; 34: 890-896.
- 4) Kethley JL, Gamble JW. The lip switch, a modification of kazanjian’s labial vestibuloplasty. J Oral Surg 1978; 36: 701- 705.
- 5) Hillerup S. Pre prosthetic vestibular sulcus extension by operation of Edlan and Mejchar, Int J oral surg 1979; 8: 333 – 339.
- 6) David Hall H. Vestibuloplasty, mucosal grafts (palatal and buccal). J Oral surg 1971; 29: 776-791.
- 7) Landesman HM, Levin BA. A patient survey of denture tolerance before and after a mandibular vestibuloplasty with skin grafting. JADA 1975; 90: 806 – 810.
- 8) Samit A, Kent K. Complications associated with skin graft vestibuloplasty. Oral surg Oral med Oral pathol 1983; 56: 586-592.
- 9) Hansen EH, Adawy AM, Hillreup SM. Mandibular vestibulolingual sulcoplasty with free skin grafts. A five year follow-up study. J Oral Maxillofac Surg 1983; 41: 173-176.
- 10) Hillerup S. Preprosthetic mandibular vestibuloplasty with free skin graft. Int J Oral Maxillofac Surg 1987; 16:270-278.
- 11) Hillerup S, Hansen EH, Erikse E. Influence of skin graft pathology on residual ridge reduction after mandibular vestibuloplasty. Int J Maxillofac Surg 1991; 49: 1132-1133.
- 12) Omura S, Mizuki N, Kawabe R, Haimotos. A newly developed collagen silicone bilayer membrane as a mucosal substitute. A preliminary study. Br J Oral Maxillofac Surg 1997; 35:85.
- 13) Bessho K, Murakami K, T. Lizuka. The use of a new bilayer artificial dermis for vestibular extension. Br J Oral Maxillofacial Surg 1998; 36: 457-459.
- 14) M.Samandari, M.Yaghmaei, M.Ejlali, M.Moshref, A.Saffa, Use of amnion as a graft material in vestibuloplasty: a preliminary report. Oral Surg, Oral Medic, Oral Pathol, Oral Radio & Endo 2004; 5: 574-578.
- 15) Harle F. follow-up investigation of surgical correction of the atrophic alveolar ridge by visor osteotomy. J maxillofac surgery 1979; 7(4): 283-293.
- 16) Brons R, Bosker H, Van Dijk L. Visor osteotomy and vestibuloplasty- a one stage procedure. A preliminary report. Intl J Oral Surg 1977; 6(3): 127-30.
- 17) Shafer S.C, Parnell A.G. Hydroxyapatite augmentation of mandible with simultaneous mucosal graft vestibuloplasty. J Oral Maxillofac Surg 1984; 41: 173- 176.

# A Comparative Study of Random Urine Protein : Creatinine Ratio With 24 Hour Urine Protein Excretion in Diabetic Nephropathy

Hamsaveena<sup>1</sup>, Rashmi.M.V<sup>2</sup>,

<sup>1</sup>Assistant Professor, Department of Biochemistry. <sup>2</sup>Associate Professor, Department of Pathology Sree Siddhartha Medical College and Research Center. Tumkur

## ABSTRACT

Renal involvement in diabetes is one of the long term complications leading to morbidity and premature mortality. Proteinuria is the most widely accepted clinical sign of diabetic nephropathy. The present study was a correlation between 24 hour urine protein excretion and random urine protein: creatinine ratio in diabetic subjects for predicting renal involvement. A total of 69 diabetic subjects were studied. It was observed that protein excretion in 24 hr sample correlated significantly with random urine protein: creatinine ratio in physiological and also in nephrotic range of proteinuria. This may have important clinical applications as single urine specimens, which can be collected easily in outpatient clinics and field studies, could replace the more traditional timed urine collections that have been used to assess the risk of clinical diabetic renal disease.

*Key words : Diabetic nephropathy, protein : creatinine ratio*

## INTRODUCTION

Diabetic nephropathy is a devastating complication of diabetes mellitus and is among the leading indications for dialysis and kidney transplantation. It is the commonest cause of end stage renal disease. Occurrence of nephropathy is around 40% in type 1 and 25% in type 2 diabetes mellitus<sup>1</sup>.

Degree of proteinuria is the useful marker for renal involvement and response to treatment. Protein excretion rate is ordinarily determined from a 24-hour urine collection. Random specimens vary considerably in protein concentration. 24-hour urine sample collection could be inconvenient and cause frequent collection errors. Random urine sampling for protein:creatinine ratio would be more acceptable and less time consuming. The protein:creatinine ratio takes into account the fact that creatinine excretion remains fairly constant in presence of a stable Glomerular Filtration Rate . The protein excretion would also be fairly stable. Therefore the ratio of the two in a single voided sample would reflect the cumulative protein excretion over the day, as the two stable rates would cancel out the time factor<sup>2</sup>.

The protein:creatinine ratio in a single voided urine samples is an accurate, convenient, inexpensive and

reliable estimate of total proteinuria in the vast majority of patients. Hence protein : creatinine ratio in single voided urine samples may be even more reproducible than 24 hours urinary protein excretion<sup>3</sup>. The protein: creatinine ratio of a randomly obtained urine specimen correlates with 24-hour urine protein in patients with type 1 diabetes and may be a useful tool in screening a patient for proteinuria or estimating range of proteinuria in patients <sup>4</sup>.

## METHODS

Total of 69 diabetics were selected. 12 were with 24 hours urinary protein levels > 3g/day, 39 with protein levels 0.2 – 3.0 g/day and 18 were with < 0.2g/day. Detailed medical history and relevant clinical examinations were carried out in these patients. Patients with chronic renal failure, glomerular nephritis due to other systemic conditions and hypertensives were excluded from the study. 24 hour urine was collected in the container having 4ml of 10% thymol in isopropanol as a preservative for 24 hours. This was thoroughly mixed and a sample of 2ml was taken for evaluation of proteins. Total volume was noted and calculation was done for 24 hours. A random urine sample of 5ml was collected on next day any time just before the analysis. The biochemical parameters were analyzed.

## RESULTS

Of the 69 diabetic subjects studied, 16 subjects with 24 hour urine protein < 0.2 g/day had P:C ratio of < 0.2, 37 subjects with 24 hour urine protein 0.2 – 3.0 g/day had P:C ratio of 0.2 – 3.0 g/day and 9 subjects with 24 hour urine protein > 3.0 g/day had P:C ratio of >.3.0 g/day. It is evident that correspondence of 24 hr urine protein and protein:creatinine ratio in diabetic subjects is highly significant (p<0.001).

**TABLE.1 CORRELATION BETWEEN PROTEIN : CREATININE RATIO IN RANDOM URINE SAMPLE AND 24 HOUR URINARY PROTEIN CONCENTRATION**

Protein : creatinine ratio in random urine sample	24 hour urinary protein concentration				Total
	< 0.2 (g/day)	0.2 – 3.0 (g/day)	> 3.0 (g/day)		
< 0.2	16	2	-		18
0.2 - 3.0	2	37	3		42
> 3.0	-	-	9		9
Total	18	39	12		69

X<sup>2</sup> = 92.0

p < 0.001 HS (highly significant)

## DISCUSSION

The reference method for estimating urine protein concentration is accurately timed 24-hour urine specimen which is considered to be difficult in some circumstances because of difficulties associated with obtaining a complete collection. An alternative approach of estimating urine protein : creatinine ratio in random specimen can be considered. Protein : creatinine ratio in single voided urine samples correlates well with measurements of 24-hour urinary protein, this may be even more reproducible than 24-hour urinary protein excretion<sup>5</sup>.

More over a random urine sample in an outpatient tested usually represents renal excretion during two to four hours of varied activity and most of the daily urinary excretion of protein of an outpatient takes place during activity not recumbency<sup>6</sup>. Correlation between random urine protein:creatinine ratio and 24 hour urine protein excretion was significant and strong protein:creatinine ratio is highly useful test in outpatient clinical setting but its precision and accuracy may be affected by patient's physical activity<sup>7</sup>.

Urinary protein excretion is routinely expressed as the amount of protein excreted per unit of time per unit body surface area. Since creatinine production and excretion are also related to body size, it is possible that good correlation exist between protein : creatinine ratio and quantitative protein excretion in individual patients<sup>8</sup>. It is noted in earlier studies and also in present study that patients who excreted > 3 gm protein in 24

hour had protein:creatinine ratio that exceed 3.0 which predicted nephrotic proteinuria. Similarly those patients who excreted < 200 mg protein in 24 hour had protein:creatinine ratio of < 0.2, which reflect insignificant or physiological protein excretion<sup>9</sup>. Hence a highly significant correlation exist between 24-hour urinary protein concentration and protein : creatinine ratio levels in random urine sample<sup>10</sup>.

By careful choice of cut-off, protein: creatinine ratio can be used in patients with kidney disease to rule out abnormal 24 hr loss of protein. Random samples can be used as surrogate for 24 hour sample<sup>11</sup>.

## CONCLUSION

Proteinuria is an important clinical sign of diabetic nephropathy. The definitive method for quantifying urinary protein excretion is 24-hour urine sample, but obtaining these samples is cumbersome, time consuming and inaccurate.

The present study suggests estimating protein : creatinine ratio in random urine sample for renal involvement in diabetic subjects provide a convenient method for early diagnosis and intervention of diabetic nephropathy. Hence the single voided test is simple, reliable and useful in screening, assessment and follow-up of diabetic nephropathy

## REFERENCES

- 1) Ronald CK, Gordon CW. Joslin's Diabetes Mellitus. 13<sup>th</sup> edn : B.I. Waverly Pvt Ltd (New Delhi) 1994; 624.
- 2) Indira Agarwal, Chellam Kirubakaran, Markandeyulu, Selvakumar. Quantitation of proteinuria by spot urine sampling. Indian journal of Clinical Biochemistry 2004; 19(2): 45-47.
- 3) Schwab SJ, Chirstensen RL, Dougherty K, Klahr S. Quantitation of proteinuria by the use of protein to creatinine ratios in single urine samples. Arch Intern Med 1987; 147:943-944
- 4) Rodby RA, Rohde RD, Sharon Z, Pohl MA, Bain RP, Lewis EJ. The urine protein to creatinine ratio as a predictor of 24-hour urine protein excretion in type 1 diabetic patients with nephropathy. American Journal of Kidney diseases 1995; 26(6): 904-909.
- 5) Price CP, Newall RG, Boyd JC. Use of protein : creatinine ratio measurements on random urine samples for prediction of significant proteinuria : A systematic review. Clinical Chemistry 2005; 51(9): 1577-1586.
- 6) Abuelo JG. Proteinuria : Diagnostic principles and procedures. Annals of Internal Medicine 1983; 98: 186-191.

- 7) Sadjadi SA & Jaiparel N. Correlation of random urine Protein: Creatinine ( P:C) ratio with 24 hour urine protein and protein : creatinine ratio based physical activity : a pilot study. *Ther Clin Risk Mana* 2010; 6: 351- 357.
- 8) Xing, Wang M, Jiao L, Xu G, Wang H. Protein-to-creatinine ratio in spot urine samples as a predictor of quantitation of proteinuria. *Clinica Chimica Acta* 2004; 350: 35-39.
- 9) Kunzelman CL, Knowler WC, Pittitt DJ, Benett PH. Incidence of proteinuria in type 2 diabetes mellitus in the Pima Indians. *Kidney international* 1989 ; 35: 681-687.
- 10) Ginsberg JM, Chang BS, Matarese RA, Garella S. Use of single voided urine samples to estimate quantitative proteinuria. *N Engl J Med.* 1983; 309: 1543-1546.
- 11) Mark G et al. Protein and albumin : creatinine ratios in random urine accurately predict 24 hour protein and albumin loss in patient with kidney disease. *Ann Clin Biochem* 2009;46: 468-472.

# Diagnostic Imaging in Implantology: From Conventional to Newer Paradigms

Hemen Das<sup>1</sup>, Himanshu Gupta<sup>2</sup>, Ajay Singh<sup>3</sup>, Geeta Verma<sup>4</sup>

<sup>1</sup>Professor, Dept. of Prosthodontics, Sardar Patel Post Graduate Institute of Dental and Medical Sciences, Rai Baraeli Road, Lucknow <sup>2</sup>Senior Lecturer, Dept. of Prosthodontics, Sardar Patel Post Graduate Institute of Dental and Medical Sciences, Rai Baraeli Road, Lucknow. <sup>3</sup>Professor And Head, Dept. of Prosthodontics, Sardar Patel Post Graduate Institute of Dental and Medical Sciences, Rai Baraeli Road, Lucknow <sup>4</sup>Post Graduate Student, Dept. of Orthodontics, Faculty of Dental Sciences, CSMMU (former King George Medical College), Lucknow.

## ABSTRACT

Imaging is an useful adjunct for many dental procedures in general but is essential in the clinical practice of implantology. Apart from ruling out local bone and tooth pathology, imaging helps clinicians to determine bone quality and quantity and give a fair idea of implant orientation. Unlike endodontics, which can rely on conventional intra oral periapical assays (IOPA), imaging in implantology require definite cross sectional views to appreciate buccal and lingual bone plates and overall bone quality and quantity bucco-lingually. From conventional IOPAs and orthopantomograms (OPG) to cone beam computed tomography (CBCT) and three dimensional implant planning software with computer aided designed and machined surgical guide templates, the diagnostics in implantology has gone through a sea change. With prosthetically guided implant placement becoming a standard protocol today, the need for computed tomography has also increased. This article reviews various diagnostic imaging modalities used in implantology today with clinical guidelines to adhere in the end.

**KEYWORDS:** *Imaging, IOPA, OPG, CBCT, three dimensional implant planning software.*

## INTRODUCTION

The influence of implants in clinical dentistry has been phenomenal. These are in a way unique as they provide a range of additional artificial abutments – a possibility which never existed before. The success of implants in providing optimum esthetics and function is unparalleled by any other treatment modality in prosthodontics.<sup>1,2,3</sup> In the past few years, the advances in science related to implant diagnosis and treatment planning has also been incredible. From conventional periapical films to three dimensional implant planning software with computer aided designing and machining, the diagnostics in implantology has gone through a sea change. Without these advancements, certain concepts like flapless surgery and ideal positioning of the implant would have not seen the light of the day. Overall, the precision in patient and implant selection, implant placement, evaluation of the need for hard and soft tissue augmentation has been greatly enhanced with the help of these advancements.

This review series covers the conventional tech-

niques and also deals with the advancements like multiplanar reformatted computed tomography and three dimensional imaging techniques as used in implantology today with clinical guidelines to adhere in the end.

### **The requirements and objectives of imaging in implantology:**

The requirements for imaging in implantology are: <sup>4</sup>

- a) Presurgical planning
- b) Restorative treatment
- c) Maintenance, monitoring of research trials
- d) Diagnosis of failing implant.

The basic objectives of imaging in implantology are:

- a) Identify disease.
- b) Determine bone quality.
- c) Determine bone quantity.
- d) Determine implant position.
- e) Determine implant orientation.

The standard diagnostic and imaging protocol in an implant case:

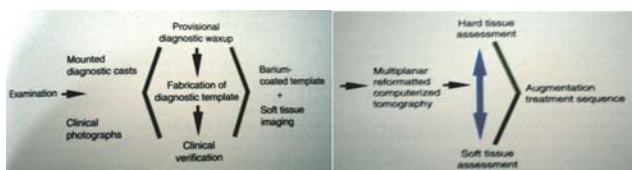


Fig1. The stepwise procedure from examination to placement.

This is the standard protocol which can be followed in all implant cases as given by Rosenfeld and Mecal<sup>5</sup> helping clinicians to place implants with clinical precision. With the help of diagnostic wax up, correct alignment of the replacing tooth can be finalised. Barium coated templates will help clinicians to determine the exact implant alignment and multiplanar reformatted computed tomography will help clinicians to determine the need for any hard or soft tissue augmentation. Although recommended, this protocol may not be possible in every implant case because of economic, time, space and availability concerns. Standard intraoral periapical assays (IOPA) and orthopantomograms (OPG) although do not provide cross sectional imaging but still are of significance as these can be used as screening and also for non complicated cases having abundant bone.

### VARIOUS IMAGING MODALITIES IN IMPLANTOLOGY

#### a) Parallel IOPA

Conventional IOPA are used mainly to rule out any local bone or dental disease but has limited value in determining bone quality and quantity. Normally, a no.2 size dental film captures 25x 40 mm of view, hence certain landmarks like inferior alveolar canal and maxillary sinuses are beyond its view. In addition, there is difficulty in obtaining an undistorted film in areas of shallow palate and reduced sulcus depth. Long cone paralleling technique limits distortion and magnification to 10%. Low cost and low radiation dosage is an advantage.

#### Recommended in :

- 1) Single tooth implants with abundant bone width.
- 2) Estimating crestal bone loss over a period of time. However, it's to be noted that vertical bitewing intraoral x ray is better than IOPA in estimating crestal bone loss
- 3) To check fit of the abutment and sulcus formers.
- 4) Diagnosis of a failing implant.

#### b) Digital IOPA

The charged couple device systems use rigid sensors placed intraorally to capture the image. When radiograph is made, the remnant x ray beam exiting the patient is captured to scintillator coating a silicon chip. The resulting image flashes at the monitor in seconds of exposure and hence allows operator to make necessary adjustments if required during surgery. Advantages include better sharpness and contrast and less exposure than conventional IOPAs.<sup>6</sup>

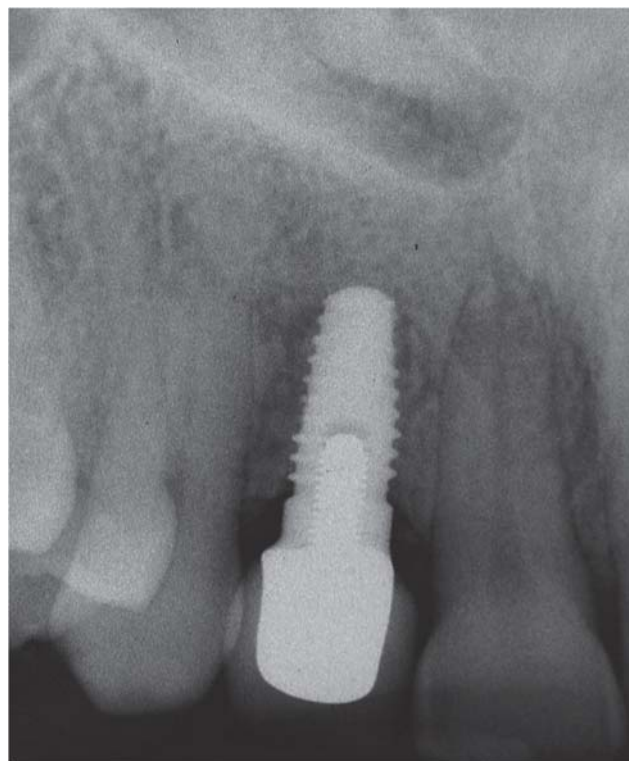


Fig 2 IOPA showing crestal bone loss

In a study comparing diagnostic potential of direct digital and conventional intraoral radiography in the evaluation of periimplant conditions, it was observed that there is no statistically significant difference between the two. However, there was a tendency of more consistent evaluation in digital radiographs. Also, the speed of delivery of view and low radiation exposure make the digital IOPA the suitable option in today's scenario.<sup>7</sup>

In a study on imaging of peri-implant bone levels of implant with buccal bone defects, it was concluded that periapical assay does not provide valid data on the circumferential bone level in implants with buccal bone defects but in general reflects the bone level on the lingual side, hence overestimating the bone anchorage of these implants.<sup>8</sup>



**c) Lateral cephalogram**

Demonstrates geometric skeletal anatomy, interarch relationship, anterior crown to implant ratio and clear view of the sinuses. However as only the median area is shown, it has got limited use in implant placement.

**d) Oblique lateral cephalogram**

In extreme mandibular atrophy it can be difficult to obtain intraoral radiographs of adequate diagnostic quality. Extraoral oblique lateral cephalometric radiographs (OLCR) can then be an alternative and also reproducible images of large parts of mandible can be obtained. *In vitro*, the results of densitometry using periapical films and OLCR were shown to be similar.

9



Fig3. Oblique lateral cephalometric radiograph

**TOMOGRAPHY**

Tomography otherwise known as body section radiography, planigraphy, laminography or stratigraphy is a process of using motion of a x ray source and film in generating images in one plane at a time

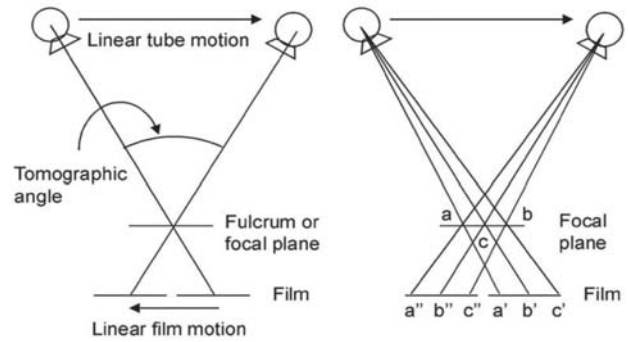


Fig4 Movement of the film and and x ray tube in linear tomography

It's basically of two types *i.e* linear and complex. Complex again can be divided into many types like circular, spiral, elliptical, figure-8, trispiral and hypocycloidal

Each of these motions has advantages regarding the way in which out of plane structures are blurred. For example, a linear structure which is aligned with the linear motion of a linear tomograph, will not appear blurred, except at the ends, whereas such a structure will be blurred by the circular motion of a circular tomograph.

**e) Pantomography**

It is a special tomography technique where panoramic roentgenograms of curved surfaces are obtained by rotating the X ray tube and film-screen holder around the patient.

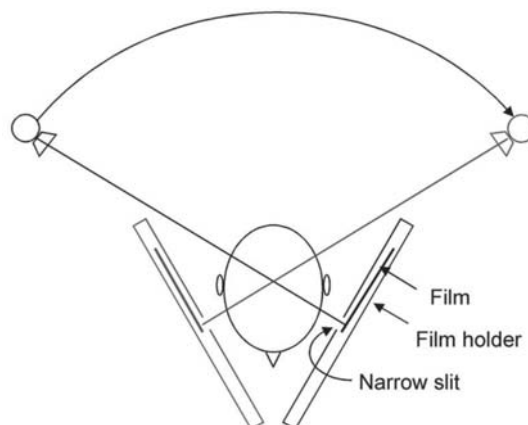


Fig5. Panoramic movement of the film and x ray tube in an OPG

It's the most widely used imaging modality but not the most diagnostic. It's considered as a screening radiograph which provides a good overall picture, but are subject to distortion and magnification. Vertical magnification is 10% while horizontal is 20% and also variable.

**Uses**

- 1) Opposing landmarks are easily identified
- 2) Vertical bone height can be assessed
- 3) Procedure performed with great ease and speed
- 4) Gross anatomy and related pathology can be assessed

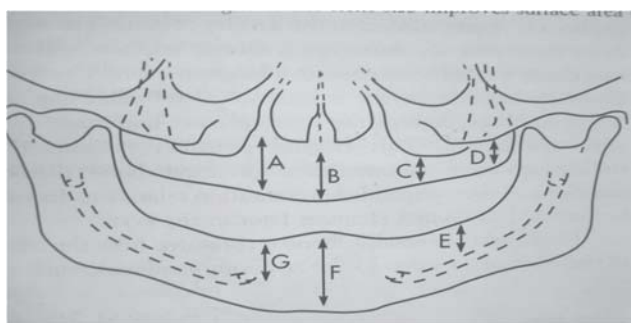


Fig6. Determination of bone height for implants in various regions.

A,B- from alveolar crest to nasal fossa in the maxillary anteriors.

C,D- from alveolar crest to maxillary sinus floor in maxillary posteriors.

E- from alveolar crest to inferior alveolar canal in mandibular posteriors.

F- from alveolar crest to lower border of the mandible in mandibular anteriors

G- from alveolar crest to mental foramen in mandibular premolar region.

**Disadvantages**

- 1) Does not demonstrate bone quality
- 2) Misleading due to magnification
- 3) Little use in depicting the spatial relation
- 4) Least useful in deciding angulation.
- 5) Overlapping in maxillary anterior region.

To reduce errors and to aid in orientation, stents are often used. These may be copies of a denture incorporating steel balls of known dimension, twists of wire or vacuum moulded splints painted with radiopaque material.

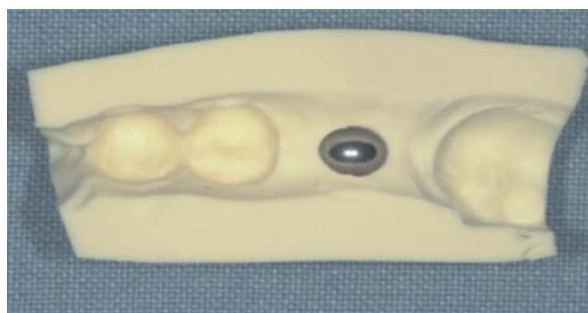


Fig7. Steel ball incorporated in the putty index<sup>10</sup>



Fig8 OPG showing steel ball <sup>10</sup>

The formula for calculating the bone height is as follows:

$$\frac{\text{Radiographic bone height}}{\text{Actual bone height}} = \frac{\text{Radiographic dimension of the metal ball}}{\text{Actual dimension of the metal ball}}$$

In a study relating to the effectiveness of an OPG in clinical placement of mandibular implants, it was found that there was no permanent sensory disturbances of the inferior alveolar nerve in any of the cases and there were only two cases of postoperative paraesthesia, representing 2/2584 (0.08%) of implants inserted in the posterior segment of the mandible or 2/1527 (0.13%) of patients. These sensory disturbances were minor, lasted for 3 and 6 weeks and resolved spontaneously.<sup>11</sup>

In a study to know the reliability of crown root ratio, linear and angular measurements on panoramic radiographs, it was observed that these parameters can be taken of the same patient at different times with consistent accuracy.<sup>12</sup>

**f) Transverse saggital section**

The cross sectional imaging in implantology is required essentially so as to visualize buccal and lingual bone morphology which is otherwise not possible in traditional imaging modalities previously discussed.

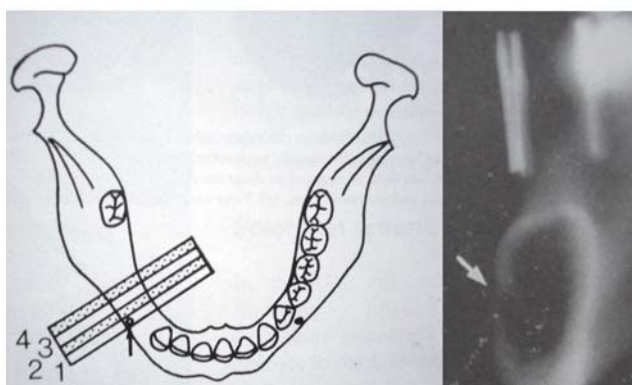


Fig.9 Transverse section of the mandible in the preferred implant placement and scan showing the visible buccal defect at no.4 position.

However, the structures are not very clear and also limited by distortion, the exact measurements can only be made after magnification correction. But with limited cost, this transverse section has gone along way in redefining clinical implantology as it gives a view of buccal and lingual walls which were never seen before.

**g) Computed tomography**

Invented by sir Hounsefield in 1972, it has revolutionized imaging in implant dentistry. It's a digital and mathematical imaging technique which reduces blurring to a great extent. In this modality axial images are produced and can view both hard and soft tissues. This treatment modality fulfills all the five objectives of implant imaging. The density of bone and soft tissues is categorized on the basis of Hounsfield units.

Density	Hounsfield units
D1	e" 1250
D2	850-1250
D3	350-850
D4	150-350
D5	<150

Fig.10 Various bone densities and their respective Hounsfield units

Major disadvantage of CT is of metal artifacts from tooth filling was overcome by use of axial plane and hence left the image of the jaw bone undistorted. Device is capable of acquiring thin slices of 1.5mm or less. Conventional spiral tomography plays an important role in pre-surgical treatment planning, increasing clinician's certainty of the need of additional surgical procedures (bone grafting, sinus lifting, and others) in pre-surgical treatment stage.<sup>13</sup>

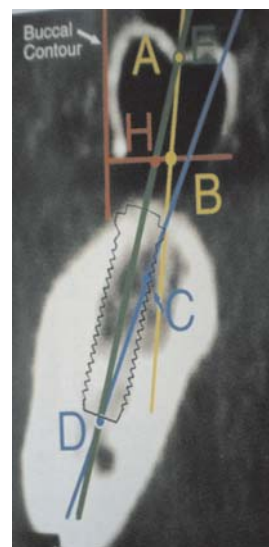


Fig11. Cross sectional axial CT image with barium coated prosthesis used as radiographic template depicting blue line as center of bone line, yellow line as center of prosthesis line and green line as implant placement line. The horizontal distance H (from point B to red buccal contour line ) denotes the buccal cantilever of the prosthesis.<sup>5</sup>

**h) Cone Beam CT**

The cone-beam technique involves a single 360° scan in which the x-ray source and a reciprocating area detector synchronously move around the patient's head, which is stabilized with a head holder.<sup>14</sup>

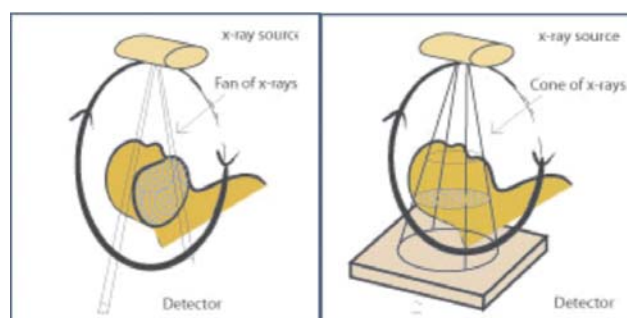


Fig. 12 Diagrammatical representation of conventional and cone beam CT.

**Advantages of CBCT over CT:**

- Rapid scan time.
- Display modes unique to maxillofacial imaging,
- Reduced image artifact
- X-ray beam limitation.
- Cost of equipment is approximately 3-5 times less than traditional conventional CT.

- The equipment is substantially lighter and smaller,
- No special electrical requirements needed,
- No floor strengthening required,
- The room does not need to be cooled,
- Little technician training is required,
- Feasible choice for Claustrophobic individuals.
- The upright position is also thought by many to provide a more realistic picture of condylar positions during a TMJ examination,
- Both jaws can be imaged at the same time (depending on the specific cone beam machine),
- Radiation dose is considerably less than with a conventional CT.

### i) Three dimensional Implant planning software

First preoperative implant planning software was developed in 1993 in Columbia under the name *Simplant*. These kind of softwares have revolutionized imaging and preoperative planning in implantology as choosing the exact length and diameter of the implant, exact site of placement and knowing the exact density of the bone have become increasingly easy. As the software provides three dimensional imaging it is even possible to do a virtual mock surgery. *Dentascan* and *Implan* are the other similar softwares available. These softwares also help us in fabrication of CT based surgical guides which are made on the precise measurements obtained by a three dimensional scan and hence precise placement of the implant. *Nobleguide* and *M guide* are two such examples.



Fig13. Implant planning software with features like virtual implant placement, color contrast for nerves

### Dosages in various imaging modalities

Full mouth IOPA	13–100 $\mu$ Sv
OPG	10 $\mu$ Sv
CT	1,320–3,324 $\mu$ Sv
CBCT	36.9–50.3 $\mu$ Sv

### Guidelines and conclusion

The conventional two dimensional imaging modalities discussed in this article may not provide an exact overall picture as computed tomography and other three dimensional implant planning softwares but are very useful, handy, economic and efficient provided magnification is corrected. These can be used in relatively simple cases and in patients having abundant bone. The advancements like multiplanar reformatted computed tomography and three dimensional imaging planning softwares are essential in cases where hard and soft tissue augmentation is needed and multiple implants are planned. Cone beam computed tomography has become a standard of care owing to its advantages of being economical, in office design and image accuracy.

### REFERENCES

1. Carl E Misch. Dental Implants Prosthetics. 2004 Mosby publishers.
2. Stephen L. Wheeler. Implant Complications in the Esthetic Zone, J Oral Maxillofac Surg 2007, 65-93-102.
3. Moy and Aghaloo. Which hard tissue augmentation techniques are the most successful in furnishing bony support for implant placement? Int J Oral Maxillofac Implants, 2007; 22 Suppl 49-70.
4. Rita Mason and Bourne. A Guide to Dental Radiographs, Oxford University Press, 1998
5. Rosenfeld M, McCall, Nevinis and Melloning, Implant therapy: clinical approaches and evidence of success, Vol 2, Quintessence publishers 1998.
6. Singh A, Shekhar A, Singh SK: Diagnostic Dental Imaging and Implant Prosthodontics. Indian Dentist Research and Review Jan 2010, 97-103
7. Morner-Svalling A-C, Tronje G, Andeson LG, Welander U. Comparison of the diagnostic potential of direct digital and conventional intraoral radiography in the evaluation of peri implant conditions. Clin Oral Impl Res, 14, 2003; 714-719.
8. Schliephake H, Wichmann M, Donnerstag F, Vogt S. Imaging of periimplant bone levels of implants with buccal bone defects. Clin Oral Impl Res, 14, 2003; 193-200.
9. Verhoeven JW, Ruijter J, Cune MS, Terlouw M. Oblique lateral cephalometric radiographs of the man-

- dible in implantology: usefulness and reproducibility of the technique in quantitative densitometric measurements of the mandible *in vivo* Clin Oral Impl Res,11, 2000, 476-486.
10. Frei C, Buser D, Dula K. Study on the necessity for cross sectional imaging of the posterior mandible for treatment planning of standard cases in implant dentistry. Clin Oral Impl Res,15, 2004;490-497.
  11. Vazquezv L, SaulaicN, Belser U, Bernard J-P. Efficacy of panoramic radiographs in the preoperative planning of posterior mandibular implants:a prospective clinical study of 1527 consequitively treated patients. Clin Oral Impl Res,19,2008;81-85.
  12. Stramotas S, Geenty JP, Darendeliler MA, Byloff F, Berger J, Petocz P. The reliability of crown root ratio, linear and angular measurementson panoramic radiographs. Clin Orthod Res. 3 2000;182-191.
  13. Diniz AF *et al* . Changes in pre surgical treatment planning using conventional spiral tomography Clin Oral Implants Res. 2008 Mar;19(3):249-53
  14. Scarfe WC, Farman AG,Sukovic P, Clinical applications of cone beam computed tomography in dental practice J Can Dent Assoc 2006; 72(1):75-80.

# Assessment of Quality Health Services Rendered by the Health Facilities to Improve the Reproductive and Child Health Under National Rural Health Mission in Uttarakhand

**Itisha Vasisht**

*MBA (Public Health Informatics) Department of National Rural Health Mission, Health and Family Welfare Society, Ministry of Uttarakhand,*

## ABSTRACT

The National Rural Health Mission (NRHM) is one of the largest global programmes for revitalizing primary health care systems in India. The thrust of the programme is on securing quality health services in remote rural areas that are accessible, affordable and accountable for safe motherhood and child survival through operationalisation of the Primary Health Centres to provide delivery and emergency obstetric and child health services on a 24X7 basis. The focus of the RCH program will be on reducing the maternal mortality ratio, the infant Mortality rate and total fertility rate. The health infrastructure has grown at decent pace however till date is urban centric, rural areas are still sidelined. Mid and high Himalayan region which are difficult to reach areas have not been able to catch up the pace. This brief research has been taken up to evaluate gaps in functioning and infrastructure of health system.

**Key words:** *Reproductive and Child health, MMR, IMR, Human Resource shortage, Quality Health services, NRHM Uttarakhand*

## INTRODUCTION

The Government of Uttarakhand is committed to improve the health status and quality of life of its people, by focusing on health issues with the objective of reducing disease burden, creating an enabling environment influencing direct and indirect health determinant such as nutrition, water, sanitation, the environment and other factors such as education and employment in the state. The state has a population of 8.5 million with average density of 159 persons per sq km which varies from as high as 612 in Haridwar and 414 in Dehradun districts to as low as 37 in Uttarkashi and 48 in Chamoli. The CHC/ Referral Hospital Network are virtually nonexistent within the state having only 55 CHC. The state has only 239 PHCs including additional PHCs. A similar situation prevails with regard to facilities at the Health Sub Centre level, where the state has 1765 Health Subcentres'. The analyses of the CHCs & PHCs throw light on the reason behind such poor key performance indicators. MMR of Uttarakhand is 440(SRS 2004-06) as compared to

India is 254 (SRS 2004-06). IMR and TFR is 44 (SRS 2008), 2.62 (NFHS2) respectively as compared to country's 53 (SRS 2008) and 2.7 (SRS 2007). According to DLHS3 (2007-08) Mothers who received 3 or more antenatal care checkups (%) are 33.8%, 62.9% of Children aged 12-23 months are fully immunized (%) and 57.7% of usage of any modern contraceptive method. Annual expenditure under NRHM is only 24.6% of total release of funds by GOI.

## OBJECTIVE

1. To assess operational status of health facilities (CHC/PHC) to meet the reproductive and Child health needs.
2. Identify gaps in operationalization, of those facilities (CHC/PHC), which do not qualify as functional facilities as per Govt. of Uttarakhand norms.
3. Verification & ensuring authenticity of the data collected from the centre.

Methodology:-

1. Demographical Analysis of Uttarakhand Health

facilities.

2. Assessment of basic Health services essential to reduce MMR, IMR and to improve RCH status at each facility level as per govt. of uttarakhand norms.
3. Self prepared Questionnaire on the basis of assessment of above norms.
4. Questionnaire being filled by the District programme manager and Block programme manager of randomly selected facilities.
5. Analyzing the Questionnaire by using SPSS - statistical software.
6. Conducting the Gap analysis - regression study of basic health services.

**Study Sample:** - Among total existing Health facilities i.e. 55 CHCs and 239 PHCs (Including APHC), only few random selections were made. Among total facilities 46 CHCs and 53 PHCs were assessed. All the BPM's and BLA's of respective block facility got interviewed and basic questionnaire was filled by them.

### SITUATION ANALYSIS

Uttarakhand has 13 districts, 49 tehsils, 95 blocks, and 16,414 villages. The population sex ratio of 964 females per 1,000 males is not only higher than both the all-India sex ratio (933) and the Uttar Pradesh sex ratio (898). The literacy rate for the population age 7 and above in Uttaranchal is 84 percent for males, 60 percent for females, and 72 percent for the total population. Mothers who had at least 3 antenatal care visits for their last birth (%) are 44.8 % to improve the status of **Reproductive Health**. Among these Mothers who consumed IFA for 90 days or more when they were pregnant with their last child (%) is 26.2 %. Mothers who received postnatal care from doctor/nurse/LHV/ANM/other health personnel within 2 days of delivery for their last birth (%) are 30.2 %. Knowledge of contraception is nearly universal: 98 percent of currently married women know at least one modern **family planning** method. Yet only 59.3 percent of married women in Uttaranchal are currently using some method of contraception. Contraceptive prevalence in Uttaranchal is considerably higher in urban areas (65.3 percent) than in rural areas (57.2 percent). Female sterilization is by far the most popular method: 32.1 percent of currently married women are sterilized. By contrast, only 1.8 percent of women report that their husbands are sterilized. Overall, sterilization accounts for 55.5 percent of total contraceptive use. Use rates for the pill (4.2 percent) and IUD (1.5 percent) remain very low, but condom use is somewhat higher (4.2 percent).

In Uttaranchal, **Child Health** includes only 60 percent of children age 12-23 months are fully vacci-

nated. One reason that only 60% of children have been fully immunized is that only 71.6 percent of children have been vaccinated against measles and only 67.1 percent have received all three doses of DPT vaccine. 80 percent received all three doses of polio vaccine. However, the effect of the Pulse Polio Immunization Campaign is quite evident. Although polio and DPT vaccinations are typically given at the same time as part of the routine immunization programme, the proportion of children receiving polio vaccinations is considerably higher than the proportion receiving DPT vaccinations due to the Pulse Polio Programme. NFHS collected information on the prevalence and treatment of three health problems that cause considerable mortality in young children, fever, acute respiratory infection (ARI), and diarrhoea. In Uttaranchal, 25 percent of children under age three were ill with fever during the two weeks preceding the survey, 17 percent were ill with ARI, and 35.4 percent had diarrhoea. Seventy-one percent of children who were ill with ARI were taken to a health facility.

### Gap Analysis

**Public Health Infrastructure** is lacking the basic minimum infrastructure needed for their optimal functioning. Uttarakhand have 3 Medical colleges, 18 District hospitals, 18 sub-district hospitals, 7 Ayurvedic hospitals, 467 Ayurvedic dispensaries, 5 Unani dispensaries and 96 homeopathic dispensaries. Similar to the situation with physical infrastructure, districts face acute shortages in **health personnel** as well. As per the data available with the state, a large number of posts of Medical Officers and frontline health workers remain vacant. Specific personnel data indicate that against the sanctioned strength of 232MOs at PHCs there are only 182 medical officers that are working in the state, leaving close to 21.5% post vacant. Only 20.57% of PHCs and 52.56% of CHCs having LMOs in uttarakhand, with the main reason is doctors avoid staying in hilly regions. According to the IPHS standards uttarakhand needs 3418 staff nurses at PHCs, CHCs, SDH, DH combined together. Currently there are only 675 staff nurses and the shortfall is 2743 or 80%. In addition 166 staff nurses are required for the medical college hospitals that have 300 beds. The overall shortfall of staff nurse in the state is 2848 (79%). In case of frontline health workers such as ANM, LHV, MHWs, staff nurses and AWW, situation is almost similar or even worse. For example, in case of ANMs, against the sanctioned posts of 1997, the state has only 1785 ANMs (i.e. a shortage of about 11%), whereas there are only 656 MHWs against the sanctioned strength of 1765 (about 62.83% posts vacant) and 159 LHVs against the sanctioned number of 239 (shortage of more than 33%). In case of Staff Nurses 195 out of 451 sanctioned

posts are vacant. A detailed analysis on the functionality of the CHC and PHCs as per the survey undertaken on the various components gives an insight on the quality of the facilities as well as the services provided. **Reproductive health** includes Institutional Delivery rate is 36% and Births assisted by doctor/nurse/LHV/ANM/other health personnel is 41.5%. Home deliveries are highest in Uttarkashi (91.8%) and lowest in Pauri Garhwal i.e. 65.9%. depicts 20-60% of facilities in district are able to conduct the lowest level of lab test i.e Hb test for identification of anaemic pregnant women. Only three districts in which all the facilities can conduct Hb tests. – Haridwar, Uttarkashi and Dehradun. Only 52.55% of PHCs and 68.71% of CHCs can conduct haemoglobin test at their health facilities. Hypertension of pregnant women should be checked during ANC checkups. However in Uttarakhand it's not a regular practice at few facilities. As 20% of facilities in chamoli district which belong from the interiors of the hills, able to provide hypertension check services. For the remaining districts, this facility ranges from 70-90%. 60% of facilities are able to perform C-section in champawat district with the lowest percentage of facilities conduct C-section is Haridwar district i.e. 10%. Lack of availability of skilled staff at these institutions is the one of the important reason for non-functionality of these institutions, particularly in terms of **Emergency Obstetric care services**. Only 25.64% of CHCs and 6.04% of PHCs can manage complications during delivery. 60 percent of children age 12-23 months are fully vaccinated, 83 percent have received some but not all of the recommended vaccinations to improve the **Child health**. On an exceptional of Hb test only 55% of PHCs and 70.8% of CHCs can able to conduct malaria **laboratory test**. 5.3%, 20.4% of PHCs and 32.8%, 44% of CHCs can conduct VDRL and Widal test respectively. The major reasons for unavailability of laboratory test in all the health facilities are 36.7% of facilities don not have appointed lab technician, reagent kit is not available at 30% of facilities and scarcity of equipments in 22.45 of facilities. . The standards for **AYUSH** component in the primary health network are being finalized for facilitating uniformity in implementing the mainstreaming of AYUSH. 60-85% of facilities have AYUH wing functioning with services are provided there. Pithoragarh district have the 100% functioning of AYUSH wing in their health facilities.

## CONCLUSION

Facility-based information tells us what is actually happening at the level of service delivery (input, process, costs, output, and quality). Availability of services is quite poor at PHCs and CHCs especially in Upper and Middle Himalayas regions due to the worse condition of Human resource.

## REFERENCES

1. M Jain , D Nandan, S K Mishra: Qualitative Assessment of Health Seeking Behaviour and Perceptions Regarding Quality of Health Care Services among Rural Community of District Agra. *Indian Journal of Community Medicine Vol. 31, No. 3, July - September, 2006.*
2. V.M Nair, K.R Thankappan, R.S Vasan, P.S Sarma : Community utilization of subcentres in primary Health care - an analysis of determinant in Kerala. *Indian Journal of public Health Vol.XXXXVIII No. 1 Jan. - Mar., 2004.*
3. A.B. Biswas, S. Nandy, R.N. Sinha, D.K. Das, R.N. Roy, S. Dutta: Status of maternal and newborn care at first referral units in the state of West Bengal. *Indian Journal of public Health Vol.XXXXVIII No. 1 Jan. - Mar., 2004*
4. Elshabrawy AM: A Study of Patient Satisfaction as an Evaluation Parameter for Utilization of Primary Health Care Services. *Journal of Social Health. 1992; 112:64-7.*
5. Ann Taket, Leroy White : Assessment of health service systems: a case study of metamodelling to explore options for future health service provision. *International Journal of Services Technology and Management 2000 - Vol. 1, No.4 pp. 320-331*
6. Population Health & Health System Analysis, Winnipeg Regional Health Authority. *Community Health Assessment Report 2004. Volume II – Population Health Profiles, Children & Youth. 2004.*
7. Mehmet Tolga Taner, Bülent Sezen, Jiju Antony: An overview of six sigma applications in healthcare industry. *International Journal of Health Care Quality Assurance*
8. Nancy L. Keating and John Z. Ayanian : Challenges and opportunities for primary care evaluation. *International Journal of Health Care Quality Assurance*
9. Birley, M.H. (1995) The health impact assessment of development projects. HMSO, London. Bos, R.,
10. Rapid Assessment of functionality of FRUs and 24X7 PHCs, in Rajasthan



# Effect of Two Tongue Cleaning Methods on Oral Mutans Streptococci Level

Jayachandra. M.G<sup>1</sup>, Anil.V.Ankola<sup>2</sup>, Karibasappa.G.N.<sup>3</sup> Vijayanath.V.<sup>4</sup>

<sup>1</sup>Assistant Professor, Department of Preventive and community dentistry, Bapuji dental college and Hospital, Davangere-577004 <sup>2</sup>Professor and head, Department of Preventive and community dentistry. K.L.E.S's Institute of dental sciences, Nehru Nagar, Belgaum. <sup>3</sup>Reader, Department of Preventive and community dentistry, Bapuji dental college and Hospital, Davangere-577004. <sup>4</sup>Associate Professor, Department of Forensic Medicine & Toxicology, S.S.Institute of Medical Sciences & Research centre, Davangere-577005 Karnataka ( India)

## ABSTRACT

**Background:** Tongue scraping and brushing have been appreciated for hundreds of years but are still appreciated or used by the public. Scientific evidence has validated the need to practice habitual and tongue cleaning as part of daily home oral hygiene procedures. Objective: To assess and compare the effect of tongue scraping and tongue brushing on oral *Mutans streptococci* level. Methods: 20 healthy subjects aged 14 to 15 years were randomly selected. Flat plastic tongue scraper and Nylon multitufted small headed tooth brush are the two tongue cleaning devise used. Unstimulated salivary samples were obtained at 4 intervals from each individual. Salivary samples were inoculated on Mitis Salivary Agar Plate and Sorbital Broth was used for identification of

**Mutans streptococci group. Results:** Paired and unpaired 't' test were employed. Reduction in the *Mutans streptococci level* from  $48.4 \times 10^4$  CFU and  $38.3 \times 10^4$  CFU at baseline in tongue scraping and tongue brushing group respectively to  $0.34 \times 10^4$  and  $0.39 \times 10^4$  CFU after 7<sup>th</sup> day. Conclusion: Both tongue coating removal methods evaluated were efficient in reducing *Mutans streptococci* level. This implies that physical removal of the coating on the dorsum of the tongue is important and not the method used for the same.

**Key words:** Tongue scraping, Tongue brushing, Tongue cleaning, *Mutans streptococci*.

## INTRODUCTION

The most common concept concerning individual health is the harmony of one's physical, mental, and social well being. The simple absence of disease is not accepted as an indication of health. Tongue cleaning being an ancient habit, is practiced for centuries in many Eastern and Oriental cultures, though not very popular in the Western Civilizations<sup>1</sup>.

Recent literature has shown that tongue cleaning leads to healthy oral Environment<sup>2</sup>. Tongue is a small but powerful organ of the body since it performs the function of - Taste, speech, mastication and deglutition. Hence the need for tongue cleaning has become a part of daily oral hygiene. Gilmore and Bhaskar presented convincing evidence that plaque forming streptococci counts increased ten folds after a week of not brushing the tongue<sup>2</sup>.

## TONGUE CARE IN ANTIQUITY

Although largely an unknown practice in the west, tongue brushing and scraping have been used since antiquity and are still used by natives of Africa, Arabia and India. In the early civilizations, oral cleansing often had religious ritual significance. The Hindus regarded 'mouth as the gateway of the body, therefore it was necessary to keep it scrupulously clean'. The ancient Hindus used tongue scrapers with sharp curved edges made of Gold, Silver, Ivory or Tin<sup>1</sup>.

The Mohammedans used Siwak wood brush once a day in a manner specified in the Koran. Prophet Mohammed said 'You shall clean your tongue for that is the way to praise God' and in Mohammedans the final stage of oral cleansing involved vigorous tongue brushing.<sup>1</sup>

From 15<sup>th</sup>-19<sup>th</sup> century, tongue cleaning was known

to be practiced primarily by the affluent leisure class. More recently, during the 20th century, tongue cleaning was not a popular concept, and only a few references are mentioned in the literature<sup>3</sup>.

### WHY CLEAN THE TONGUE

Tongue, because of its surface texture contributes significantly in plaque formation and accumulation, has remained a neglected part in the oral cavity<sup>4</sup>.

The dorsal posterior part of most tongues has a coating of millions of microorganisms. Studies have shown that Dorsum of the tongue is an important reservoir for *Mutans streptococci*<sup>5</sup>.

Further more, studies have also found a significant correlation between the prevalence of *Mutans streptococci* in saliva and its prevalence on the dorsum of the tongue<sup>5</sup>.

*Mutans streptococci* (MS) are one of the most virulent cariogenic pathogens in the oral cavity. Tooth brushing alone is effective in reducing bacterial counts in the mouth, but not dramatically. Tongue cleaning seems to have a more dramatic effect on the salivary levels of caries-causing bacteria, Such as *Mutans streptococci*<sup>5</sup>. With tongue scraping becoming established as an excellent tool for reducing the levels of *Mutans streptococci* in the oral cavity, it would be of great interest to compare the efficacy to tongue brushing method for decreasing the bacterial count in the oral cavity.

In this regard the effect of mechanical oral hygiene techniques on the levels of microorganisms, especially *Mutans streptococci*, is of great interest to dentists focused preventive care.

### OBJECTIVES OF THE STUDY

1. To assess the effect of tongue scraping and tongue brushing on oral *Mutans streptococci* level.
2. To compare the two methods of tongue cleaning on the reduction of oral *Mutans streptococci* level.

### MATERIAL AND METHODS

**Study design:** Double blinded Randomized Controlled trial

**Study population:** 20 healthy subjects with similar food habits aged 14-15 years were selected and randomly distributed into two groups:

Group A-10 subjects, Group B-10 subjects.

Following tongue cleaning devices had been selected.

- Flat plastic tongue scraper - group A subjects.
- Nylon multitufted small headed toothbrush - group B subjects.

### Inclusion criteria

- Subjects with permanent dentition were included.
- All levels of Oral hygiene and dental caries were accepted those who had either rampant tooth decay or very poor oral hygiene were also included in this study this was important to see if the protocol was effective for all ranges of oral hygiene or not.

### Exclusion criteria

- Subjects suffering from Tonsillitis
- Subjects with any contributing medical history
- Subjects who have performed any type of tongue cleaning habits.

### Method of collection of salivary samples

Unstimulated salivary samples were collected in the test tube by spitting method from all subjects prior to start of the experiment to establish base line *Mutans streptococci* level, after routine tooth brushing.

Demonstration to perform tongue scraping and tongue brushing was given to both the groups by a single examiner. Subjects were told to clean the tongue every morning after routine tooth brushing for 7 days.

Group A, involving 10 subjects, were given a tongue scraper and asked to scrape the dorsum of the tongue along the linea mediana and at each lateral part of the tongue once every morning after routine tooth brushing, every day for 7 days. Group B, consisted of 10 subjects were asked to brush the tongue with forward and backward strokes along the linea mediana and at each lateral borders of the tongue once every morning after routine tooth brushing, every day for 7 days.

Upon scraping or brushing the tongue, the patients were asked to spit out the excess saliva that had accumulated on the tongue. Then unstimulated salivary samples were obtained at 1 hour, 3<sup>rd</sup> day, and 7<sup>th</sup> day after the start of the experiment. A total of 4 samples were collected from each individual. During the entire study participants continued their habitual oral hygiene and were instructed not to take any antibiotics without prior information.

One ml of salivary samples were collected in the test tube and transported through Thyroglycolate broth media. 10 micro liters of saliva from each sample was inoculated on *Mitis Salivary Agar* Plate and Incubation was done at 37°C in 5-10% carbon dioxide for 48hrs. Sorbital broth was used for identification of *Mutans streptococci* group.

### Ethical Clearance and informed consent

Before starting the study, ethical clearance was

obtained from ethical review committee board of K.L.E's Institute of dental science, Belgaum, Karnataka state India. Oral consent was obtained from all the children and written informed consent was obtained from the parents.

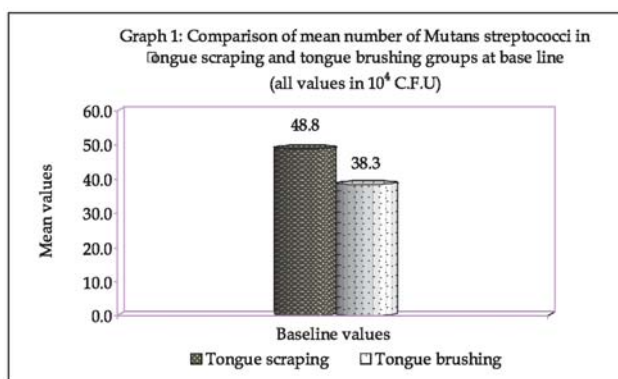
### Statistical analysis

Statistical test employed for the obtained data in our study were Paired and unpaired 't' tests. There were 20 participants in this research study. Paired 't' test was used to compare within the group at different intervals and unpaired 't' test was used to compare between the two groups.

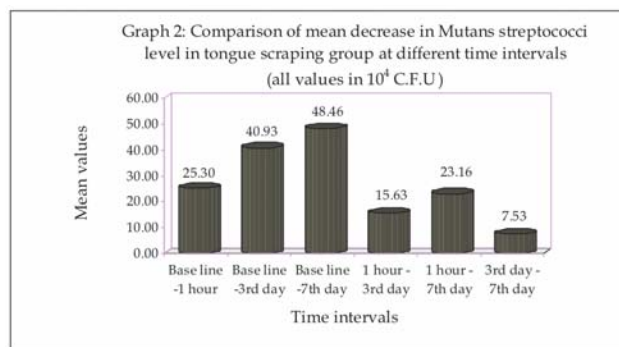
## RESULTS

Reduction in the *Mutans streptococci* level from  $48.4 \times 10^4$  colony forming units (C.F.U) and  $38.3 \times 10^4$  C.F.U at baseline in tongue scraping and tongue brushing group respectively to  $0.34 \times 10^4$  and  $0.39 \times 10^4$  C.F.U after 7<sup>th</sup> day ( $p < 0.01$ ).

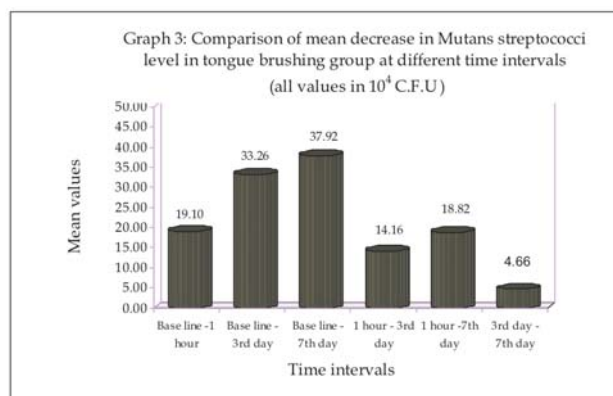
Graph I show the comparisons of mean number of *Mutans streptococci* in tongue scraping and tongue brushing groups at baseline. Mean number of *Mutans streptococci* in tongue scraping group was  $48.8 \times 10^4$  and in tongue brushing group it was  $38.3 \times 10^4$  colonies forming units. The results demonstrate that there were no significant differences between group means at base line. This simply states that the groups were statistically equivalent before the start of the treatment. Base line measurements were compared to ascertain if there were any differences among the groups before the start of the treatment.



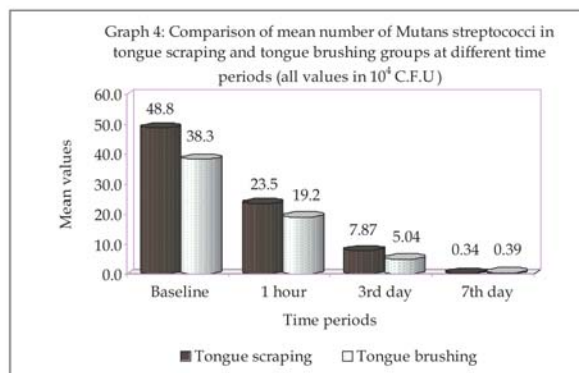
Graph II shows the mean decrease in *Mutans streptococci* level in tongue scraping group at different time intervals. When baseline value was compared with 1 hour, third day and seventh day value ( $p < 0.01$ ) and 1 hour value with 7<sup>th</sup> day value statistically highly significant difference was found. But when 1 hour value was compared with 3<sup>rd</sup> day value and 3<sup>rd</sup> day value with 7<sup>th</sup> day value no significant difference was found.



Graph III shows the mean decrease in *Mutans streptococci* level in tongue brushing group at different time intervals. When baseline value was compared with 1 hour, third day and seventh day value ( $p < 0.01$ ) and 1 hour value with 3<sup>rd</sup> day and 7<sup>th</sup> day value statistically highly significant difference was found. Only when 3<sup>rd</sup> day value was compared with 7<sup>th</sup> day value no significant difference was found.



Graph IV shows the gradual reduction of microorganisms from baseline to one hour, 3<sup>rd</sup> day and 7<sup>th</sup> day ( $p < 0.01$ ) but when it was compared between the groups at the final stage (after 7<sup>th</sup> day) no significant difference was found.



## DISCUSSION

The data obtained from this research project showed very clear trends and highly significant results. In the present study, there was a gradual reduction in the *Mutans streptococci* count from base line to 7<sup>th</sup> day after tongue scraping which is in close agreement with the study conducted by Almas.et.al<sup>2</sup>, White GE.et.al<sup>5</sup> and Bordas A.et.al<sup>7</sup>. Since this method is performed every day there will be a gradual reduction of microorganisms from the tongue coating. Hence by 7<sup>th</sup> day the count reduced significantly. Bordas A.et.al<sup>7</sup> reported that while mechanical tongue cleaning with or without chemical intervention can reduce bacterial load on the tongue, this effect is transient, and regular tongue cleaning is required to provide a long lasting (overnight) reduction in bacterial numbers. Nevertheless, tongue cleaning is an oral hygiene procedure that is little practiced due to discomfort and/or lack of awareness on the part of dental professionals and their patients.

In a study conducted by Quirynen.M.et.al<sup>6</sup> no significant reduction in bacterial load was found when using toothbrush or scraper to clean the tongue. This may be because of different methods employed in collection of microbial sample from the tongue and analysis of non specific bacteria, where as in the present study, only *Mutans streptococci* level has been evaluated and saliva samples were collected by spitting method.

Hence this study is unique, being the first to compare two different methods of tongue cleaning and evaluating its effects on the reduction of specific microorganisms. Thus the clinical significance of this study should not be overlooked as research has proved the need to include the tongue in all oral hygiene measures. Thorough preventive measures need to include an effective means of reducing the pool of *Mutans streptococci* inhabiting the dorsum of the tongue if one is to truly expect a striking reduction in caries.

## CONCLUSION

In summary, both tongue coating removal methods evaluated were efficient in reducing *Mutans streptococci* level. This implies that physical removal of the coating on the dorsum of the tongue is important and not the method used for the same. On the basis of literature there appears to be enough data to justify the necessity to clean the tongue on a regular basis and as part of daily home oral hygiene practice.

Tongue cleaning is simple, fast and the benefits for most people far out weigh the small investment and time required to accomplishing this procedure. Therefore oral hygiene measures should include the dorsum of the tongue, especially in high-risk patients, who have endogenously high levels of *Mutans streptococci* residing in the oral cavity.

## BIBLIOGRAPHY

1. Christen AG, Swanson BZ. Oral hygiene: a history of tongue scraping and brushing. J Am Dent Assoc Feb 1978;96:215-19
2. Almas K, Al-Sanawi E, Al-Shahrani B. The effect of tongue scraper on mutans streptococci and lactobacilli in patients with caries and periodontal disease. Odontostomatol Trop Mar 2005;28(109):5-10.
3. Gordon. J. Christensen. Why clean your tongue? J Am Dent Assoc. Nov 1998;129(11):1605-7.
4. Gulati MS, Gupta L. Clinical evaluation of supplementing tongue brushing to most advocated regime of tooth brushing. J Indian Soc Pedod Prev Dent. 1998 Mar;16:12-6.
5. White GE, Armaleh MT. Tongue scraping as a means of reducing oral mutans Streptococci. J Clin Pediatr Dent. Winter 2004;28(2):163-6.
6. Quirynen M, Avontrodt P, Soers C, Zhao H, Pauwels M, Steenberghe D. Impact of tongue cleansers on microbial load and taste. J Clin Periodontol Jul 2004;31(7):506-10.
7. Bordas A, McNab R, Staples AM, Bowman J, Kanapka J, Bosma MP. Impact of different tongue cleaning methods on the bacterial load of the tongue dorsum. Arch Oral Biol. 2008 Apr;53 Suppl 1:S13-8.

# School Teachers as Facilitators in Imparting Knowledge on Road Safety Measures to School Children

Jayakumary Muttappillymyalil<sup>1</sup>, Jayadevan Sreedharan<sup>2</sup>, Bino Divakaran<sup>3</sup>, Jeesha C Haran<sup>4</sup>

<sup>1</sup>Research Associate & Associate Professor, Research Division, Gulf Medical University, Ajman, UAE, <sup>2</sup>Assistant Director & Associate Professor, Research Division, Gulf Medical University, Ajman, UAE, <sup>3</sup>Sr. Lecturer (Biostatistics), Dept. of Community Medicine, Academy of Medical Sciences, Pariyaram Medical College P O Kannur, Kerala, India <sup>4</sup>Professor, Dept. of Community Medicine, Sree Gokulum Medical College and Research Foundation, Venjarumoodu, Trivandrum, Kerala, India

## ABSTRACT

**Background:** Among children road traffic accidents is a major public health issue in many countries. The health habits developed during school age will pass on the succeeding phases of life. School teachers are excellent resources to impart knowledge on road safety measures to children.

**Methods:** This cross sectional study was carried out to assess the scope and extent to which school teachers are participating in providing knowledge on road safety measures to school children and to determine the potential barriers that hinder their participation in providing knowledge on road safety measures to school children. A pilot tested structured close ended self-administered questionnaire was distributed among teachers who were willing to take part in the study by signing an informed consent form.

**Results:** Among 127 female participants, 90 (70.9%) teachers were willing to take part in health related activities and among 73 male teachers it was found to be 62 (84.9%). Among the participants, 76% of the teachers were willing to impart knowledge on road safety measures to school children. The association ( $p < 0.05$ ) between willingness to impart knowledge on road safety measures and years of teaching experience was statistically significant. Potential barriers in providing knowledge on road safety measures were lack of time and busy teaching schedule.

**Conclusion:** Teachers can play a pivotal role in providing road safety measures to school children because of their proximity to school children. There is a need to explore the possibilities of including road safety measures to be followed by school children through school curricula.

**Key words:** Knowledge, Facilitator, Road safety, School teachers, Children

## INTRODUCTION

Health habits created in childhood, especially the school going age, pass on to the succeeding phases of life and even to the next generation. Health promoting schools are a successful mode of promoting the health of children internationally.<sup>(1)</sup> Road traffic accidents are a major public health issue throughout the world. Globally, people killed in road traffic accidents each year is estimated to be nearly 1.2 million, whereas the number injured could be far above 50 million. By 2020, the deaths are expected to increase by as much as 80% in low and middle income countries. Majority of such

deaths currently occur among the vulnerable road users - pedestrians, pedal cyclists and motor cyclists. According to the WHO global burden of disease project (2002), road traffic injuries account for the leading cause of deaths among the age group of 0-4 years.<sup>(2)</sup>

Child trauma is a major world wide problem. Children are especially vulnerable as their physical and cognitive skills are not fully developed and their smaller stature makes it hard for the rider to see and to be seen.<sup>(2)</sup> Road traffic accident is a leading cause of injury and trauma to children. In low income and middle income countries, child deaths and injuries are

rising as the number of vehicles increases. According to WHO estimates (2002), 1,80,500 children were killed as the result of road crashes. 97% of these child road deaths occurred in low and middle income countries.<sup>(2)</sup>

Global burden of disease by WHO reported that fatal road-traffic injury rates per 1,00,000 among boys in the age group of 5- 9 is 13.3 and 10-14 years is 8.7. Among girls it is 9.3 and 4.5 respectively.<sup>(3)</sup> A report from UNICEF showing the annual number of deaths from injuries among 1 to 14 year old children during 1991-95, expressed ranges from 5.1 to 25.6 per 1,00,000 children. The annual deaths among children aged 1 to 14 years, caused by transport accidents during 1991-95 ranged from 2.5 per 100,000 in Sweden to 12.6 per 100,000 in Korea.<sup>(4)</sup> Data on road accident deaths in India (1980-2007) shows a steady increase over years.<sup>(5)</sup> A retrospective study by Bener et al at among children in the age group of 0-14 years in United Arab Emirates observed that during the period 1980 – 1995, 301 children died due to accidents. Among these children about 70% were males and the most common cause of accidental death was road traffic accident. The most common cause of trauma in 5-9 years old was road traffic accident. Almost 33% of trauma in 10-14 years old was also due to road traffic accident. They concluded that road traffic accidents mainly occurred in children over 10 years.<sup>(6)</sup>

Irrespective of the schools, teachers provide the means and conducive environment for students to become responsible adults.<sup>(6)</sup> Teachers carry out a variety of responsibilities in a comprehensive manner. At the elementary level, teachers commonly conduct health instruction on a variety of topics, which includes growth and development, nutrition, injury prevention and safety etc. At all schooling levels, teachers can be motivated and encouraged to amalgamate health topics with academic areas to boost learning in both areas. Teachers help the students to develop skills, habit and attitudes which they will maintain life long. Teachers also take part in promoting scholarly and social development of children in their influential years.<sup>(7)</sup>

In keeping with this concept, the investigators planned to conduct a study among school teachers to explore the scope and extent to which teachers are participating in providing knowledge on road safety measures to school children and to find the factors that hinder their participation in providing knowledge on road safety measures to school children.

## METHODS

This school based cross sectional study was carried out in the northern part of Kerala, India. Kerala has 3.44% of India's population, and 819 persons per square

kilometer (three times as densely settled as the rest of India). However, Kerala's population growth rate is far lower than the national average. As per 2001 census, Kerala has a population of 3,18,41,374. Kerala's people are most densely settled in the coastal region, leaving the eastern hills and mountains comparatively sparsely populated. Northern part of Kerala includes the northern half of the state of Kerala and some coastal regions. The religion wise distribution of this area shows Hindu predominance, but the majority of Kerala's Muslim population also lives in this area, as well as a sizable ancient Christian population.<sup>(8)</sup> The districts in northern Kerala included were Kasaragod, Kannur, Kozhikode, Wayanad and Malappuram.<sup>(9)</sup> Primary Education in Kerala consists of two levels, lower primary (Grade I - IV) and Upper Primary (Grade V to VII). There are around 6,726 lower primary and 2,968 upper primary schools. Among primary schools, 61.07% are private aided (partially supported by Government), 2.98% are private unaided and 35.95% are government schools. A total of 2,580 secondary schools (Grade VIII to X) are functioning in Kerala. These include 975 (37.67%) Government schools, 1,400 (54.1%) private aided schools and 213 (8.23%) private unaided schools. There are 931 higher secondary schools (Grade XI to XII) of which 417 are in government sector, 506 in private aided sector and 8 in private unaided sector.<sup>(10)</sup>

A total of ten schools were randomly selected from the list of schools in Kannur district, Kerala, India. Teachers who were willing to participate in the study by giving a verbal informed consent were recruited for the study. A total of 200 hundred teachers participated in the study. The data collection was completed over a period of four months. A self-administered pre tested structured closed ended questionnaire was used for data collection. The questionnaire was designed to collect information on socio demographic characteristics which included variables like age, gender, education, religion, marital status, years of teaching experience, distance traveled every day to reach school and the mode of conveyance used to reach school. Participation in health related activities, opinion towards providing road safety measures to be followed by school children, practice of road safety measures by teachers were collected in detail. The researchers distributed the instrument to the participants and the purpose of the study was explained to the teachers and the completed questionnaire was collected on the same day. Anonymity was maintained by asking them not to write their names in the survey instrument. Statistical analysis was performed using PASW 17 software. Tests were considered significant when the two-sided p value was less than 0.05.

References and further reading may be available for this article. To view references and further reading you must purchase this article.

## RESULTS

Socio-demographic characteristics of the respondents Majority of the respondents 145 (72.5%) were in the age group of 30-49 years. 14% in the age group of 20-29 years and 13.5% were 50 and above the age of 50 years. The mean age of the participant was  $39.05 \pm 8.03$  years. Minimum age observed was 22 years and maximum 54 years.

Males constituted 36.5% and females 63.5% of all the teachers. Maximum number of male (71.2%) and female (73.2%) participants were in the age group of 30 to 49 years. Only 8% of females and 6% of males belonged to the age group 20 -29 years, whereas 9% of females and 4.5% of males were in the age group of 50 years and above. With regard to the educational attainment of the participants, 24% were under graduate, 44.5% were graduates and 31.5% were post graduates. Among the 200 participants, 81% were married and the remaining were single. 71.5% of the participants were Hindus, whereas Christians and Muslims were 26% and 2.5% respectively. More than one fourth (31.5%) of the participants were having a teaching experience of less than five years. Among the participants, 18% had 5-9 years and 20-24 years of teaching experience respectively. Regarding the mode of conveyance used by the respondents to reach school, 61% travel by bus and 24.5% were walking. More than 50% of the respondents were teaching in high school. The Socio-demographic details are given in Table-1.

**Table-I Socio-demographic Characteristics of the respondents**

Variable	Group	No.	%
Gender	Male	73	36.5
	Female	127	63.5
Age group(in years)	20-29	28	14.0
	30-39	73	36.5
	40-49	72	36.0
	50 and above	27	13.5
Educational attainment	Below graduate	48	24.0
	Graduate	89	44.5
	Above graduate	63	31.5
Marital status	Married	162	81.0
	Unmarried	38	19.0
Distance traveled to reach school	Less than 20 kilometers	153	76.5
	More than 20 kilometers	47	23.5
Mode of Conveyance used to commute	Walk	49	24.5
	Bus	133	66.5
	Bike	18	9.0

## Extent of participation of teachers in health related activities

In addition to teaching, 71 (35.5%) respondents had participated in health related events and training programs. 47% of the respondents took part in health related awareness programs, among them 37.5% were participants and 8.5% were organizers. Among the 200 respondents in the study, 149 (74.5%) had a positive attitude towards taking part in any health related events or programs. 54 (27%) respondents participated in imparting knowledge on road safety measures to school children.

## Willingness to impart knowledge about Road Safety measures to school children

Of the total, 152 (76%) of the respondents were willing to impart knowledge on road safety measures to school children. Among participants, 71.4% between 20-29 years, 76.7% between 30-39 years, 73.6% in the age group of 50 years and above expressed their willingness to impart knowledge about road safety measures to school children. No significant statistical association was found for age and willingness to impart knowledge on road safety measures to school children.

Of the total (73) male participants, 84.9% willing to impart knowledge on road safety measures to school children. However, among female participants 70.9% willing to take part in creating awareness on road safety measures to school children. A statistically significant association was observed between gender and willingness to impart knowledge on road safety measures to school children ( $p < 0.02$ ). Among 162 participants who were married, 122 (75.3%) willing to impart knowledge on road safety measures to school children and among 38 unmarried, 78.9% were willing to take part in creating awareness on road safety measures to school children. No significant association was observed for marital status and willingness to impart knowledge on road safety measures to school children. With regard to educational attainment of participants and their enthusiasm to impart knowledge on road safety measures to school children, 70.8% of under graduates, 78.7% of graduates and 76.2% of post graduates were willing to provide education on road safety measures to school children. The association between education and willingness to take part in imparting knowledge on road safety measures was not statistically significant. Of the participants who commute more than or equal to 20 kilometers daily to reach school, 33 (70.2%) were willing to take part in creating awareness on road safety measures to school children. Among 153 participants who commute less than 20 kilometers daily, 119 (77.8%) expressed their willingness to impart knowledge on road safety measures to school children. No statistically significant association was observed for

distance commuted daily and willingness to impart knowledge on road safety measures. The details are given in Table-2.

**Table-II Comparison on Socio-Demographic characteristics and willing to impart knowledge on Road safety measures to school children**

Variable	Willing to impart knowledge on Road safety measures		p value	
	Yes Number (%)	No Number (%)		
Gender	Male	62 (84.9)	11(15.1)	NS
	Female	90 (70.9)	37 (29.1)	
Age group(in years)	20-29	20 (71.4)	8 (28.6)	NS
	30-39	56 (76.7)	17 (23.3)	
	40-49	53 (73.6)	19 (26.4)	
	50 and above	23 (85.2)	4 (14.8)	
Educational attainment	Below graduate	34 (70.8)	14 (29.2)	NS
	Graduate	70 (78.7)	19 (21.3)	
	Above graduate	48 (76.2)	15 (23.8)	
Marital status	Married	122 (75.3)	40 (24.7)	NS
	Unmarried	30 (78.9)	8 (21.1)	
Distance traveled to reach school	Less than 20 kilometers	119 (77.8)	34 (22.2)	NS
	More than 20 kilometers	33 (70.2)	14 (29.8)	
Mode of Conveyance used to commute	Walk	40 (81.6)	9 (18.4)	NS
	Bus	98 (73.7)	35 (26.3)	
	Bike	14 (77.8)	4 (22.2)	

Willingness to impart knowledge on road safety measures to children and their previous experience in health related activities, showed a statistically significant association ( $p < 0.001$ ). Of the 97 teachers who had previous experience in participation in health related activities, 86 (88.7%) were willing to impart knowledge on road safety measures to school children and among those without previous experience in health related activities, 66 (64.1%) were willing to participate in creating awareness on road safety measures to school children. Of the participants, 35 had their own vehicle and among them 31 (88.6%) were willing to impart knowledge on road safety measures. However, 165 participants did not have any personal vehicle and among them 121 (73.3%) expressed their willingness in providing road safety measures to school children. The association was found to be statistically significant ( $p < 0.05$ ). Half of the participants opined that they follow traffic/road safety measures and among them 80% expressed their enthusiasm in providing knowledge on road safety measures to school children com-

pared to those who do not follow traffic/road safety measures. The association was not statistically significant. Among 44 participants who had experienced road traffic accident in their life time, 81.8% expressed their willingness in teaching school children about road safety measures than those who did not experience road traffic accident in their life time. The association was not statistically significant. Of the total participants, 26 opined that helmet is not required as a part of road safety measures and among them 57.7% were willing to impart knowledge on road safety measures to school children. The association was not statistically significant. In the present study, 55 participants opined that the seat belt is not necessary while driving and among them 56.4% expressed their interest in imparting knowledge on road safety measures to school children. 145 participants felt that seat belt is necessary and among them 83.4% were willing to take part in creating awareness on road safety measures to school children. A statistically significant association was observed between attitude towards seat belt use and willingness to impart knowledge on road safety measures to school children ( $p < 0.001$ ). Those with positive attitude regarding seat belt use had higher chance of imparting knowledge compared to those with negative attitude. It was observed that 54 participants had previous experience in creating awareness on road safety measures to school children and among them 90.7% expressed their willingness to impart knowledge on road safety measures to school children compared to 70.5% of those without any previous experience in imparting road safety measures to school children. The association was found to be statistically significant for previous experience in imparting knowledge on road safety measures to school children and willingness to impart knowledge on road safety to school children ( $p < 0.003$ ). A statistically significant association was observed between opinion of teachers about the need for imparting knowledge on road safety measures to school children and willingness in providing knowledge on road safety measures to school children ( $p < 0.001$ ). 185 participants opined that there is a need in creating awareness on road safety measures to school children and among them 147 (79.5%) expressed their willingness in providing knowledge on road safety measures to school children. 15 participants had the opinion that education about road safety measures is not needed in schools. However, among them 5 (33.3%) were willing to impart knowledge on road safety measures to school children. The details are given in Table-3



**Table-III Comparison on different factors and willingness to impart knowledge on Road safety measures to school children**

Questions	Variables	Willing to impart knowledge on Road safety measures		p value
		Yes Number (%)	NoNumber (%)	
Have you participated in health related activities	Yes	86 (88.7)	11(11.3)	< 0.001
	No	66 (64.1)	37 (35.9)	
Do you have own vehicle	Yes	31 (88.6)	4 (11.4)	< 0.05
	No	121 (73.3)	44 (26.7)	
Do you obey road safety measures	Yes	80 (80.0)	20 (20.0)	NS
	No	72 (72.0)	28 (28.0)	
Have you ever met with road traffic accident	Yes	36 (81.8)	8 (18.2)	NS
	No	116 (74.4)	40 (25.6)	
Opinion on helmet use	Necessary	137 (78.7)	37 (21.3)	NS
	Not necessary	15 (57.7)	11 (42.3)	
Opinion on seat belt use	Necessary	121 (83.4)	24 (16.6)	<0.001
	Not necessary	31 (56.4)	24 (43.6)	
Do you have previous experience in providing knowledge on road safety measures to school children	Yes	49 (90.7)	5 (9.3)	< 0.003
	No	103 (70.5)	43 (29.5)	
Is there any need to impart knowledge about road safety measures to school children	Yes	147 (79.5)	38 (20.5)	< 0.001
	No	5 (33.3)	10 (66.7)	

**Potential barriers in imparting knowledge on road safety measures to school children**

Of those who were not willing to impart knowledge, lack of time and busy teaching schedule in the school keeps them away from activities other than teaching.

**DISCUSSION**

Teachers by advantage of their closeness to children and a trained person, must have a prominent role in propagating awareness on health related issues. Therefore teachers can be used as a resource person to develop and improve the health care at the grass root level.<sup>(11)</sup>

A study conducted in Zimbabwe included secondary school teachers and headmasters for eliciting their opinion on implementation of AIDS prevention education programs in the school setting. 95.2% supported implementing AIDS prevention programs in the school setting.<sup>(12)</sup> Another study in South Africa to investigate the knowledge of grade 3 and 4 school teachers on HIV/AIDS and their opinion on educating their pupils about HIV prevention suggests that, school teachers would need to be adequately trained prior to their involvement in HIV/AIDS education to pupils.<sup>(13)</sup> In the present study, we tried to assess the scope and extent of participation of teachers in imparting knowledge on road safety measures to their students. This study observed that, about 75% teachers had a positive attitude towards educating their students on road safety measures. Those who are having a positive attitude towards

creating awareness among school children on health related issues also favoured educating the school children on road safety measures. A postal survey conducted in North Staffordshire reported majority of their participants agreed that prevention of road traffic accidents is an important topic to be taught to children in schools as a method of accident prevention and a small percentage of participants revealed that they had adequate training on accident prevention.<sup>(14)</sup>

**Conclusion:** In conclusion, study reveals that the education department should take necessary steps to include the importance of road safety measures in the school curricula and also the teachers have to be well equipped to train the students on this topic.

The information on road safety measures given by school teachers to children can have a great impact on the quality of life for children and their families. Thus, teachers can serve as resources and as advocates for prevention of road traffic accidents among school children.

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**Competing interests:** None declared

**Ethical approval:** This research was approved by the Research and Ethics Committee of the Academy of Medical Sciences, Pariyaram Medical College, Kannur, Kerala, India.

**REFERENCES**

1. Mukoma W, Flisher AJ. Evaluations of health pro-

1. moting schools: A review of nine studies. *Health Promot. Int.* 2004; 19: 357- 68.
2. Peden M, Scurfield R, Sleet D et al. eds. *World report on road traffic injury prevention*, Geneva: World Health Organization, 2004.
3. World Health Organization, *Global Burden of Disease: 2004 update*. Switzerland, 2008. [online]. Available at : [http://www.who.int/healthinfo/global\\_burden\\_disease/GBD\\_report\\_2004update\\_full.pdf](http://www.who.int/healthinfo/global_burden_disease/GBD_report_2004update_full.pdf), Accessed 3 March 2010)
4. UNICEF, 'A league table of child deaths by injury in rich nations', *Innocenti Report Card No.2*, February 2001. UNICEF Innocenti Research Centre, Florence.
5. Gururaj G. Road Traffic Injury. In: NIMHANS BISP fact sheet [online]. Available at: <http://www.nimhans.kar.nic.in/epidemiology/bisp/fs4.pdf>, accessed March 3, 2010.
6. Bener A, Al-Salman KM, Pugh RN. Injury mortality and morbidity among children in the United Arab Emirates. *Eur J Epidemiol.* 1998; 14: 175-8.
7. UNESCO. The contribution of early childhood education to a sustainable society. Eds. Samuelsson IP, Kaga Y. 2008. [www. http://unesdoc.unesco.org/images/0015/001593/159355e.pdf](http://unesdoc.unesco.org/images/0015/001593/159355e.pdf) (accessed on 20 April 2010)
8. Census of India 2001. Basic Data Sheet District Kannur (02), Kerala (32). [online]. Available at: [http://www.censusindia.gov.in/Dist\\_File/datasheet-3202.pdf](http://www.censusindia.gov.in/Dist_File/datasheet-3202.pdf). Accessed March 3, 2010 (32)
9. Maps of India. Kerala District Map. [online]. Available at: <http://www.mapsofindia.com/maps/kerala/districts/>, Accessed December 3, 2009
10. School Education. In: Education [online]. Available at: <http://www.kerala.gov.in/education/school.html>. Accessed January 7, 2010.
11. Jayakumary M, Jayadevan S. Scope and extent of participation of primary school teachers in the dissemination of knowledge on HIV/AIDS in rural areas of Kerala, India. *Int Conf AIDS.* 2004 Jul 11-16; 15: abstract no. ThPpD2103.
12. Munodawafa D. Attitude of teachers toward implementing AIDS prevention education programme in secondary schools of Zimbabwe. *Cent Afr J Med.* 1991; 37: 390-3.
13. Yusulf A, Naidoo S, Chikte UM. The role of primary school teachers in HIV prevention in South Africa. *SADJ* 2001; 56: 596-8.
14. Carter YH, Bannon MJ, Jones PW. The role of the teacher in child accident prevention. *J Public Health Med.* 1994; 16: 23-8.

# Antinociceptive Activity of Selective Serotonin Reuptake Inhibitors in Albino Rats

K.V. Shivanand Reddy<sup>1</sup>, J.Balaji<sup>1</sup>, Dr. Umakant Patil<sup>2</sup>

<sup>1</sup>Students M.B.B.S IIIrd Phase, <sup>2</sup>Professor and Head, Department of Pharmacology, S.S.Institute of Medical Sciences & Research centre, Davangere- 577005 (Karnataka)

## ABSTRACT

**Objective:** To study the antinociceptive activity of four selective serotonin reuptake inhibitors (SSRIs) viz., fluoxetine, fluoxetine, paroxetine and sertraline.

**Materials and Methods:** Antinociceptive activity was studied using hot water immersion test, tail flick method and hot plate method in albino rats. Drugs and normal saline (control) were given intraperitoneally and the results were analyzed with suitable statistical application.

**Results:** Fluoxetine (10mg/kg), Fluoxetine (25 mg/kg), Paroxetine (10mg/kg) and Sertraline (10mg/kg) produced significant antinociceptive effect in all the three experimental models ( $P < 0.001$ ). Fluoxetine produced maximum effect among the four SSRIs.

**Conclusion:** As serotonin is an important mediator of pain, these SSRIs have shown considerable antinociceptive activity. These SSRIs have shown considerable antinociceptive activity. These may be used as co-analgesics in diabetic neuropathy, differentiation pain, migraine and also in the patients of depression with pain. Further studies may widen the horizon of usage of SSRIs in the management of pain.

**Key words:** Pain, SSRIs, Rat, Antinociception.

## INTRODUCTION

Pain is defined as an unpleasant sensation that can be either acute or chronic and that is a consequence of complex neuro chemical processes in the peripheral & central nervous system<sup>1</sup>. It acts as a warning signal against disturbances either in the body or in the external environment of an individual. The main objective of treating pain is removal or abolishing its cause. Opioids are the potent & commonly used drugs for pain but are associated with a greater degree of adverse effects. Antidepressant drugs are widely used in management of chronic pain<sup>2</sup>. Serotonin (5-HT) is known to be important mediator of pain. Selective Serotonin reuptake inhibitors (SSRIs) are reported to be modulators of pain response, particularly in neuropathic pain, rheumatoid arthritis<sup>3</sup> and migraine<sup>4</sup>. There are many studies reporting the analgesic profile of fluoxetine<sup>4,6,7</sup>. But there are few studies available showing the analgesic activities of other members of same family viz. Paroxetine<sup>2,5</sup>, Fluoxetine and Sertraline.

Hence, the present study was undertaken to demonstrate antinociceptive activity of four SSRI's viz; fluoxetine, fluoxetine, paroxetine and sertraline.

## MATERIALS AND METHODS

Albino rats of either sex weighing between 150-200gm were obtained from Central animal house, S.S. Institute of Medical Sciences, Davangere. They were maintained at the atmospheric temperature of 25-30°C, with food and water given ad libitum. A total number of 30 animals (n=30) were used. They were grouped into five groups containing six animals each. Group I received Normal saline (control), group II, III, IV and V received fluoxetine, fluoxetine, sertraline and paroxetine respectively and all were given intraperitoneally.

## DRUGS AND CHEMICALS

Drug samples are procured from pharmaceutical

companies in the pure form.

- (a) Fluoxetine (item code-4000633, batch number 0301000815 from Zidus Cadila.
- (b) Fluoxetine (No.0108R0004, from Microlabs)
- (c) Sertraline ( item code-4000952, batch no.0301000357, from Zydus Candila)
- (d) Paroxetine (item code-4000243, batch no. 0301000822, from Zydus Candila)

### Determination of Antinociceptive Activity

In all the groups the Antinociceptive test was performed at time intervals of 15,30,60,120 min,5hr and 12hr after the administration of drugs. Antinociceptive activity was measured by using three methods

1. **Tail immersion test:** After intraperitoneal injection of the test substance, the animal tail is immersed in the hot water bath at a temperature of 58°C. The time until a typical reaction- a violent jerk of the tail is noted.
2. **Tail clip test:** in which a fine polythene sheathed artery forceps is applied to the tip of the tail and the time taken for biting and the effort of removal is noted
3. **Hot plate test (Company:- Medcraft, No. A-10-0102):-** where the animals were supposed to (radiant heat) and the time taken for the animal for licking of the limbs are noted.

### STATISTICAL ANALYSIS

The results were expressed as mean±SEM & p value has been calculated using ANOVA test. P value of <0.05 was taken as statistically significant.

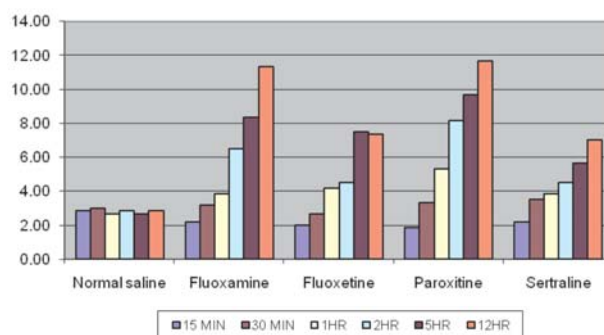
### RESULTS

1. **Effects of Saline treatment:** In the saline treated animals there were no significant changes in hot water immersion test, tail clip method or in the hot plate method during the entire test period of 12 hrs.
2. **Effects of treatment with drugs:** Fluoxetine(10 mg/kg), Fluoxetine(25 mg/kg), Paroxetine (10 mg/kg) and Sertraline (10 mg/kg) have shown significant antinociceptive activity in all the three tests when compared with the control values. Activity was minimum at 15 min and progressed gradually to the maximum value at 12 hrs after the drug administration ( Table graph 1,2,3).Fluoxetine has shown maximum effect among all four SSRI's. All results were statistically highly significant.

### Hot water immersion test

Time of assessment	Normal saline	Fluoxetine	Fluoxetine	Paroxetine	Sertraline	P Value sig
15-MIN	2.83±0.31	2.17±0.31	2.00±0.45	1.83±0.31	2.17±0.31	P<0.001 HS
30-MIN	3 ±0.26	3.17±0.31	2.67±0.33	3.33±0.33	3.50±0.43	P<0.001 HS
1-HR	2.67±0.33	3.83±0.4	4.17±0.40	5.33±0.67	3.83±0.31	P<0.001 HS
2-HR	2.83±0.31	6.50±0.67	4.50±0.67	8.17±0.31	4.50±0.34	P<0.001 HS
5-HR	2.6±0.31	8.33±0.67	7.50±0.67	9.67±0.42	5.67±0.42	P<0.001 HS
12-HR	2.83±0.31	11.33±0.49	7.33±0.33	11.67±0.33	7.00±0.37	P<0.001 HS

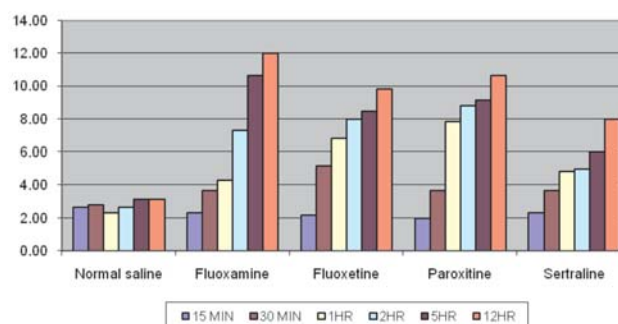
HotWater



### Tail clip method

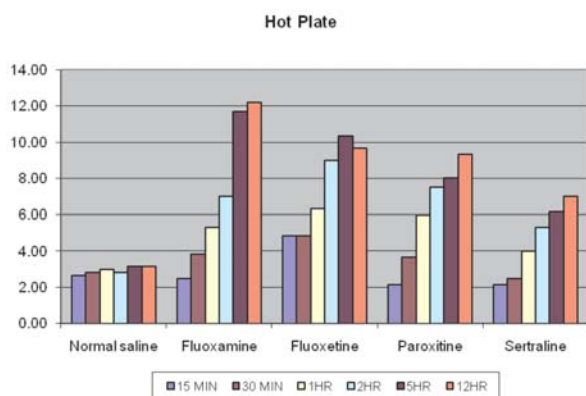
Time of assessment	Normal saline	Fluoxetine	Fluoxetine	Paroxetine	Sertraline	P Value sig
15-MIN	2.67±0.33	2.33±0.33	2.17±0.48	2.00±0.37	2.33±0.21	P<0.001 HS
30-MIN	2.83±0.31	3.67±0.21	5.17±0.60	3.67±0.42	3.67±0.42	P<0.001 HS
1-HR	2.33±0.33	4.33±0.21	6.83±0.48	7.83±0.48	4.83±0.31	P<0.001 HS
2-HR	2.67±0.33	7.33±0.49	8.00±0.86	8.83±0.60	5.00±0.26	P<0.001 HS
5-HR	3.17±0.48	10.67±0.84	8.50±0.67	9.17±0.48	6.00±0.26	P<0.001 HS
12-HR	3.17±0.40	12.00±0.45	9.83±0.70	10.67±0.33	8.00±0.58	P<0.001 HS

Tail Clip



**Hot Plate Method**

Time of assessment	Normal saline	Fluoxamine	Fluoxetine	Paroxetine	Sertraline	P Value sig
15-MIN	2.67±0.33	2.50±0.43	4.83±0.65	2.17±0.31	2.17±0.31	P<0.001 HS
30-MIN	2.83±0.31	3.83±0.31	4.83±0.40	3.67±0.42	2.50±0.43	P<0.001 HS
1-HR	3.00±0.37	5.33±0.33	6.33±0.56	6.00±0.37	4.00±0.37	P<0.001 HS
2-HR	2.83±0.48	7.00±0.26	9.00±1.13	7.50±0.76	5.33±0.21	P<0.001 HS
5-HR	3.17±0.48	11.67±0.56	10.33±0.76	8.00±0.52	6.17±0.60	P<0.001 HS
12-HR	3.17±0.48	12.17±0.60	9.67±0.99	9.33±0.42	7.00±0.45	P<0.001 HS



**DISCUSSION**

Pain is an unpleasant sensation and is always a subjective feeling. The main target in the management of pain is removal of its cause. Opioids are the main drugs used for symptomatic relief of pain, but they exert a wide array of adverse effects especially on long term use. Conditions like neuropathy, migraine, arthritis Or diafferentiation pain require quite a long term drug therapy. Antidepressants are said to be more effective and producing less side effects in these situations than opioids<sup>8</sup>.The exact mechanism by which these antidepressants exert analgesic activity is not clear. But possible endogenous opioid mechanism or potentiation of analgesic activity by monoaminergic pathways may be involved. However peripheral mechanisms are not clear<sup>5</sup>.Some studies reported binding of SSRI's to opiod receptors but then disputed with regard to binding of fluoxetine <sup>9</sup>.But the reports about antagonizing of antinociceptive activity of fluoxetine by naloxone, an opioid antagonist,<sup>4,10</sup> may indicate opioid receptor involvement and enhancement of opioid activity by SSRI's<sup>11</sup>.Whatever may be the underlying mechanism SSRI's have proved useful in the management of chronic pain. In the present study Fluoxamine has shown the maximum effect among the

four SSRI's, other drugs has also shown considerable antinociceptive effect. As already reported, SSRI's potentiate opioid analgesia, these can be co-administered for the management of pain . This may reduce the dose requirements of individual drugs as well as reducing adverse effects. Further, clinical studies may widen the horizon of usefulness of SSRI's for the management of pain.

**REFERENCES**

1. Richard AH, Pamela CC, editors ;Lippincott's Illustrated Reviews, Pharmacology. Wolter Kluwer/ Lippincott Williams and Wilkins, 3<sup>rd</sup> edition, 2006, 154.
2. Duman NE, Kesim M, Kadiogru M ,Yaris E, Erciyas N: Possible involvement of opioidergic and serotonergic mechanisms antinociceptive effect of Paroxetine in acute pain. J pharmacol sci, 2004 ;94(2) ;161-165.
3. Scott Wam : The relief of pain with an antidepressant in arthritis , Pract 1969, 202, 802-7.
4. Singh VP, Jain NK, Kulkarni SK : On the antinociceptive effect of fluoxetine, a selective serotonin reuptake inhibitors. Brain Res 2001 , 915, 218-26.
5. Kesim M , Duman NE, Kudioglu M , Yaris E , Kalyancu NI, Erciyas N: The different roles of 5-HT<sub>2</sub> AND 5-HT<sub>3</sub> receptors on antinociceptive effect of paroxetine in chemical stimuli in mice. J pharmacol sci 2005, 97 (1), 61-66.
6. Begovic A, Zulic I, Bacic F : Testing of analgesic effect of fluoxetine. Bosh J Basic Med sci 2004 Oct; 4(4) ; 79-81.
7. Max MU, Lynch SA, Muir J, Shoaf SE, Smollar B, Dubrer R : Effect of desipramine , amitryptilene and fluoxetine on pain in diabetic neuropathy. New Eng J Med, 1992 May 7 ; 326(19) ; 1250-1256.
8. North RA; Opioid actions on membrane ion channels. In ; Herz A, editor, Opioids handbook of experimental Pharmacology. Berlin Springer Ventag, 1992.
9. Rechelson E. Pharmacology of antidepressants in use in the united states J clin psych 1982 ; 43-44.
10. Kurlekar PN, Bhat JD. Study of the antinociceptive activity of fluoxetine and its interaction with morphine and naloxone in mice. Ind J pharmacol, Dec 2004, 36(6) ; 369-372.
11. Sindurup SH ; Antidepressants in pain management. Nordic J psychiat 1993 ; 47 ; 67-73

# Osteotome-assisted Ridge Expansion with Immediate Implant Placement: A Review and Clinical Report

Leena Tomer<sup>1</sup>, Anil Tomer<sup>2</sup>, Ajay Gupta<sup>3</sup>, Sarawati Rana<sup>4</sup>, Himanshu Shekhawat<sup>4</sup>

<sup>1</sup>Professor, Department of prosthodontics and implantology, <sup>2</sup>Professor and Head, Department of conservative dentistry and endodontics, <sup>3</sup>Professor and Head, Department of prosthodontics and implantology, <sup>4</sup>Postgraduate Student, Department of prosthodontics and implantology, <sup>5</sup>Postgraduate Student, Department of prosthodontics and implantology, D.J. College of Dental Sciences and Research, Modinagar-201204, Uttar Pradesh, India.

## ABSTRACT

**Background:** When there is loss of alveolar bone volume and associated mucosa, the function and esthetics of restorations can be poor. However, the ability to regenerate maxillary and mandibular bone and soft tissue using suitable augmentation methods and materials has extended the range of implant treatment. This article presents "osteotome assisted bone expansion" technique review, describing the main indications, advantages and disadvantages of this surgical procedure and a clinical report for bone expansion of a resorbed anterior maxillary ridge with immediate implant placement and subsequent rehabilitation with implant supported fixed prosthesis.

**Case Report:** An eighteen-year old boy was referred to the Department of Prosthodontics, D.J. college of dental sciences and research, Modinagar with a complaint of missing right maxillary central and lateral incisor and left maxillary central incisor. The patient was concerned about his appearance and wanted to get the tooth replaced. Various treatment options were discussed with the patient. However, the patient was keen on fixed-prosthesis for replacing his missing teeth. The patient was presented with different treatment options, after discussing the pros and cons of each the following treatment option was agreed upon; implant placement in 12 and 21 region with concurrent bone grafting, followed by subsequent metal-ceramic implant supported fixed partial denture. As the bone was deficient in width "osteotome assisted bone expansion" technique was used with immediate implant placement and subsequent rehabilitation with implant supported fixed prosthesis.

**Results:** The patient is comfortable and happy and periodic recall examination after 6 months reveal the surrounding gingiva is healthy and free from any inflammation. A very pleasing esthetic result was achieved.

**Conclusions:** "Osteotome assisted bone expansion" technique for horizontal ridge augmentation with implant placement has been shown to be predictable and successful in treating the maxilla with deficient alveolar bone width. "Osteotome assisted bone expansion" technique is superior to drilling technique for application in soft maxillary bone. This had a great advantage of overcoming the problem of the defect, hence maintaining the stability of the implant.

**Key Words:** Bone expansion, Osteotome, Implant Supported Prosthesis, Ridge expansion

## INTRODUCTION

The word osteotome is derived from the Latin words "osteo," meaning bone, and "tome," to incise or cut. In the field of implant dentistry, Dr Hilt Tatum coined the word in the early 1970s to describe a special set of hand instruments developed to form or shape

bone in preparation for the placement of dental implants.<sup>1,2</sup> In certain clinical situations, osteotomes offer several significant advantages over the traditional graded series of drills. Drilling removes bone. When adequate quantities of dense bone are available, this is not a problem. But when the alveolar bone is soft or when the ridge has resorbed enough to compromise

implant placement, the ability to preserve existing bone, improve its quality, and manipulate its shape becomes desirable. Osteotomes take advantage of the fact that bone is viscoelastic; it can often be compressed and manipulated. Pushed out rather than drilled into soft bone, osteotomes compress the bone laterally and thus create a denser interface for the implant to be placed. The osteotome technique also generates no heat, an advantage because heat is a major detriment to osseointegration. In the posterior maxilla, osteotomes offer much more visibility than do a rotating drill and irrigation stream. Furthermore, osteotomes allow for greater tactile sensitivity, making them more appropriate than drills for probing.<sup>3</sup>

### INDICATIONS AND CONTRAINDICATIONS OF EXPANSION OSTEOTOMES

The osteotome procedure is indicated in three general situations.<sup>4</sup> (1) where the bone at the implant site is soft and trabecular. Osteotomes improve the density of the bone around the osteotomy site. Osteotomes expand the ridge buccolingually in a less invasive manner than traditional bone-spreading techniques. (2) Where the ridge is too narrow to adequately accommodate an implant.<sup>5</sup> Osteotomes expand the ridge buccolingually in a less invasive manner than traditional bone-spreading techniques. (3) When there is less than 10mm of bone between the maxillary crest and the sinus. In such instances, osteotomes can be utilized to elevate the nasosinus cortical floor, typically by 1–3 mm. This elevation can enable placement of a longer implant than would otherwise be usable.<sup>6,7</sup> According to Branemark, bone falls into one of four categories, with Type I the densest and Type IV the least dense. Type I bone is too dense for ready manipulation; hence osteotomes are not indicated for use in it. If bone expansion is desirable, sites containing Type II through Type IV bone may be candidates. Types III and IV are best suited for trabecular compaction. In the maxilla osteotomes can be used as far posterior as the mesial aspect of the second molar. In the anterior mandible, osteotomes are most often used from the second premolar to the opposite second premolar. Bone density may be assessed before surgery by the use of computerized tomography (CT) scans, site-selected cross-sectional tomograms, radiovisiography, and lateral cephalometric radiographs. Clinical determination of bone density is best diagnosed when the surgeon penetrates the bone with a pilot bur or a 1.5-mm twist drill. The degree of resistance of the bone to the entering drill can transmit to the surgeon an indication of the bone type. If the bone is extremely resistant to the entrance of the drill then the operator can conclude that clinical Type I bone is present, and osteotome use

is not indicated. In patients with antecedents of benign paroxysmal positional vertigo (BPPV), the use of these osteotomes is also disadvised. This form of vertigo is caused by otolith displacements within the posterior semicircular canal of the inner ear, favored by hyper-extension of the head of the patient and the impacts of the surgical mallet. In order to avoid these problems, the patient is to get up slowly after surgery, and excessive tapping with the mallet during surgery should be avoided. If such vertigo appears, the Epley maneuver can be applied, involving hyper-extension of the head with movement towards the side of the affected ear, thereby contributing to reposition the calcium carbonate particles floating within the endolymph compartment. Pharmacological treatment with antivertigo drugs can also be provided<sup>8</sup>.

### ADVANTAGES AND INCONVENIENCES OF EXPANSION OSTEOTOMES

The expansion osteotome technique is more conservative in relation to the neighboring structures than conventional drilling<sup>9</sup>. Moreover, it affords superior manual control in determining the implant axis – thereby contributing to avoid fenestrations and dehiscences. There is also lesser peri-implant bone warming, and no bone loss is produced during expansion<sup>10</sup>. However, tapping of the expansion osteotomes with the surgical mallet is the greatest inconvenience of the technique, and in some cases it may induce BPPV in patients who have experienced no previous episodes of this form of vertigo.

### SURGICAL TECHNIQUE

The basic technique consists of preparing the implant bed by progressively operating the osteotomes until the desired expansion is achieved after elevation of the mucoperiosteal flap. Firstly, initial osteotomy preparation is done using a pilot drill, followed by insertion of the smallest-caliber osteotome and working up through the successively greater instrument diameters. The expansion osteotomes are inserted manually, pressing and rotating at the same time, until the desired height is reached, or until resistance is encountered. Gentle tapping of the osteotome with the surgical mallet can be applied.<sup>11</sup> Except in very spongy bone, use of the surgical mallet is unavoidable. Once the desired depth has been reached, and before moving on to the next instrument, it is advisable to wait 30–40 seconds for bone micro fractures to form and dilate and compact the adjacent bone. Final osteotomy size should be 5–7 mm less than the diameter of implant. After preparing the bed, the implant is inserted immediately, to prevent the socket from collapsing.<sup>12–</sup>

### CASE REPORT

An eighteen-year old boy was referred to the Department of Prosthodontics, D.J. college of dental sciences and research, Modinagar with a complaint of missing right maxillary central and lateral incisor and left maxillary central incisor. The patient was concerned about his appearance and wanted to get the tooth replaced. His medical history was satisfactory. The dental history revealed that he lost his teeth three years back due to an automobile accident. Various treatment options were discussed with the patient. However, the patient was keen on fixed-prosthesis for replacing his missing teeth. Patient had medium smile line and the intraoral examination revealed a very thin alveolar ridge (labio palatally) in the maxillary incisor region covered by healthy and un-inflamed mucosa (Fig.1,2).



Figure 1- Pre-operative View



Figure 2- Pre-operative Opg

Bone width measuring gauge was used to reveal the labio-palatal thickness of the bone in the edentulous region which was 2.5mm, which was not sufficient for the conventional implant placement procedure. Hence, osteotome assisted bone expansion was planned, and the detailed procedure was explained to the patient and his written consent was taken. Prophylactic antibiotics were prescribed to the patient. Local anesthesia was administered. One horizontal and two vertical releasing incisions were made to allow maxi-

imum access and visualization. The mucoperiosteal flap was elevated which revealed a very thin bone buccopalatally in the edentulous region (Fig. 3).



Figure 3- Elevation of Flap

An initial osteotomy preparation was done in 12 and 21 region using a pilot drill to a depth of 11.5mm. The osteotomy prepared with the help of pilot drill was further expanded with the help of a series of osteotomes in a progressive manner. Osteotomes of increasing diameter (first 2mm and then 2.5 mm) were gently introduced sequentially to expand the implant site (Fig.4,5).



Figure 4- Expansion of Bone With Osteotome

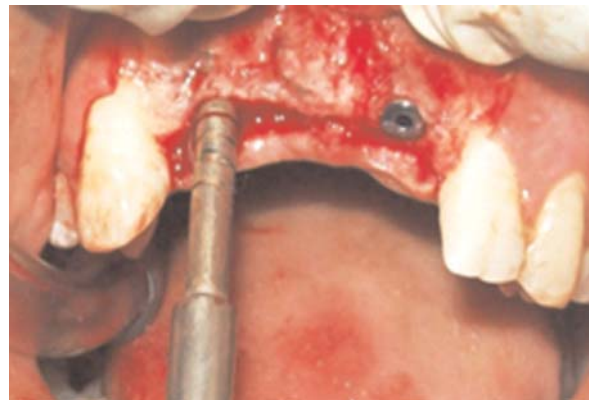


Figure 5- Implant Placed in 21 Region and Expansion of Bone With Osteotome in 12 Region

The osteotome was held in place for about one to two minutes. The procedure was repeated until the



desired width for the placement 2.8 mm implant drill bit was achieved. Care was taken to proceed as slowly as possible to avoid any fracture of bone. Subsequently, the implant of 3.75x11.5mm diameter were placed in position. After placement of the implant as there was a very small amount of bone labially so biooss graft was mixed with saline and placed on labial side for bone formation (Fig. 6).

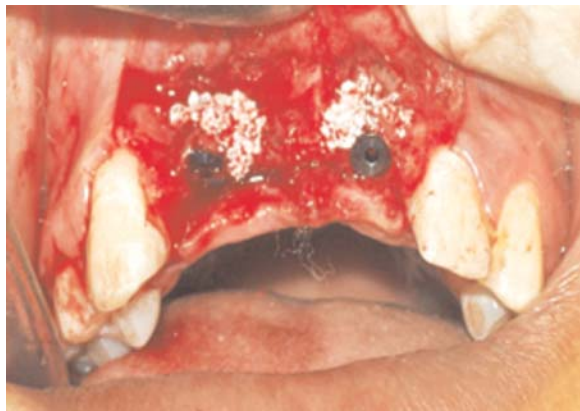


Figure 6- Biooss Graft Placed on Labial Cortical Plate

The flap was repositioned and sutured using 3.0 Mersilksutures.

The patient was provided with home care instructions, i.e. not to rinse the mouth vigorously and use ice packs over the surgical area during the first 24 hours after the operation. The patient was instructed for soft diet and oral hygiene maintenance. The patient was kept on antibiotics and analgesics along with 0.02% chlorhexidine gluconate mouthwash for 5 days. The sutures were removed on the seventh postoperative day and a provisional removable partial denture was given. Regular follow up was done for six months. The post-operative healing was uneventful through the course. After six months of uneventful healing and radiographic evaluation (Fig. 7),



Figure 7- Post-operative OPG

thesecond stage surgery was planned and healing

collar of 3mm height was placed. After 2 weeks impressions were made using transfer technique. The abutment was fixed on the implant analog in the maxillary cast and trimmed accordingly after articulation of the casts. Metal ceramic bridge was fabricated on the abutment. After the fixation of abutment on the implant, prosthesis was cemented on the abutment (Fig. 8).



Figure 8- Final Prosthesis in Place

Instructions were given to the patient regarding the importance of maintenance of the implant supported prosthesis. The patient is comfortable and happy and periodic recall examination after 6 months reveal the surrounding gingiva is healthy and free from any inflammation.

## DISCUSSION

Alveolar bone expansion consists of expanding atrophic bone crests in order to secure sufficient bone width for dental implant placement. Narrow alveolar crests make implant bed preparation difficult, with the appearance of fenestrations or dehiscences of the cortical layers. To avoid these problems, different regenerative surgical techniques have been developed using autologous or homologous bone grafts, xenografts or bone substitutes to allow implant placement in one or two surgical steps.<sup>20,21</sup> Unfortunately, bone grafting techniques require a longer treatment time, a need for second stage surgical appointment and an additional surgical site if autogenous bone is used. This may add significant cost and complexity to the treatment. The incorporation of osteotome- assisted bone expansion in the treatment plan had resulted in a single stage correction without significant increase in surgical risk, and without the need for multiple surgeries. The procedure had used the elastic, plastic, and regenerative properties of bone and had allowed for immediate implant placement. The degree of bone expansion obtained had remodeled the alveolar bone, an important esthetic achievement. Osteotome- assisted

bone expansion can be used to achieve an esthetically acceptable and functional prosthetic restoration. This procedure can be applied in patients whose residual maxillary or mandibular bone would not allow for placement of cylindrical implants without any previous bone augmentation. Osteotome- assisted bone expansion is particularly useful in maxilla, since the spongy (cancellous) bone found in this zone allows lateral compression and expansion of the adjacent bone. The ridge expansion technique with tapered osteotomes described in this article can be used in any location in the maxilla when a change in external ridge morphology would be advantageous for both aesthetics and proper dental implant placement. Usually after tooth loss, the maxilla is somewhat undercut in form. This ridge expansion technique can be used to reduce the undercut by bulging out the base of the facial/buccal plate. This would recreate the illusion of root prominences or permit implant fixtures to be inserted in a more upright position.<sup>22</sup>

### SUMMARY

In the 21st century, implant replacement of missing teeth with lifelike results has become the standard of care. The technique of bone expansion with osteotome offers the possibility of placing implants in cases of inadequate bone volume buccolingually for placement of desired implant. without the need for other more complex treatments. In addition, it improves the quality of bone surrounding the implants and reduces the time to rehabilitation.

### REFERENCES

1. Saadoun AP, Le Gall MG. Implant site preparation with osteotomes: principles and clinical application. *PractPeriodont Aesthetic Dent.* 1996;8:453–483.
2. Summers RB. The osteotome technique: part 4—future site development. *CompendContinEduc Dent.*1995;16:1090–1098.
3. Silverstein L, Hahn J. Aesthetic enhancement of anterior dental implants with the use of tapered osteotomes and soft-tissue manipulation. *Dent Surg Prod.* 1998; June/July.
4. Summers RB. A new concept in maxillary implant surgery: the osteotome technique. *Compendium.* 1994;15: 152–160.
5. Summers RB. The osteotome technique: part 2—the ridge expansion osteotomy (REO) procedure. *Compendium.* 1994;15:422–434.
6. Summers RB. The osteotome technique: part 3—less invasive methods of elevating the sinus floor. *Compendium.* 1994;15:698–708.
7. Tatum H. Maxillary and sinus implant reconstructions. *Dent Clin North Am.* 1986;30:209–229.
8. Peñarrocha M, Perez M, García A, Guarinos J. Benign paroxysmal positional vertigo as a complication of osteotome expansion of the maxillary alveolar ridge. *J Oral Maxillofac Surg* 2001;59:106–7.
9. Hahn J. Clinical uses of osteotomes. *J Oral Implantol* 1999; 25: 23–9.
10. Davarpanah M, Martínez H, Tecucianu JF, Hage G, Lazzara R. The modified osteotome technique. *Int J Periodontics Restorative Dent* 2001; 21:599–607.
11. Davarpanah M, Martínez H, Tecucianu JF, Hage G, Lazzara R. The modified osteotome technique. *Int J Periodontics Restorative Dent* 2001; 21:599–607.
12. Bruschi GB, Scipioni A, Calesini G, Bruschi E. Localized management of sinus floor with simultaneous implant placement: a clinical report. *Int J Oral Maxillofac Implants* 1998;13:219–26.
13. Rocuzzo M, Wilson T. A prospective study evaluating a protocol for 6 weeks loading of SLA implants in the posterior maxilla. *Clin Oral Implants Res* 2002;13:502–7.
14. Defrancq J, Vanassche B. Less invasive sinus lift using the technique of Summers modified by Lazzara. *Rev Belge Med Dent* 2001;56:107–24.
15. Rosen PS, Summers R, Mellado JR, Salkin LM, Shanaman RH, Marks MH, et al. The bone-added osteotome sinus floor elevation technique: multicenter retrospective report of consecutively treated patients. *Int J Oral Maxillofac Implants* 1999;14:853–8.
16. Komarnyckyj OG, London RM. Osteotome single-stage dental implant placement with and without sinus elevation: a clinical report. *Int J Oral Maxillofac Implants* 1998;13:799–804.
17. Fernández J, Fernández J. Placement of screw type implants in the pterygomaxillary pyramidal region: surgical procedure and preliminary results. *Int J Oral Maxillofac Implants* 1997;12:814–9.
18. Nocini PF, Albanese M, Fior A, De Santis D. Implant placement in the maxillary tuberosity: the Summers' technique performed with modified osteotomes. *Clin Oral Implants Res* 2000;11:273–8.
19. Anitúa E. Ensanchamiento de cresta en el maxilar superior para la colocación de implantes: Técnica de los osteotomos. *Actualidad Implantológica* 1995;7:59–63.
20. Ten Bruggenkate CM, Kraaijenhagen HA, van der Kwast WA, Krekeler G, Oosterbeek HS. Autogenous maxillary bone grafts in conjunction with placement of I.T.I. endosseous

- implants. A preliminary report. *Int J Oral Maxillofac Surg* 1992;21:81-4.
21. Misch CM, Misch CE. The repair of localized severe ridge defects for implant placement using mandibular bone grafts. *Implant Dent* 1995;4: 261-7.
22. Mattsson T, Köndell P, Gynther GW, Fredholm U, Bolin A. Implant treatment without bone grafting in severely resorbed edentulous maxilla. *J Oral Maxillofac Surg* 1999;57:281-7.

Guest Article

# Ethical Issues in Current Medical Practice-an Introspection

**S.K. Thakur**

*Professor and Head, Dept of Surgery, Saraswathi Institute of Medical Sciences, Hapur, Uttar Pradesh*

Every now and then a hue and cry is raised in media by public regarding the medical ethics, and obviously in a negative sense. The highlighting of unethical practices by the doctors in Aamir Khan's show Satyamev Jayate has added fuel to it. This has led to widespread debate in the country on medical ethics. This urged me to pen down my experience with medical ethics as a common man. As of now, majority of clauses of code of medical ethics, 2002, as displayed on MCI website have lost its significance and it is high time that this code of ethics for doctors should be rewritten and simplified.

When I got a permanent registration from Medical Council of India, way back in 1982, much importance was given to the Hippocratic oath, as far as medical ethics was concerned. In fact, we observed keenly as our teachers dealt with a patient with dignity, compassion and competence and we learnt about the proper and practical ethics by default. With the overall deterioration in standard of medical education, it is rare these days to find such a breed conscientious teachers. Unless we focus our attention on medical education we will not get doctors with a sense of responsibility for patient care<sup>1</sup> and formulating any code of medical ethics will be futile. Another important development in the recent past has been the inclusion of medical profession under consumer protection act 1986. On 13.11.95 in Civil Appeal No 688 of 1993, in Indian Medical Association v. V.P. Shantha, the Supreme Court held that, doctors are covered by the Consumer Protection Act, and that the patients aggrieved by any deficiency in treatment, diagnosis, consultation from both private clinics and Government hospitals, are entitled to seek compensation under the Consumer Protection Act (except where a doctor provides his service free of charge). From here started the era of professionalism in medical field. With time the Hippocratic oath has lost its significance and has been replaced by Declaration of Geneva as adopted by the Third General Assembly of World Medical Association at Geneva, Switzerland, in September 1948(amended in 2006).<sup>2</sup>

Today based on this, MCI gets the following format signed by all the doctors at the time of registration:

## DECLARATION

At the time of registration, each applicant shall be given a copy of the following declaration by the Registrar concerned and the applicant shall read and agree to abide by the same.

1. I solemnly pledge myself to consecrate my life to service of humanity.
2. I will maintain the utmost respect for human life from the time of conception.
3. I will not permit considerations of religion, nationality, race, party politics or social standing to intervene between my duty and my patient.
4. I will practice my profession with conscience and dignity.
5. The health of my patient will be my first consideration.

6. I will respect the secrets, which are confined in me.
7. I will maintain by all means in power, the honour and noble traditions of medical profession.
8. I will treat my colleagues with all respect and dignity.
9. I shall abide by the Code of medical ethics as enunciated in the Indian Medical Council (Professional Conduct, Etiquette and Ethics) Regulations, 2002.

I make these promises solemnly, freely and upon my honour.

Signature.....

Name .....

Now, the medical ethics, is being taught in the undergraduate course with special emphasis on code of medical ethics, 2002. I personally interviewed some of the junior residents, working in my hospital and asked them about the code of medical ethics 2002, which supposedly they have read at the time of getting registered and also at undergraduate level. Nobody could explain to me much about it.

On a personal level as a practising doctor, I never had any problem as far as medical ethics was concerned. Unfortunately two years back, I lost my younger brother in a well reputed corporate hospital of the country due to apathy and gross negligence of the hospital staff. Since the matter is subjudice, I am not in a position to reveal facts related with this issue right now. During the research for my case, I came across violation of so many ethical issues and I would like to share some of them here. I asked about the case record of the patient and very reluctantly the hospital authority handed over the photocopy of the same. They even refused to certify the photocopies. This led me to write to Medical Council of India, under the RTI act seeking information: 'Is the hospital authority not supposed to give original or at least certified photocopy of case record of the patient on written request of the authorised attendant of the patient?' The reply, which I got from MCI is as follows 'Your kind attention is invited to clause 1.3.2 of Indian Medical Council (Professional conduct, Etiquette and Ethics) Regulations, 2002.' It reads as 'If any request is made for medical records either by the patients/authorized attendant or legal authorities involved, the same may be duly acknowledged and documents shall be issued within the period of 72 hours.' I got quite confused and asked so many people, both doctors and non doctors, with a good background of English to let me know whether according to this clause

1. the original documents are to be handed over
2. the certified copies are to be handed over
3. or simply the photocopies are to be handed over

Nobody could give me the satisfactory answer. Another thing which bothers me is 'why 72 hrs is needed to hand over the documents'. This will raise a lot of questions in the mind of public and enhance the already tarnished image of the doctor among general public.

After getting this reply, I went through the code of medical ethics 2002 as given on MCI site number of times<sup>4</sup>, though I had read it previously also but not in depth. Every time I wondered what was the need of this code of medical ethics. Most of the clauses are openly violated these days and it gives a very bad image of doctors in the mind of public. For example clause 1.4.1 reads 'Every physician shall display the

registration number accorded to him by the State Medical Council / Medical Council of India in his clinic and in all his prescriptions, certificates, money receipts given to his patients.' In my own case it took me more than one year to get registration no. of doctors concerned with the treatment of my brother. It was a very painful job for me and after innumerable communications I finally got the registration no. of the doctors concerned. Nowhere in the hospital or on any document the registration no. was displayed. Even the website of the concerned hospital, did not give any information regarding the registration no. of doctors working in the hospital. In the mean time, when the registration no. of the concerned doctors was not known to me I wrote to MCI under RTI act 'Whether taking any action against a negligent doctor, whose registration no. is not known to the complainant is beyond jurisdiction of MCI?' The reply I got was quite irrelevant. It reads 'The council forwards the complaint received against a negligent doctor to the Registrar, concerned State Medical Councils where the doctor is practicing. However this is to inform you that the Medical Council of India has prescribed a format of application for use for filing before this council any appeal against a decision of State Medical Council which is available on the website of the Medical Council of India i.e. [www.mciindia.org](http://www.mciindia.org).' A lot of irrelevant information was given to me through this reply except for my specific query. It is quite common to find information, which should not be displayed on the website as per the code of medical ethics, just to increase the business of the hospital, thereby violating the clause 6.1.1 of code of medical ethics 2002. In my brother's case nobody explained the prognosis of the case to the attendant, because the junior doctors on duty failed to understand the serious nature of the case, once again violating the clause 2.3 of code of medical ethics 2002, which reads 'The physician should neither exaggerate nor minimize the gravity of a patient's condition. He should ensure himself that the patient, his relatives or his responsible friends have such knowledge of the patient's condition as will serve the best interests of the patient and the family.' One of the doctors involved in the management of my brother's case has no requisite degree, recognized by MCI to handle such cases. When I sought information on this issue from MCI under RTI act the reply I got was 'It is to inform you that the query raised by you, is not an information as defined u/s 2(f) of the RTI Act, 2005.' Even this letter I got after a long wait and only in the office of Information Commissioner of India, after filing a second appeal.<sup>5</sup> It is quite common to find people practicing medicine with many fake degrees. I wonder if there is any other body in the country to apprise us with the fact other than Medical Council of India on this aspect. Even the clause 7.20 reads 'A Physician

shall not claim to be specialist unless he has a special qualification in that branch.'

In my case the consultant under whom my brother was admitted preferred not to examine the patient till the case was out of hand. If he had no time, he could have refused admission of my brother under him as per clause 2.4 of code of medical ethics, which reads 'A physician is free to choose whom he will serve. He should, however, respond to any request for his assistance in an emergency. Once having undertaken a case, the physician should not neglect the patient, nor should he withdraw from the case without giving adequate notice to the patient and his family. Provisionally or fully registered medical practitioner shall not willfully commit an act of negligence that may deprive his patient or patients from necessary medical care.'

When I met the medical director of the hospital and apprised him of the lapses in the management of the case, he instead of being apologetic and offering sympathy, started defending his doctors and staff, violating the clause 1.7 of code of medical ethics, 2002 which states 'A Physician should expose, without fear or favour, incompetent or corrupt, dishonest or unethical conduct on the part members of the profession

My brother was taken off the life support without observing any formality violating the clause 6.7 of code of medical ethics 2002 according to which 'Practicing euthanasia shall constitute unethical conduct. However on specific occasion, the question of withdrawing supporting devices to sustain cardio-pulmonary function even after brain death, shall be decided only by a team of doctors and not merely by the treating physician alone. A team of doctors shall declare withdrawal of support system. Such team shall consist of the doctor in charge of the patient, Chief Medical Officer / Medical Officer in charge of the hospital and a doctor nominated by the in-charge of the hospital from the hospital staff or in accordance with the provisions of the Transplantation of Human Organ Act, 1994. .

Besides the above clauses of code of medical ethics 2002, the violations of which which I have experienced, not as a doctor ,but sitting on the other side of table as a common man, there are so many clauses like clause 1.1.3[basically deals with quackery],1.4.2[fake

degrees not recognized by MCI], 3.1[unnecessary consultation],3.3[punctuality in consultation], 6.4.1[commission], 7.6 [sex determination test], 7.11[advertising], 7.13[affixing sign-board on chemist,s shop], 7.19[touts], 7.22[unethical research], 7.23,7.24[regarding being absent from place of duty in rural and medical college respectively] etc ,which are being violated routinely . This code of medical ethics is not a law of the country. Only MCI can take any action in case of any violation in code of medical ethics. There is need to rewrite the code of medical ethics. What so ever is displayed on the website and taught to the medical students , should be followed in practice. This can happen only when MCI, public representatives and Govt of India act in unison.

Aamir's Satyamev Jayate has made a section of doctors uncomfortable. Aamir has repeatedly given the statement that he had respect for doctors doing good work and not involved in any unethical practice. His last such statement came on 30<sup>th</sup> June 2012 on IBN TV in 'Tikhi Bat' with Prabhu Chawla.<sup>6</sup> Even the IMA secretary Dr. D.R.Roy has accepted the fact that there are black horses in medical field also.<sup>7</sup> Through this letter I would like to request IMA and MCI to identify such horses and do the needful to save our profession from deteriorating and being degraded any further.

#### REFERENCES

1. Thakur S K 'Responsible writing' *Indian J Surg*,2010,72:278
2. <http://www.wma.net/en/30publications/10policies/g1/index.html>
3. [http://www.mciindia.org/helpdesk/download/Indian\\_Provisional\\_Permanent\\_Registration.pdf](http://www.mciindia.org/helpdesk/download/Indian_Provisional_Permanent_Registration.pdf)
4. <http://www.mciindia.org/RulesandRegulations/CodeofMedicalEthicsRegulations2002.aspx>
5. [http://www.rti.india.gov.in/cic\\_decisions/CIC\\_SG\\_A\\_2012\\_000229\\_19180\\_M\\_83922.pdfv](http://www.rti.india.gov.in/cic_decisions/CIC_SG_A_2012_000229_19180_M_83922.pdfv)
6. [http://khabar.ibnlive.in.com/tag/tag\\_topic/blog/Tikhi-Baat.html](http://khabar.ibnlive.in.com/tag/tag_topic/blog/Tikhi-Baat.html)
7. <http://post.jagran.com/Satyamev-Jayate-IMA-ac-cuses-Aamir-of-defaming-medical-profession-asks-him-to-apologize-1338651132>

# Hypertension: Prevalence and its Associated Factors in a Rural South Indian Population

Madhu.B<sup>1</sup>, Srinath K M<sup>2</sup>, Ashok N C<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of Community Medicine, <sup>2</sup>Associate Professor, Department of Medicine, <sup>3</sup>Professor and HOD, Department of Community Medicine, JSS Medical College, JSS University Mysore.

## ABSTRACT

**Background:** Cardiovascular diseases are the leading causes of morbidity and mortality in the world. It has been predicted that most of the increase in the cardiovascular diseases will be occurring in the developing countries. Hypertension is not only the main factor involved in the pathogenesis cardiovascular diseases, but also a disease by itself with own risk factors and complications. Hence epidemiological studies for understanding the burden of hypertension are of vital importance.

**Objectives:** i) to estimate the prevalence of hypertension among adults in a rural area of Mysore district. ii) To identify the factors associated with hypertension.

**Materials and methods:** 1423 individuals aged above 18 years were interviewed to collect information about their socio-demographic characteristics, risk profile and measurements of blood pressure, height and weight.

**Statistical Analysis:** Prevalence rate and chi square analysis, for each factor was performed. Multiple logistic regression analysis was performed to identify the independent factors associated with hypertension.

**Results:** Overall prevalence of hypertension was 14.96 % (95% CI: 14.02%-15.91%), (213/1423). Highest prevalence (47.6%) was noted among individuals aged more than 60 years and the lowest (0.4%) was in 18-24 year age group. Increasing age, higher BMI, history of diabetes and sedentary lifestyle, were identified as independent risk factors for hypertension among the rural population of Mysore.

**Conclusions:** Rural population of Mysore which is in economic transition is burdened with non communicable diseases like hypertension. An effective screening program and specific health promotion are needed to control and curtail the same.

**Key Words:** Hypertension, Prevalence, Rural, Mysore, South India

## INTRODUCTION

Cardiovascular diseases are the leading causes of morbidity and mortality in the world. It has been predicted that, by the year 2020, an increase in cardiovascular disease will occur in the developing countries<sup>1</sup>. Hypertension is one of the powerful and modifiable risk factor for the development of cardiovascular disease. It is a condition by itself with many risk factors and complications. Considering the large population and increasing number of hypertension related deaths, the burden of hypertension can be enormous. In the absence of efficient non communicable disease

surveillance system in our country, reliable methods of obtaining disease estimates is to conduct population based studies. Examining the patterns of blood pressure distribution, can shed light on the role of various factors associated with hypertension. This helps in planning of population based preventive strategies to control and curtail the same.

Mysore has recently come up as the hub of industrialization and urbanization, influencing the lifestyle and behavioural patterns of people living in and around Mysore city. Rural areas, around Mysore urban agglomeration are influenced by such urbaniza-

tion and are in a phase of socioeconomic and epidemiological transition. Such populations are at high risk of developing lifestyle disorders like hypertension. Literature review does not reveal any population based studies from rural areas of Mysore. As there is paucity of data in this regard, the present study was undertaken in a rural area of Mysore district.

Objectives of the study were to estimate the prevalence of hypertension among adults in a selected rural area of Mysore district and to identify the factors associated with hypertension.

## MATERIAL AND METHODS

**Type of Study:** A population based Cross-sectional study was carried out at Hadinaru, Nanjangud taluk, Mysore district, Karnataka state, south India. Data collection was carried out from July 2007 to May 2008.

**Sample size estimation:** Sample size of 1600 was calculated according to an expected prevalence of hypertension<sup>2</sup> (p) of 10% at 5% level of significance and an allowable error (d) of 15% on the prevalence of hypertension, using the formula  $Z_{(1-\alpha/2)}^2 pq/d^2$ .

Household was considered as a sampling unit. An average of three adults was expected in each household and to interview 1600 adults, around 535 households had to be selected. A non response of 10%, in the form of locked houses was expected during the survey and finally 600 households were intended to be studied. As per 2001 census, there were 1200 households in the village, to select 600 households, systematic random sampling technique was used and every alternate house in each lane was selected and persons aged  $\geq 18$  years in the selected household were included in the study. Individuals who had i) Severe chronic illness ii) Physical disability iii) Mental disability and pregnant women were excluded from the study. A total of 484 households were covered and 1423 persons were interviewed (90% response rate). Reasons for non response were locked houses, individuals who had been to work at the time of interview, who had been to a relative's house in a different village and individuals who refused to participate in the study.

Ethical clearance was obtained from the JSS Institutional ethical committee before the initiation of the study. Informed consent was obtained from each of the study participant.

Data was collected by personal face to face interviews, using a predesigned questionnaire. The questionnaire included details on individual's socio-demographic characteristics, information on risk factors for hypertension.

Current history of hypertension/ diabetes, tobacco and alcohol consumption pattern, fat consumption pattern and physical activity status was obtained from each individual.

Physical activity was assessed and classified as sedentary, moderate and rigorous activity. Sedentary activity was defined, if the individual was doing routine activities and/or doing less than 2 hours of moderate activity per day and with no active exercise or walking (e.g.: job involving desk work, mainly doing domestic activities, viewing television or reading, woman having a servant for washing and cleaning purposes. Moderate activity, if the individual was doing activities like office work, walking to the field, walking for half an hour every day, cooking with the help of motorized equipment, gardening, feeding cattle for 2-8 hrs and doing less than 2 hours of rigorous activity per day. (e.g.; home maintenance activities like cooking, sweeping and mopping the floor, gardening, feeding cattle or livestock, washing linen/ cloth by hand, carrying firewood, drawing water from well etc. Based on the visible fat consumption / person /month, the individuals were grouped into either as consuming more than 1kg of visible fat or otherwise.

A standard mercury sphygmomanometer (Diamond Co. BP Apparatus, Pune India) was used for recording the blood pressure. Study participants were instructed to refrain from drinking any caffeinated beverage and from smoking beedi/ cigarette during the half-hour preceding the interview. Blood pressure was measured twice on the left arm of each subject in sitting position and mean Blood pressure calculated. **Hypertension** was defined if Systolic Blood Pressure was  $\geq 140$  mm of Hg and/or Diastolic Blood Pressure  $\geq 90$  mm of Hg, and/or on treatment with antihypertensive (JNC VII criteria) **Height** was measured to the nearest 0.5cm, with the subject standing erect without foot wear, with gaze horizontal, on which the scale was marked with the measuring tape. **Body weight** of the study subject was measured, to the nearest 0.5kg using a standard Krupp's weighing machine. Subjects were instructed to wear minimal clothing (as culturally appropriate) and no footwear while their weight was being measured. Cut off levels for overweight and obesity were taken as Body Mass Index  $\geq 23$  and  $\geq 25$  respectively. (WHO Asia Pacific guidelines).<sup>3</sup>

## STATISTICAL ANALYSIS

Data analysis was performed using Epi-info software Version 3.5.3. Overall prevalence of hypertension and prevalence rate (in %) for each of the factors were estimated. Statistical significance was evaluated at 5% level of significance utilizing chi-square test. Multiple



logistic regression analysis was performed with hypertension as the dichotomous outcome variable (dependent variable) and age, BMI, type of occupation, fat intake, history of current diabetes mellitus and physical activity as independent variables.

### RESULTS

Study included 1423 subjects (Males= 710, females =713). Mean age of participants was 40.9 ±16.32 years. 47.9% of subjects were literates. Main occupation of the respondents was agriculture based (41%). Thirty four percent and twenty percent of subjects belonged to socio-economic class IV and V.

Mean systolic and diastolic blood pressure was 124 ± 14.47 mmHg and 78.5 ± 8.2 mm of Hg respectively. From figures 1 and 2

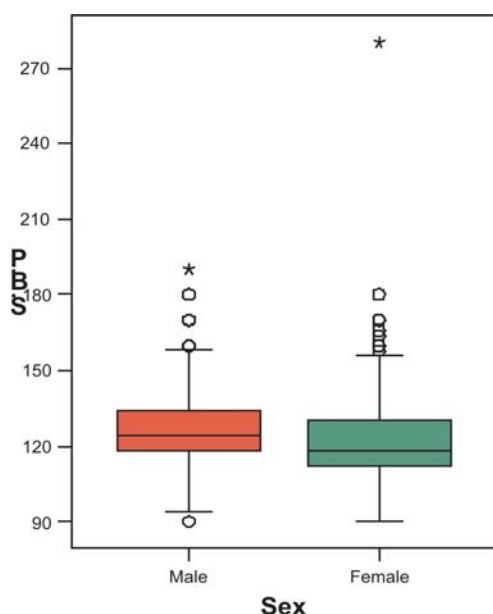


Figure 1: Distribution of Systolic Blood Pressure among study subjects

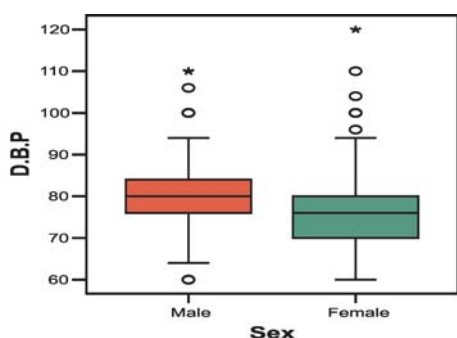


Figure 2: Distribution of Diastolic Blood Pressure among study subjects

it is evident that distribution of SBP and DBP among males and females is similar. However, SBP and DBP values for females are lower when compared to males.

One woman was found to have an extreme SBP and DBP (280/120 mmHg)

Prevalence of self-reported hypertension was 8.7% (95% CI: 7.95 - 9.44%) (117/1425). Overall prevalence of Hypertension was 14.96% (95% CI: 14.02%-15.91%) (213/1423). Prevalence of hypertension was low (0.41%) in the 18-24 year age group and steadily increased to 19.3% in 45-54 year age group and highest prevalence of 47.6% was noted in persons above 65 years. Prevalence of hypertension was higher among women than men (16.2% vs. 13/5%; p>0.05). Age and sex wise prevalence of hypertension is depicted in figure 3.

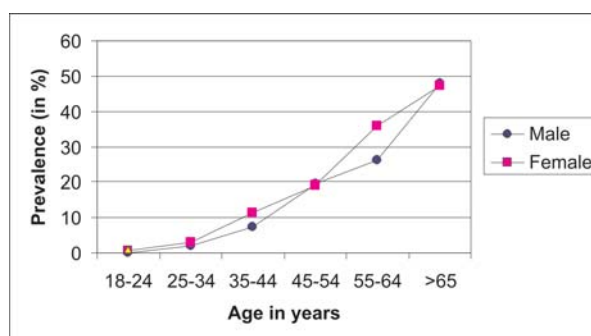


Figure 3: Age and sex wise prevalence of hypertension

In both sexes, statistically significant positive relationship of hypertension with age was noted.

Prevalence of hypertension according to various factors is presented in table 1 and table 2. Chi-square analysis indicated that factors like age, education, marital status, type of family, type of occupation, self-reported diabetes, high fat intake, physical activity and obesity were significantly associated with hypertension (p<0.05).

Multiple logistic regression analysis (Table 3) revealed age (OR=1.07), BMI (OR = 1.27), history of diabetes (OR = 4.29), and sedentary life style (OR = 2.4) as significant independent predictors of hypertension.

### DISCUSSION

Epidemiology of hypertension, in terms of its importance as a risk factor for cardiovascular diseases, continues to be a major area of research. In the absence of a reliable Non Communicable diseases surveillance system, sporadic studies from different parts of the country provide data on the epidemiology of hypertension. First epidemiological study of hypertension from urban north India was reported by Chopra and Chopra in 1942<sup>4</sup>. Since then many sporadic studies have been reported from urban and rural areas of India. Subsequently various studies conducted in other rural areas of India, have estimated prevalence of hyperten-

sion ranging from 3.2% to 33%<sup>5-12</sup>.

**Table 1: Prevalence of hypertension according to socio-demographic Characteristics**

Variable	Total (n =1423)	Prevalence of hypertension (in %)	95% C.I.Of prevalence rate (in %)	P value
Age group (in years)		(in %)	(in %)	
18-24	242	0.4	0.0-0.8	< 0.001
25- 34	315	2.4	1.5-3.25	
35-44	260	9.0	7.3-10.69	
45-54	183	19.3	16.68-21.91	
55-64	122	30.3	26.83-33.76	
>65	88	47.6	43.74-51.45	
Gender				
Male	710	13.6	12.31-14.88	>0.05
Female	713	16.2	14.82-17.57	
Educational status				
Illiterates	744	18.6	17.17-20.02	<0.001
Primary	226	15.0	12.62-17.37	
Secondary	261	8.4	6.67- 10.11	
PUC / Diploma	107	4.7	2.65-6.74	
Graduate and above	85	16.5	12.47-20.52	
Marital status				
Unmarried	260	3.1	2.73-3.46	<0.001
Currently married	994	14.9	14.11-15.68	
Divorced/separated	169	39	35.41-42.58	
Family				
Nuclear	495	11.9	10.97-12.82	<0.001
Joint	312	10.5	9.45- 11.54	
Three generation	604	18.4	17.2-19.59	
Living alone in the house	12	84		
Occupation				
Professionals/Semi professionals	44	15.9	10.38-21.41	<0.001
Agriculturists	242	14.8	12.51-17.08	
Business	67	16.4	11.87-20.96	
Skilled workers	63	7.9	4.5-11.29	
Unskilled workers/labourers	343	9.6	8.0-11.19	
Housewives	491	15.2	13.57-16.82	
Others(Students, unemployed & retired)	173	26.5	23.14-29.85	
Social class				
Class I (upper)	121	19.0	15.43-22.56	>0.05
ClassII(upper middle)	138	18.1	14.82-21.37	
Class III (lower middle)	401	15.7	13.88-17.51	
Class IV (upper lower)	484	14.7	13.09-16.30	
Class V (lower)	279	11.1	9.21-12.98	

Overall prevalence of hypertension among adults in the rural area of Mysore as estimated in the present study is 14.96%, indicating that nearly one fifth of adults in rural Mysore have hypertension. Estimates made by Gupta et al<sup>6</sup> in rural Rajasthan and Wander et al<sup>7</sup> in rural Punjab is similar to our estimate (15.3% (Rajasthan) and 14.5% (High prevalence of 30% was reported in studies done by Kutty et al<sup>8</sup>, in rural Kerala and Hazarika et al<sup>9</sup> in rural Assam. Low estimates were observed by Hussain et al (6.7%)<sup>8</sup> and Malhotra et al (4.5%).<sup>9</sup> Differences in prevalence rates could be due to different cut off points used for defining hypertension and differing age groups that constituted the study.

**Table 2: Prevalence of hypertension according to clinical correlates.**

Variable	Total (n=1423)	Prevalence of hypertension (in%)	95% C.I of Prevalence rate (in %)	P value
History of diabetes mellitus				
No	1388	13.6	12.67-14.52	<0.001
Yes	35	68.6	60.75-76.44	
Oil consumption/month/person				
<1kg	897	12.4	11.29-13.5	<0.05
>1 Kg	526	19.4	17.67-21.12	
Alcohol consumption				
No	1292	14.6	13.61-15.5	>0.05
Yes	131	19.1	15.66-22.5	
Tobacco consumption				
No	1161	14.2	13.71-15.2	>0.05
Yes	262	18.3	15.91-20.68	
Physical activity				
Sedentary	500	29.0	2.14-3.65	<0.001
Moderate	510	9.4	8.10-10.29	
Rigorous	413	4.8	3.74-5.85	
BMI				
Underweight (<18.5)	223	8.0	6.18-9.81	<0.001
Normal (18.5 - 22.99)	846	9.3	8.3-10.29	
Overweight (23-24.99)	192	23.9	20.82-26.97	
Obese (>25)	162	43.2	39.30-47.09	

**Table 3: Multivariate logistic regression analysis for association of various factors with prevalence of hypertension**

Variable	Categories	Odds Ratio	95% CI (lower limit-upper limit)	P-value
Age		1.07	1.05-1.09	< 0.001
BMI		1.27	1.19-1.35	< 0.001
Education	Illiterate	1.00		> 0.05
	< 10 years	0.79	0.49-1.26	
	>10 years	1.48	0.66-3.31	
Family	Nuclear <sup>R</sup>	1.00		
	Joint	0.64	0.22-1.51	> 0.05
	3 -generation	0.78	0.27-1.29	
Marital status	Unmarried <sup>R</sup>	1.00		> 0.05
	Married	1.04	0.41-2.59	
	Widowed/divorced	1.70	0.59- 4.84	
Occupation	Professional/ Semi-professionals <sup>R</sup>	1.00		> 0.05
	Agriculturists	2.07	0.66-6.51	
	Businessmen	1.96	0.53-7.25	
	Skilled worker	1.85	0.42- 8.17	
	Unskilled worker	1.29	0.37-4.50	
	Housewives	2.38	0.75-7.53	
	Retired /unemployed	1.21	0.37-3.96	
Oil consumption	< 1 Kg <sup>R</sup>	1.00		> 0.05
	> 1 Kg	1.10	0.73-1.67	
Diabetes mellitus	No <sup>R</sup>	1.00		< 0.001
	Yes	4.29	1.70-10.87	
Physical activity	Rigorous <sup>R</sup>	1.00		> 0.05< 0.001
	Moderate	1.23	0.63-2.4	
	Sedentary	2.4	1.23-4.76	

R – Reference category

Along with the burden of poverty related diseases, rural population are equally facing the burden of chronic non-communicable diseases. Prevalence of hypertension steadily increased with increasing age and the highest prevalence of 47.6 percent was noted in the above 65 year age group. This indicates that the advancing age is an important non modifiable risk factor of hypertension and among the elderly nearly half of them are diagnosed to have hypertension. Women had higher prevalence of hypertension than men; however this difference was statistically insignificant.

**Prevalence of self – reported hypertension** was 8.7 percent as against the estimated prevalence of 15 percent. This calls for regular hypertension screening in the rural population, which can help in early detection and also in the reduction of hypertension related complications.

Various risk factors have been associated with hypertension in epidemiological surveys. Increasing age, higher BMI, history of diabetes mellitus and decreased physical activity were found to be independently associated with increased risk of hypertension in the rural population of Mysore. This association was according to expectations and further substantiates previous researches done by Malhotra et al<sup>11</sup> and Thankappan et al<sup>12</sup> in Indian rural populations. Significant association between hypertension and diabetes were made by Dhobi et al<sup>13</sup> and the UKPDS<sup>14</sup> studies, the present study too observed a four times higher prevalence among diabetics than non diabetics.

**Conclusions:** With predominant focus on communicable diseases and reproductive and child health issues in national programs, non communicable diseases are neglected. Non-communicable diseases, once regarded as diseases of the affluent, now burden rural populations. There is a need to develop population based hypertension screening programs within the health system.

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#### REFERENCES

- 1 Preventing Chronic Diseases. A Vital Investment: WHO Global Report. Geneva .World Health Organization, 2005.
- 2 WHO: Hypertension control; Report of a WHO Expert Committee: Technical Report Series No. 862: 1996: WHO: Geneva: 4-7.
- 3 World Health Organization. The Asia Pacific perspective: Redefining obesity and its treatment. Geneva, Switzerland: World Health Organization; 2000.
- 4 Chopra RN, Chopra GS. A study of normal blood pressure in Indians. Indian Med Gaz 1942; 77:21-2.
- 5 Gupta R. Trends in hypertension epidemiology in India. J Hum Hypertens 2004; 18:73-8.
- 6 Gupta R, Gupta HP, Herwani P et al., Coronary Heart Disease and Coronary Risk factor prevalence in Rural Rajasthan. J. Assoc. Physicians of India 1994; 42(1): 24-26.
- 7 Wander GS, Khurana SB, Gulati R, Sachar PK, Gupta RK, Khurana S et al. Epidemiology of Coronary Heart Disease in a rural Punjab population .Indian Heart J 1994; 16(6):319-23.
- 8 Kutty VR, Balakrishna KG, Jayashree AK, Thomas J. Prevalence of CHD in rural Population of Thiruvananthapuram district, Kerala, India. Int J Cardiol 1993; 39(1):59-70.
- 9 Hazarika NC, Biswas D, Narayan K, Mahanta Kalita HC. Hypertension and its risk factors in tea garden workers of Assam. The National Medical Journal of India 2002; 15(2): 63-8.
- 10 Core committee group. Indian Hypertension guidelines. Munjal YP, editor. Post Graduate Medicine [Recent Advances in Medicine] Mumbai. Association of Physicians of India.2007; vol 21:315-18.
- 11 Malhotra P, Kumari S, Kumar R, Jain S, Sharma BK. Prevalence and determinants of hypertension in an un –industrialization rural population of North India. Journal of Human Hypertension 1999; 13(7): 467-72.
- 12 Hypertension study group. Prevalence, awareness, treatment and control of hypertension among the elderly in Bangladesh and India. A multi- centric study. Bulletin of WHO.2001: 79(6): 490-500.
- 13 Dhobi GN, Majid A, Masoodi SR, Bashir MI, Wani AI, Zargar AH. Prevalence of hypertension in patients with new onset type 2 diabetes mellitus. J Indian Med Assoc 2008; 106:92-8.
- 14 United Kingdom Prospective Diabetes Study. UKPDS. The prevalence of hypertension in newly presenting type 2 diabetic patients and the association with risk factors for cardiovascular and diabetic complications. J Hypertension.1993; 11:309-17

# Health Scenario of Urban Set Up of Assam in Regard to Chronic Diseases

Manab Deka<sup>1</sup>, Labananda Choudhury<sup>2</sup>, Amit Choudhury<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of Statistics, Arya Vidyapeeth College, Guwahati – 781016, Assam, India.<sup>2</sup>Professor,

<sup>3</sup>Associate Professor, Department of Statistics, Gauhati University, Guwahati-781014, Assam, India.

## ABSTRACT

**Objective:** There is increasing evidence to suggest that the epidemiologic transition is well underway in India and other less industrialized countries. Hence there is a need to review the status of our understanding of the impending epidemic of non-communicable chronic diseases (NCD) in India, given their chronic nature and their impact on society.

**Materials and Methods:** In this paper, attempt has been made to study the extent to which the risk factors contribute to chronic diseases. Specifically, inside the chronic disease afflicted group, one could be interested to quantify the extent of influence of each of the risk factors and behaviors. Data set used here is a primary one collected through a household survey. Baye's method has been used to calculate the posterior probabilities.

**Results:** Given a person suffers from a chronic disease; the probabilities of him/her belonging to a particular group are calculated.

**Conclusion:** Such an exercise can help in focusing attention to the risk factors.

**Keywords:** *Chronic disease, Bayesian approach and logistic regression.*

## INTRODUCTION

Based on current trends, it is expected that non-communicable diseases (NCD) will account for 73% of deaths and 60% of the global disease burden by 2020, and will account for a major proportion of disease and deaths in India (WHO, 2002)<sup>1</sup>. As the work of Murray and Lopez (1996)<sup>2</sup> on the burden of diseases shows, the whole non-communicable disease cluster mostly comprising of chronic and degenerative disease is a major problem in middle income countries like India with cardiovascular diseases taking the lead. Diabetes is now emerging as the new pandemic of the 21<sup>st</sup> century. It is estimated that there are 150 million people with diabetes worldwide, with that number expected to double by 2025. Alarming increases are occurring everywhere including India, especially in urban areas. (WHO, 2001)<sup>3</sup>

Chronic diseases may be defined as diseases which have one or more of the following characteristics: they are permanent, leave residual disability, are caused by nonreversible pathological alteration, require spe-

cial training of the patient for rehabilitation or may be expected to require a long period of supervision, observation or care. (Dictionary of Health Services Management, 1987)<sup>4</sup>

The effect of socio-economic and demographic factors on health outcomes particularly prevalence of chronic disease may result from a variety of social and individual factors that vary by social class and adoption of life style behaviors that are associated with prevalence of chronic diseases (Lowry et. al,1996)<sup>5</sup>.

Although, conventional statistical approaches to inferences had dominated statistical theory and practice for most of the last century, the last decade or so has seen a rise of interest in the Bayesian approach, which is, today, extensively used for making inferences by researchers of applied statistics. By Bayesian data analysis, we mean practical methods for making inferences from data using probability models for quantities we observe and for quantities about which we wished to learn. The essential characteristic of Bayesian method is their explicit use of probability for

quantifying uncertainty in inferences based on statistical data analysis (Gelman et. al, 2000)<sup>6</sup>.

In this paper, attempt has been made to unearth the possible influence of various socio-economic and demographic factors on the prevalence of chronic diseases by using Bayesian approach for a representative sample of adult population of Guwahati, the capital city of Assam.

### MATERIALS AND METHODS

The data source used in this study is a primary one collected through a household survey conducted in Guwahati, the state capital as well as largest city of Assam. People from nook and corner of the state migrate to the city to earn a living. Therefore it being a good representative of urban areas of Assam, we concentrated on this city for data collection. There are 60 wards under Guwahati Municipal Corporation area. We have used Stratified Random Sampling technique taking wards as strata. We observe that the strata are homogenous with respect to socio-economic and cultural factors. From each ward, households were selected by Simple Random Sampling technique. Altogether, 6343 respondents from 1469 households were interviewed.

We use the well known Bayes theorem for our analysis with usual notations.

### OBSERVATION & RESULTS

For our analysis, we have considered only those persons who attained age 30 years at the time of interview. The reason for this censoring is that very few cases of chronic disease have been observed under 30 years of age. Consequently, our analysis was carried out on 2913 respondents, out of which 1571 are males and 1342 are females. Moreover, we observe that out of total respondents, 17% are afflicted by chronic diseases, whereas only 11% are afflicted by non-chronic diseases, which is one of the reasons for choosing chronic diseases for our study.

The authors had carried out an exercise to identify risk factors of chronic diseases in the context of the above mentioned database. Details of the results can be seen in one of our earlier publications (Choudhury et al, 2009)<sup>7</sup>. The technique used was logistic regression and the results are presented in Table 1. We do see any merit in restating details of the analysis we carried out in that paper. In this paper, our aim is to carry forward that analysis by using Bayesian approach.

**Table 1: Results of logistic regression for chronic diseases.**

Variables	P-value	Odds Ratio	95% C. I. for Odds Ratio	
			Lower	Upper
<b>Age</b>				
Above 50 years	.000	3.134	3.134	3.975
30 – 49 years®				
<b>Sex</b>				
Male	.840	.959	.959	1.445
Female®				
<b>Marital status</b>				
Ever married	.000	4.882	4.882	12.232
Widow/Widower	.064	1.459	1.459	2.175
Never married®				
<b>Education</b>				
Illiterate	.099	1.555	1.555	2.628
Below HSLC	.795	1.046	1.046	1.464
HSLC-Under Graduate	.298	1.158	1.158	1.527
Graduate and above®				
<b>Occupation</b>				
House wife	.008	.488	.488	.832
Self-employed	.064	.671	.671	1.024
Pvt. Service	.045	.568	.568	.988
Govt. Service	.055	.691	.691	1.008
Others	.045	.580	.580	.988
Retired®				
<b>Per capita income (Annual)</b>				
Below Rs. 10,000	.029	.662	.662	.958
Rs.10,000– Rs.30,000	.986	.998	.998	1.262
Rs.30,000 and above®				
<b>Type of house</b>				
Kachcha	.011	.474	.474	.841
Semi-pucca	.086	.778	.778	1.036
Pucca®				
<b>Food habit</b>				
Vegetarian	.085	1.447	1.447	2.204
Non-vegetarian®				
<b>Smoking</b>				
Yes	.000	2.056	2.056	2.720
No ®				
<b>Mother Tongue</b>				
Assamese	.029	1.548	1.548	2.293
Bengali	.002	1.964	1.964	3.002
Others®				
<b>Religion</b>				
Hinduism	.085	.747	.747	1.041
Others®				
<b>Caste</b>				
SC/ST	.932	.987	.987	1.337
Gen/OBC®				
<b>Media exposure</b>				
Yes	.096	1.706	1.706	3.197
No®				
<b>Crowding</b>				
£ 3 Persons per room	.959	1.011	1.011	1.520
>3 Persons per room®				

For the purpose of this paper, we have considered only those categories of variables/characteristics, which were found to have a significant effect and whose chances of having chronic diseases are more than double than the reference categories, obtained in our previous study by logistic regression. We observe from table 1 that the following categories of the characteristics can be selected according to our criteria of selection:

1. **Age**
  - (i) 50 years and above
  - (ii) 30 – 49 years.
2. **Marital status**
  - (i) ever married
  - (ii) other than ever married.
3. **Occupation**
  - (i) retired
  - (ii) other than retired.
4. **Type of house**
  - (i) living in pucca houses
  - (ii) living in other than pucca houses.
5. **Smoking habit**
  - (i) Yes
  - (ii) No

We propose mutually exclusive segmentation of the population under study in such a manner that individuals belonging to a particular segment are homogeneous with regard to their vulnerability to the chronic disease with heterogeneity among different segments. We thus define the following 32 mutually exclusive events in Table 2 by using the categories of the above-mentioned characteristics. We may note here that our database is large enough to ensure that there is sufficient data in each of the categories to carryout our analysis.

**Table 2: Different mutually exclusive segments:**

Categories		Characteristics			
B <sub>1</sub>	Age50+	Ever-married	Retired	Pucca houses	Smokers
B <sub>2</sub>	Age50+	Ever-married	Retired	Pucca	Non-smoker
B <sub>3</sub>	Age50+	Ever-married	Retired	Non-Pucca	Smoker
B <sub>4</sub>	Age50+	Ever-married	Retired	Non-Pucca	Non-smoker
B <sub>5</sub>	Age50+	Ever-married	Non-Retired	Pucca	Smoker
B <sub>6</sub>	Age50+	Ever-married	Non-Retired	Pucca	Non-smoker
B <sub>7</sub>	Age50+	Ever-married	Non-Retired	Non-Pucca	Smoker
B <sub>8</sub>	Age50+	Ever-married	Non-Retired	Non-Pucca	Non-smoker
B <sub>9</sub>	Age50+	Unmarried	Retired	Pucca	Smoker
B <sub>10</sub>	Age50+	Unmarried	Retired	Pucca	Non-smoker
B <sub>11</sub>	Age50+	Unmarried	Retired	Non-Pucca	Smoker
B <sub>12</sub>	Age50+	Unmarried	Retired	Non-Pucca	Non-smoker
B <sub>13</sub>	Age50+	Unmarried	Non-Retired	Pucca	Smokers
B <sub>14</sub>	Age50+	Unmarried	Non-Retired	Pucca	Non-smoker
B <sub>15</sub>	Age50+	Unmarried	Non-Retired	Non-Pucca	Smoker
B <sub>16</sub>	Age50+	Unmarried	Non-Retired	Non-Pucca	Non-smoker
B <sub>17</sub>	Age30-49	Ever-married	Retired	Pucca	Smoker
B <sub>18</sub>	Age30-49	Ever-married	Retired	Pucca	Non-smoker
B <sub>19</sub>	Age30-49	Ever-married	Retired	Non-Pucca	Smoker
B <sub>20</sub>	Age30-49	Ever-married	Retired	Non-Pucca	Non-smoker
B <sub>21</sub>	Age30-49	Ever-married	Non-Retired	Pucca	Smoker
B <sub>22</sub>	Age30-49	Ever-married	Non-Retired	Pucca	Non-smoker

B <sub>23</sub>	Age30-49	Ever-married	Non-Retired	Non-Pucca	Smoker
B <sub>24</sub>	Age30-49	Ever-married	Non-Retired	Non-Pucca	Non-smoker
B <sub>25</sub>	Age30-49	Unmarried	Retired	Pucca	Smoker
B <sub>26</sub>	Age30-49	Unmarried	Retired	Pucca	Non-smoker
B <sub>27</sub>	Age30-49	Unmarried	Retired	Non-Pucca	Smoker
B <sub>28</sub>	Age30-49	Unmarried	Retired	Non-Pucca	Non-smoker
B <sub>29</sub>	Age30-49	Unmarried	Non-Retired	Pucca	Smoker
B <sub>30</sub>	Age30-49	Unmarried	Non-Retired	Pucca	Non-smoker
B <sub>31</sub>	Age30-49	Unmarried	Non-Retired	Non-Pucca	Smoker
B <sub>32</sub>	Age30-49	Unmarried	Non-Retired	Non-Pucca	Non-smoker

We define the event CD: Having chronic disease.

We calculate the probabilities of the 32 events mentioned in the above table.

We observe as expected that

$$\sum_{i=1}^{32} P(B_i) = 1$$

We also calculate the conditional probabilities of the event of having chronic diseases (CD) given that the events B<sub>1</sub>, B<sub>2</sub>, ..., B<sub>32</sub> have already been happened.

We have

$$P(CD) = P\{CD \cap (\cup B_i)\}$$

since B<sub>i</sub>'s are mutually exclu-

sive events.

$$= \sum_{i=1}^{32} P(B_i)P(CD / B_i)$$

We thus compute

$P(CD) = 0.1671816$ , which represents the probability of having chronic disease.

By Baye's theorem, the posterior probabilities are given by

$$P(B_i / CD) = \frac{P(B_i)P(CD / B_i)}{\sum_{i=1}^{32} P(B_i)P(CD / B_i)}$$

We then compute the posterior probabilities and presented in table 3.

**Table 3: Different posterior probabilities:**

$P(B_1/CD) = .034908$	$P(B_2/CD) = .006160$	$P(B_{17}/CD) = 0$	$P(B_{27}/CD) = 0$
$P(B_2/CD) = .075975$	$P(B_{10}/CD) = .016427$	$P(B_{18}/CD) = 0$	$P(B_{28}/CD) = .004107$
$P(B_3/CD) = .006160$	$P(B_{11}/CD) = .002053$	$P(B_{19}/CD) = 0$	$P(B_{29}/CD) = 0$
$P(B_4/CD) = .012320$	$P(B_{12}/CD) = .002053$	$P(B_{20}/CD) = 0$	$P(B_{30}/CD) = 0$
$P(B_5/CD) = .098563$	$P(B_{13}/CD) = 0$	$P(B_{21}/CD) = .071869$	$P(B_{31}/CD) = .002054$
$P(B_6/CD) = .164271$	$P(B_{14}/CD) = .090343$	$P(B_{22}/CD) = .209446$	$P(B_{32}/CD) = .014374$
$P(B_7/CD) = .036960$	$P(B_{15}/CD) = .006160$	$P(B_{23}/CD) = .030801$	$P(B_{33}/CD) = 0$
$P(B_8/CD) = .026694$	$P(B_{16}/CD) = .026694$	$P(B_{24}/CD) = .049282$	$P(B_{34}/CD) = .012320$

We observe from table 3 that the highest risk group for the chronic diseases is the group number 22, having characteristics – age 30-49 years, ever married, other than retired, living in pucca houses and not having smoking habit. This group is coming out to be the most vulnerable group comprising of 21% of the total chronic disease patients. An interesting verity that comes out of our analysis is the fact that the lower age group (30-49 years) has 5% higher probability than the higher age group (50 years and above) with similar characteristics. This is perhaps a feature of the area under study and it requires further in depth analysis to unravel reasons behind this apparent inconsistency.

We next compute the posterior probabilities for the characteristics – age group, marital status, occupation, type of house and smoking, given that the person has chronic disease. This will provide us the chance that a chronic disease patient will belong to a particular group.

We have

$$P(\text{Age 50 years and above } /CD)$$

$$= \sum_{i=1}^{16} P(B_i / CD)$$

$$= 0.605741$$

$$\text{and } P(\text{Age 30-49 years } /CD) = \sum_{i=17}^{32} P(B_i / CD)$$

$$= 0.394259$$

$$P(\text{ever married } /CD)$$

$$= \sum_{i=1}^8 P(B_i / CD) + \sum_{i=17}^{24} P(B_i / CD)$$

$$= 0.817247$$

$$\& P(\text{ Other than ever married } /CD) = 0.182753$$

$$P(\text{ Retired person } /CD) = 0.160162$$

$$\& P(\text{ Other than retired person } /CD) = 0.839838$$

$$P(\text{ living in pucca houses } /CD) = 0.825463$$

$$\& P(\text{ living in other than pucca houses } /CD) = 0.174537$$

$$P(\text{Smoker } /CD) = 0.295688$$

$$\& P(\text{Non-smoker } /CD) = 0.704312$$

We note that for a chronic disease patient, there is 61% chance that s/he will belong to the age group 50 years and above. Moreover, there is 81% chance that s/he will be an ever married person, 16% chance that s/he will belong to the retired category, 82% chance that s/he will live in pucca house and 30% chance that s/he will be a smoker.

The interpretation of these combined results may not be so persuasive, as for example; females who are usually non-smokers also contribute to the smoking category. That is why we try to compute the posterior probabilities for the above events for male and female separately to yield some compelling results. We calculate the prior probabilities as well as the conditional probabilities for both male and female separately.

We compute

$P(CD \text{ for male}) = 0.1756842$ , which represents the probability for a male to have chronic disease.

Similarly,  $P(CD \text{ for female}) = 0.157228$ , which represents the probability for a female to be affected by chronic disease.

We then calculate the posterior probabilities by using Baye’s theorem. The posterior probabilities are tabulated separately for male and female in table 4.

We observe vide table 4 that group number 5 having characteristics - age 50 years and above, ever-married, other than retired, living in pucca houses and with smoking habit, is the most vulnerable group for males, comprising of 17% of the male chronic disease patients. Whereas, for females, the most vulnerable group is group number 22 having characteristics- age 30-49 years, ever-married, other than retired, living in pucca houses and not having smoking habit, consisting of 31% of the female chronic disease patients.

We next compute the posterior probabilities for the characteristics – age group, marital status, occupation, type of house and smoking, given that the person has chronic disease separately for male and female. This will provide us the chance that a chronic disease patient will belong to a particular group.

**Table 4: Different posterior probabilities for males and females separately:**

MALES		FEMALES	
$P(B_1/CD) = .061594$	$P(B_{13}/CD) = 0$	$P(B_1/CD) = 0$	$P(B_{13}/CD) = 0$
$P(B_2/CD) = .130183$	$P(B_{14}/CD) = .007246$	$P(B_2/CD) = .004739$	$P(B_{14}/CD) = .199052$
$P(B_3/CD) = .010869$	$P(B_{15}/CD) = .010869$	$P(B_3/CD) = 0$	$P(B_{15}/CD) = 0$
$P(B_4/CD) = .021739$	$P(B_{16}/CD) = 0$	$P(B_4/CD) = 0$	$P(B_{16}/CD) = .061611$
$P(B_5/CD) = .173913$	$P(B_{17}/CD) = 0$	$P(B_5/CD) = 0$	$P(B_{17}/CD) = 0$
$P(B_6/CD) = .126812$	$P(B_{18}/CD) = 0$	$P(B_6/CD) = .213270$	$P(B_{18}/CD) = 0$
$P(B_7/CD) = .065217$	$P(B_{19}/CD) = 0$	$P(B_7/CD) = 0$	$P(B_{19}/CD) = 0$
$P(B_8/CD) = .021739$	$P(B_{20}/CD) = 0$	$P(B_8/CD) = .033175$	$P(B_{20}/CD) = 0$
$P(B_9/CD) = .010869$	$P(B_{21}/CD) = .126812$	$P(B_9/CD) = 0$	$P(B_{21}/CD) = 0$
$P(B_{10}/CD) = .014493$	$P(B_{22}/CD) = .130435$	$P(B_{10}/CD) = .018957$	$P(B_{22}/CD) = .312796$
$P(B_{11}/CD) = .003623$	$P(B_{23}/CD) = .054345$	$P(B_{11}/CD) = 0$	$P(B_{23}/CD) = 0$
$P(B_{12}/CD) = 0$	$P(B_{24}/CD) = .021739$	$P(B_{12}/CD) = .004739$	$P(B_{24}/CD) = .085308$
$P(B_{25}/CD) = 0$	$P(B_{25}/CD) = .003623$	$P(B_{25}/CD) = 0$	$P(B_{25}/CD) = 0$
$P(B_{26}/CD) = 0$	$P(B_{30}/CD) = .003623$	$P(B_{26}/CD) = .009479$	$P(B_{30}/CD) = .028436$
$P(B_{27}/CD) = 0$	$P(B_{31}/CD) = 0$	$P(B_{27}/CD) = 0$	$P(B_{31}/CD) = 0$
$P(B_{28}/CD) = 0$	$P(B_{32}/CD) = 0$	$P(B_{28}/CD) = 0$	$P(B_{32}/CD) = .028436$

We have for **males**,

$$P(\text{Age 50 years and above /CD}) = \sum_{i=1}^{16} P(B_i / CD) = 0.659421$$

P( ever married /CD)

$$= \sum_{i=1}^8 P(B_i / CD) + \sum_{i=17}^{24} P(B_i / CD) = 0.945652$$

P( Retired person /CD) =0.253623

P( living in pucca houses /CD) = 0.790203

P( Smoking habit /CD) = 0.521739

It has been noted that for a male suffering from chronic disease there is 66% chance that he will belong to the age group 50 years and above. Moreover, there is 95% chance that he will be an ever married person, 25% chance that he will belong to the retired category, 79% chance that he will live in pucca house and 52% chance that he will be a smoker.

Similarly we have for **females**,

$$P(\text{Age 50 years and above /CD}) = \sum_{i=1}^{16} P(B_i / CD) = 0.535545$$

P( ever married /CD)

$$= \sum_{i=1}^8 P(B_i / CD) + \sum_{i=17}^{24} P(B_i / CD) = 0.649289$$

P( Retired person /CD) =0.037915

P( living in pucca houses /CD) = 0.786730

P( Smoking habit /CD) = 0

We note that for a female suffering from chronic disease, there is 54% chance that she will belong to the age group 50 years and above. Moreover, there is 65% chance that she will be an ever-married lady, 4% chance that she will belong to the retired category, 79% chance that she will live in pucca house and no chance that she will be a smoker.

### DISCUSSION / CONCLUSION

We hope that our endeavour of using Bayesian approach to outline the probability of an individual being afflicted by chronic disease in each of some mutually exclusive segments of the population would be of considerable interest to health policy makers and would assist in improved targeting of executing action. Moreover, we have also presented an exercise to determine the extent to which the risk factors contribute to prevention of chronic diseases. Such an exercise can help in focusing attention to these factors.

### REFERENCE

1. World Health Organization. The World Health Report 2002: Reducing risks, promoting healthy life. World Health Organization, 2002, Geneva, Switzerland.
2. Murray, C. J. L. and Lopez, A. D. The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries, and Risk Factors in 1990 and Projected to 2020, Cambridge, M.A, Harvard University Press, 1996 (Global Burden of Disease and Injury Series, Vol. 1).
3. World Health Organization. Prevalence, Awareness, Treatment and Control of Hypertension Among the Elderly in Bangladesh and India: a Multicentre Study, *WHO Bul.* Vol 79, No. 6, 2001.
4. Dictionary of Health Services Management. Second edition, Owings Mills, MD: National Health Publication. Edited by Timmreck, T.C. 1987.
5. Lowry, R; Laura, K; Collins, J. L. and Kolbe, L. J. The Effect of Socioeconomic Status on Chronic Disease Risk Behaviors Among US Adolescents,



- JAMA*, September 11, 1996. Vol.276. No.10.
6. Gelman, A. B; Carlin, J. S; Stern, H. S. and Rubin, D. B. Bayesian Data Analysis, *Chapman & Hall/CRC*, New York, 2000.
  7. L. Choudhury, A. Choudhury and M. Deka. Influence of Socio-Economic and Demographic Factors on The Risk of Chronic Diseases in Guwahati- The Premier City of North East India, *Demography India* Vol. 38(1), 2009, pp:85-101

# Synthetic Drinks and Ill Health in Children

S.K.Manuprakash<sup>1</sup>, K.Varadarajshenoy<sup>2</sup>

<sup>1</sup>Assistant Professor of Pediatrics, Hassan Institute of Medical Sciences, Hassan, Karnataka 573201. <sup>2</sup>Professor, Fr Muller's Medical College, Mangalore, Karnataka

## ABSTRACT

The per capita consumption of carbonated soft drink has increased over the years especially among the pediatric population. This review attempts to give an insight of the impact of soft drinks on child's health and suggests some alternative for a healthy life style. Various research studies have shown that children consuming soft drinks have developed various acute and chronic ill effects such as nutritional deficiency, obesity, dental diseases, bone pathologies & psychological illness. As rightly said "an ounce of prevention is better than a pound cure", Government, parents, teachers, health professionals & mainly manufacturing companies should play a crucial role in solving the problems related to soft drink consumption.

**Key words:** Synthetic drinks, carbonated drinks, obesity

## INTRODUCTION

Progressive globalization of the food supply chain and the increased consumption of soft drinks, snacks, fast foods form a significant part of daily life causing acute and chronic illness.<sup>1, 2</sup>

Synthetic drinks are perceived as the "other" drinking problem in society in which the addicts are mostly kids. Intense marketing efforts by large soft drink manufacturers have ensured this addiction.<sup>2</sup>

This review gives an insight of the impact of soft drinks on human health & suggests alternatives for a healthy life style.

### Consumption Data

The per capita consumption of all carbonated soft drinks in united states increased from 24 gallons per year in 1970<sup>3</sup> to 52 gallons per year in 2005 an increase of 117%. Another report from an Australian soft drink industry says that the average per capita consumption of soft drink was 110 liters in 2003. This amount equates to approximately 300ml of soft drink consumed per person per day.<sup>4</sup>

### Reasons for elevated soft drink consumption

- 1) Cultural shifts play a major role in changing food habits.
- 2) There is strong association of high television viewing rate & unhealthy food habits leading to obesity in adolescents<sup>2,4</sup>

- 3) Watching movies has been another major influence.
- 4) Soft drinks being tasty & easily available, it is wrongly considered to be a stress reliever.

### Synthetic drink & its ingredients

Synthetic drink or soft drink is a non alcoholic beverage containing water & a flavoring agent.

Carbonated soft drinks were discovered by Europeans in 18<sup>th</sup> Century & later bubbly drinks were patented in US in 1810.

## SYNTHETIC DRINK COMPONENTS

### 1. Sweeteners

It can be in the form of sugar, saccharin & aspartame. Though aspartame in small doses is said to be harmless it is one of the most controversial additives. The uncontrolled consumption of soft drinks containing aspartame leads to acute & chronic methanol toxicity in humans.

### 2. Aromatic Substances

The pleasant taste in the soft drinks is due to aromatic substances. They also provide better stability to the drink.

### 3. Carbonated water

This is supposed to make the drink more refreshing. Carbonation is done by dissolving carbon dioxide

in water under pressure in chilled temperature just before the bottle is capped.

#### 4. Acids

Citric acid, Phosphoric acid & Malic acid are most commonly used. Acidity in the drink balances the sweetness.

#### 5. Food Colorants

Color makes the drink appetizing & attractive. Since many colorants are toxic, the usage of colorants is strictly restricted, as it can trigger asthma, hives & attention deficit hyperactive disorders in children.

#### 6. Preservatives

Preservatives like natriumbenzoate & potassium sorbate increases the shelf life of the product. Sodium benzoate is used as a broad spectrum antimicrobial, inhibiting bacteria, molds & yeasts. However preservative like sulfur dioxide can trigger asthma, rashes, hyperactivity, fainting, shock & coma.

#### 7. Antioxidants

Ascorbic acid prevents reactions that destroy aromatic substances in soft drinks.

#### 8. Additives

Emulsifying agents, stabilizing agents & thickening agents such as pectin, alginates & carraghen are also added to keep the drinks even bodied.

#### 9. Caffeine

Caffeine can be addictive. It can stimulate the central nervous system & increase the heart rate. It can increase the excretion of calcium.

#### 10. Undisclosed Ingredients

These are ethyl alcohol, sodium alginate, bromine in vegetable oil & Caffeine. Sodium alginate is hazardous during pregnancy.

#### Health hazards of soft drink consumption

Various research studies have shown that children consuming soft drinks have developed acute and chronic ill effects.<sup>6</sup>

#### 1. Displacement of healthier foods from diet

A high level of soft drink consumption is associated with less intake of vitamins, minerals & dietary fiber.<sup>7</sup> Another nutritional survey has shown that soft drink consumption by adolescents has increased leading to decline in milk consumption by 10%,<sup>8</sup> as a consequence of which there will be decreased intake

of calcium, magnesium, phosphorus, vitamin A and protein, resulting in short & long term bone diseases.

#### 2. Obesity

The major dietary factors associated with developing childhood obesity include, increased consumption of soft drinks, fat, oils & sodium. The most frequently encountered barriers in the management of obesity include consumption of fast food & soft drinks.<sup>9</sup>

There is a significant association of soft drink consumption & obesity as shown by Ludwig et al<sup>10</sup> & James J et al<sup>11</sup> in their studies. It was also shown that soft drink consumption has increased obesity by 57%.<sup>10</sup>

In a study by National heart, lung & blood institute, where in over 2000 girls were followed from ages 9-10 years till 18-19 years of age, revealed that the average soda consumption increased almost 300% over 10 years of study. This study concluded that, soda was the only beverage that was associated with increased obesity (BMI).<sup>25</sup>

Crawford PB et al study has concluded that, out of 28 dietary factors thought to be associated with obesity in children, sweetened beverages was the only dietary factor that was consistently linked to overweight in children.

Theoretically, daily consumption of one can of sweetened soft drink (500 kJ) over a period of 10 years could lead to a 50kg increase in weight, conversely by reducing daily intake of small quantity of energy or on increasing energy expenditure (energy gap), one may prevent unhealthy weight gain.

In children who increased their consumption of sugar sweetened drinks by one serving a day, their body mass index increased by 0.24kg/m<sup>2</sup> & their odds of being obese significantly increased.<sup>10</sup>

#### 3. Dental Health

Consumption of soft drinks in large quantity & increased frequency may cause damage to teeth in the form of enamel erosions & dental caries.<sup>13</sup>

Demineralization of dental enamel has increased in the recent past, due to larger usage of soft drinks, which eventually leads to calcium & phosphorus mobilization from the enamel, as a consequence of which collapse of the surface structures occurs. Another hypothesis is that, soft drinks may cause damage to teeth through acidogenicity & cariogenicity.

Dental erosion is the situation of a chronic loss of dental hard tissue that is chemically etched away from the tooth surface by acid & chelating agents without

bacterial involvement. Compared with caries, dental erosion seems to have much stronger relationship with soft drinks.<sup>16</sup>

It is found that over time, exposing dental enamel to carbonated beverage weakens & permanently destroys enamel.<sup>17</sup>

According to Australian dental association, damage to tooth enamel by acid erosion was reported in 25-45% of those surveyed.<sup>18</sup> Sugared versions of soft drinks proved to be more erosive than their diet counterparts.<sup>19</sup>

The low PH & high acidity leads to erosion of enamel surface. The sugars in drinks are metabolized by plaque microorganisms to generate organic acids that adds to process of demineralization, leading to dental caries.<sup>14</sup>

A study at **Iowa** found that intake of regular soda pop was the strongest predictor of the severity of caries.<sup>6</sup> There is also a strong association between the frequency of in between-meal consumption soda pop & caries.<sup>15</sup>

#### 4. Bone health

Commonly encountered problems following prolonged consumption of soft drinks are fractured bone, low bone density, osteoporosis & hypocalcaemia.

Several studies have shown that common bone problems occur due to displacement of milk from the diet & also due to direct effects of soft drinks. For example, caffeine causes loss of calcium in the urine<sup>20</sup> leading to osteoporosis. In the market, available 375ml of soft drink contain 40-50 mg of caffeine.

Studies have also shown that, there is strong association between soft drink & kidney stones.<sup>21</sup>

#### 5. Psychological & behavioral illness

Soft drinks containing caffeine can cause CNS disturbances like sleep disturbance, bed wetting, anxiety, headache, fatigue, decreased alertness, depressed mood & irritability.<sup>22</sup>

#### 6. Other long term implications on health

Several studies have shown that consuming soft drinks for prolonged period can cause obesity, hypertension, impaired glucose tolerance & hypercholesterolemia. Presence of Benzene<sup>23</sup> in soft drink can be carcinogenic.

Framingham heart study has shown that, those who drank one or more sodas per day were 50% more likely to develop metabolic syndrome( a combination of risk

factors , such as high waist circumference, high blood pressure, impaired fasting glucose or diabetes, that strongly predicts the likelihood of developing cardiovascular disease)than those who drank less than one soda per week<sup>26</sup>.

#### Healthy alternatives

1. Coconut water: Highly alkaline & easy to digest. It has all the properties of mother's milk.
2. Sugarcane juice & melon drinks- These are rich in natural minerals.
3. Lime juice & Butter milk
4. Dates.

#### Strategies to reduce soft drink consumption

##### 1) Main goals should be to

- a) Reduce intake of soft drink consumption by young children.
- b) Reduce frequency & quantity of soft drink consumption.
- c) Replace soft drinks with naturally available drinks.
- d) Replace sweetened soft drinks with milk based drinks.

##### 2) Recommendation for public & others

- Parents should be careful while choosing a beverage. It is important that "parents serve as role models".
- Parents & teachers should show more concern about the overall health of children & the foods consumed in the school.
- Pediatricians, dentists, health care professionals & dieticians should promote & support a healthy school environment.
- Schools should hold a thorough discussion before making any decision such as, for installing a vending machine in school to dispense a food or drink.
- Strict policies regarding prohibition of the sale of soft drinks & unhealthy food stuffs inside the school campus.
- Ban on advertisements of beverages in the school campus.
- Promoting healthy food stuffs in the public places, where people gather in large numbers.
- Manufacturing companies must acknowledge the problems of rising rates of obese children & work within their limits in influencing children from taking soft drinks.
- Government should sponsor further research to explore the ill effects of soft drinks.
- Additional taxes on each bottle of soft drinks to curtail consumption.

**Conclusion:** Several studies have proved beyond doubt that synthetic drink is no more a safe drink. "An

ounce of prevention is better than a pound cure". Government, parents, teachers, health professionals & mainly manufacturing companies should play a crucial role in solving the problems related to soft drink consumption.

### REFERENCES

1. WHO: Risks to oral health and intervention: Diet & nutrition- WHO [www.who.int]
2. Anne Nordrehaug Astros, Joyce Rose Masalu: Oral health behavior patterns among Tanzanian university students: a repeat cross-sectional survey: BMC Oral Health. 2001; 1(1):2.
3. Putnam j, Allshouse j. U.S. per capita food supply trends. Food review. 1998; 2-11.
4. Australian Beverages Council: "Carbonated Soft Drinks." Retrieved 5th September, 2007, Pg10079.
5. Martin-Villa MC, Vidal-Valverde C, and Rojas-Hidalgo E: Soluble sugars in soft drinks: Am J Clin Nutr. 1981 Oct; 34(10):2151-3.
6. Michael F Jacobson, Liquid Candy: How Soft Drinks are Harming Americans' Health: Centre for Science in the Public Interest, Washington DC 1998; 2nd Ed. 2005: 1-28.
7. Harnack L, Stang J and Story M: Soft drink consumption among US children and adolescents: nutritional consequences. J Am Diet Assoc 99(4): 436-441.
8. Cook T, Rutishauser I and Seelig M: Comparable data on food and nutrient intake and physical measurements from the 1983, 1985 and 1995 national nutrition surveys: Canberra, Australian Food and Nutrition Monitoring Unit.
9. Perrin, E.M., Flower, K.B., Garret, J. and Ammerman, A.S. 2005. Preventing and treating obesity: Pediatricians' self-efficacy, barriers, resources, and advocacy. Ambulatory Pediatrics, 5 (3):150-156.
10. Ludwig DS, Peterson KE, Gortmaker SL. Relation between consumption of sugar-sweetened drinks and childhood obesity: a prospective, observational analysis. Lancet 2001; 357:505-8.
11. James J, Thomas P, Cavan D, Kerr D. Preventing childhood obesity by reducing consumption of carbonated drinks: cluster randomized controlled trial:BMJ 2004;328:1237-41
12. Butte NF and Ellis KJ (2003). "Comment on 'Obesity and the Environment: Where Do we go from Here?' " *Science* 301(5633): 598b.
13. Jandt, K.D. 2006. Probing the future in functional soft drinks on nanometer scale towards tooth friendly soft drinks. Trends in Food Science and Technology, 17 (5): 263-271.
14. Sorvari, R. and Rytoma, I. 1991. Drinks and dental health. Proceedings of the Finnish Dental Society, 87: 621-631.
15. AI Ismail, BA Burt, and SA Eklund: The carcinogenicity of soft drinks in the United States: J Am Dent Assoc, Vol. 109, No 2, 241-245
16. Ran Cheng, Hui Yang, Mei-yang Shao, Tao HU, Xue-dong: Dental erosion and severe tooth decay related to soft drinks: a case report and literature review: Journal of Zhejiang University science B; 2009 10(5):395-399
17. Soda Attack: Soft Drinks, Especially Non-colas and Iced Tea, Hurt Hard Enamel: Oral Health Resources: General Dentistry July/August 2004 issue- www.agd.org
18. Australian dental association: Drinks and Dental Decay: ADA: Aug 2005
19. Jain P, Nihill P, Sobkowski J, Agustin MZ: Commercial soft drinks: pH and in vitro dissolution of enamel: Gen Dent. 2007 Mar-Apr;55(2):150-4; 155, 167-8
20. Kynast-Gales SA and Massey LK (1994). "Effect of caffeine on circadian excretion of urinary calcium and magnesium." J Am Coll Nutr 13(5): 467-472.
21. Shuster, J., Jenkins, A., Logan, C., Barnett, T., Riehle, R., Zackson, D., Wolf, H., Dale, R., Daley, M., Malik, I. and Schnarch, S. 1992. Soft drink consumption and urinary stone recurrence: A randomized prevention trial. Journal of Clinical Epidemiology, 45 (8): 911-916.
22. Juliano. LM and Griffiths RR (2004). "A critical review of caffeine withdrawal: Empirical validation of symptoms and signs, incidence, severity, and associated Features." Psychopharmacology 176(1): 1-29.
23. Garnet LK and Lawrence GD (1993). "Benzene production from decarboxylation Of benzoic acid in the presence of ascorbic acid and a transition-metal catalyst ." J Agric Food Chem. 41(5): 693-695.
24. Vereecken C.A., Todd, J., Robert, C., Mulvihill.C and Maes, L. 2006. Television viewing behavior and associations with food habits indifferent countries. Public Health Nutrition, 9 (2):244-250.
25. Striegel- moore RH , Thomson D, Affenito SG, Franko DL, Obarzanek E, Barton BA, Schreiber GB, Daniels SR, Schmidt M< Crawford PB. Correlates of beverage Intake in adolescent girls: the national heart, lung, & blood Institute growth & health study. J. pediatric. 2006; 148(2): 183-187.
26. Dhingra R , Sullivan L, Jacques PF, Wang TJ, Fox CS, Meigs JB, D' Agostino RB, Gaziano JM, Vasan RS. Soft drink consumption & risk of developing cardio metabolic risk factors & the metabolic syndrome in middle-aged adults in the community. Circulation. 2007; 116(5):480-488.

# Private Sector Involvement to enhance skills of physicians to manage HIV Cases – Andhra Pradesh Experience

Meenakshi Misra<sup>1</sup>, Ramesh Reddy Allam<sup>1</sup>, K. Srinivas Varma<sup>1</sup>, Abhik Dutta<sup>1</sup>, Jammy Guru Rajesh<sup>1</sup>, Ganesh Oruganti<sup>1</sup>, Vijay V Yeldandi<sup>2</sup>

<sup>1</sup>Science Health Allied Research Education – India – Andhra Pradesh AIDS Consortium, <sup>2</sup> Science Health Allied Research Education - India

## ABSTRACT

**Background:** Though private sector plays an important role in providing health care, in the case of HIV infected patients, a large number of physicians working in private medical institutions hesitate to provide care and support to them.

**Objectives:** Andhra Pradesh AIDS Consortium (APAIDSCON), therefore, developed a four-day 'Advanced Clinical Hands-on Training Program on Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome (HIV / AIDS)' to develop clinical skills among physicians in managing People Living with HIV (PLHIVs) including OIs and to treat PLHIVs without stigma and Discrimination.

**Methods** A four day training program, developed after a scientific needs assessment, was organized to provide hands on experience for doctors working in hospitals attached to private medical colleges in the south Indian state of Andhra Pradesh. The trainees were introduced to the current concepts of HIV treatment, care and support protocols including ART management in a patient care setting in accordance with the national guidelines. They were encouraged to further their knowledge and skills in HIV patient care. About 60% of the learning was through bed side discussion and demonstrations, visits to the counseling and testing centre and interaction with the PLHIVs. The training was evaluated by post training test and follow up administration of pretest questionnaire 6 months later.

**Results:** The post training mean score was significantly higher than the pre training score with about 70% showing improvement in all the topics. Follow-up assessment 6 months after training revealed that, before the training, 54% of the doctors had exhibited "right attitude" whereas after six months of training 74% of the trained doctors developed the "right attitude". The percentage of clinicians treating HIV cases increased from none to 78%. The proportion of participants having "correct knowledge" on the appropriate regimens and treatment protocols also continued to be higher (48% vs. 66%).

**Conclusion:** The results clearly reveal that a training program that provided hands on experience enhancing the skills of physicians about HIV care, can increase the pool of physicians and increase access to patient care to PLHIV.

**Key words :** HIV, Training, Physicians, Private Sector

## INTRODUCTION

HIV/AIDS, regarded globally as a major public health epidemic of the current decade, in India, is now encroaching upon every section of the society, particu-

larly in the high prevalence states like Andhra Pradesh<sup>1</sup>. Private sector has been a dominant health care provider in India, extending about with 82% outpatient care and 58% of in-patient care<sup>2</sup>. This sector is largely unmonitored and unregulated. Unfortunately, signifi-

cant numbers of physicians in the sector hesitate to provide care and treatment to HIV infected patients either due to lack of opportunities or absence of professional training or other barriers. A review literature on the barriers to HIV care and treatment by doctors, revealed that the four most commonly reported barriers were: i. fear of contagion, ii. fear of losing patients, iii. unwillingness to care, and iv. inadequate knowledge/ training about treating HIV patients<sup>3</sup>. Another survey of health care professionals also reported that the three most important concerns about treating HIV/AIDS patients were fear of becoming infected (81%), contamination of facility, materials and instruments (17%), and not having materials needed to treat<sup>4</sup>.

Constructive interventions and strategies are, therefore, required to overcome these barriers both for increasing their participation and improving the quality of patient care in the private sector. As a part of their commitment Andhra Pradesh AIDS Consortium (APAIDSCON), an association of 17 private medical colleges (partnering institutions) spread across 12 districts of the South Indian state developed a strategy to bring about a change in the attitudes of physicians practicing HIV medicine and to enhance their skills through a four-day 'Advanced Clinical Hands-on Training Program on HIV / AIDS'. APAIDSCON is funded by Centers for Disease Control and Prevention – Global AIDS Program (CDC-GAP) through President's Emergency Plan for AIDS Relief (PEPFAR) - with the major objective of strengthening HIV/AIDS services through networking and establishing linkages. A prospective translational research was conducted to find out whether and how the scientifically developed training program helped and motivated the physicians to care and treat HIV patients without fear, stigma and discrimination.

The study was conducted among the partnering institutes of the APAIDSCON in the following 4 phases:

1. *Needs Assessment*: The extent to which individual gains knowledge during the training largely depends on the training curriculum designed. Hence, to identify the levels of competence, the training needs and preferences of the target audience, a training needs assessment was conducted for all the physicians of the private medical colleges attending the training, by administering a structured questionnaire consisting of questions regarding their practices, knowledge, awareness on HIV and training on HIV at the start of the program.

2. *Development of training modules and Training*: Considering the results of the needs assessment and also taking into account the "NACO Specialist Training on HIV Care & Treatment" curriculum a training

program was developed. The objectives were to:

- a) Enhance clinical skills among physicians in managing PLHIV, including opportunistic infections (OI) through a standard package of services;
- b) Promote the practice of national guidelines in management of PLHIVs;
- c) Demonstrate and rationally prescribe laboratory tests for HIV;
- d) Sensitize and develop skills on infection control measures (universal work precautions, biomedical waste management and post-exposure prophylaxis (PEP)).

3. *Organization of Training* A four day training program was organized in a clinical setting of the Government General and Chest Hospital, Hyderabad, which has a care and support center catering exclusively to PLHIVs to provide hands-on experience for doctors nominated by each of the 17 partnering institutes of APAIDSCON. Experienced national and international resource persons from various institutions like International Training and Education Center on Health (ITECH), Government Hospital of Thoracic Medicine (GHTM), Belair Hospital, Panchagani, APADISCON etc. located at Chennai Hyderabad; University of Chicago, United States of America (USA), and Andhra Pradesh Government General and Chest Hospital, Hyderabad conducted the training. The participants were introduced to basic and advanced concepts of HIV treatment, care and support protocols including ART management in a patient care setting, and encouraging the clinicians to further their knowledge and skills in HIV patient care in day to day HIV related service delivery. The program offered stimulating opportunities for learning, questioning, interacting and practicing HIV Medicine. It consisted of i) clinical rounds with bedside learning, ii) field visits, iii) active learning through video case discussions, iv) quiz v) role plays and vi) didactic sessions through Power Point presentations. The distinctive and exclusive features of the clinical hands-on training were: 60% of the learning was through bed side discussion and demonstration, visits to the counseling centre and interaction with the PLHIVs. An interactive software, "Turning Point", developed by "Turning Technologies" (add-on to Microsoft® PowerPoint) that enabled educators, trainers and presenters to develop and administer real-time assessments of participants within their PowerPoint presentations was used. It allowed audiences to participate in presentations or lectures by submitting responses to interactive questions using a Response Card™ keypad. It had the provision for display of the response percentages on the screen and made the sessions interactive and interesting. Adult active learning tools were applied through bedside case discussions, video case presentations, quiz and home work

**4. Evaluation:** In addition to the routine pre and post training assessment, a follow-up assessment – 6 -12 months later - was done as a part of evaluation to assess as to how far the trainees utilized the training in actual practice.

**Pre and post assessment:** During the training, a pre and post training assessment of the participants were conducted. The pre training test questionnaires were administered before the commencement of the sessions. The questions were divided into three categories – Practice (5 questions), Attitude (11 questions) and Knowledge (27 questions). The post training questionnaire was administered on the last day of the training. Fifty four percent of the participants before training were eager to treat PLHIVs , none of them were actually treating HIV patients and only forty eight out of 100 had had proper information and know how regarding treatment protocols.

**Follow-up:** In order to understand whether the knowledge and skills acquired were being put into practice by the trained physicians, a follow up assessment was done after an interval of 6 months and after 12 months. The pre test questionnaires were re-administered to the physicians who had previously participated in the training, with specific instructions to fill the questionnaire on the basis of their current practice without referring back to the training modules. Obtaining data on all the participants was difficult as many of the trained physicians had relocated to some other institute or hospital. A format was also provided to the respective partnering institution by the APAIDSCON to capture data on the number of i) outpatient cases, ii) number of In Patients, iii) number of PEP cells established etc. This data helped to assess any association between the training imparted and the care and treatment services being provided at the institution and also corroborate the responses to the questionnaire.

The Advanced Clinical Hands on Training Programs were initiated from the year 2007 and conducted in every quarter.

### ANALYSIS

The data collected through the pre and post training questionnaires was analyzed using MS-Excel. The pre and post training scores of each individual participant for each question were entered in an excel sheet. The analysis was done in three ways:

- by comparing pre and post– training scores of each individual participant;
- group score; and
- distribution of the participants into different categories based on scores: Unsatisfactory (d<40 marks), Satisfactory (41-60 marks), Good (61-80

marks) and Very Good (81-100 marks)

The data received through follow up questionnaires was also entered in MS Excel data sheet. The data was then compared with the pre training data. To link the training to the care and treatment services being provided, the data on OP cases treated, IP cases admitted and PEP cells established among the partnering institutes, which were represented in the training was compiled to assess any changes after the training. Appropriate statistical tests were used for testing statistical significance.

### RESULTS

In the 10 advanced clinical hands-on training programs conducted, 183 doctors had been trained.

**Needs Assessment:** The results indicated that 65% of the physicians were not treating PLHIVs and did not have any formal training on HIV/AIDS; 54% of those treating PLHIV were not practicing the WHO clinical staging; 34% were not practicing waste disposal protocols; 38% of physicians were not aware of NACO guidelines, and 62% wanted the curriculum to focus on basic and advanced information.

The pre training assessment showed that only 54% of the participants were eager to treat PLHIVs without fear of stigma and discrimination, none of them were actually treating HIV patients and only 48% of them had proper information and know how regarding treatment protocols.

The results of pre and post test are presented in Table 1.

**Table 1 Mean Scores of Pre and Post Assessment**

Detail	Mean ± S.D
Pre Training	45.1 ±16.56
Post Training	70.4 ±13.32

*p*= 0.002

The group mean (**Table 1**) increased to 70.4 in the post test from the pretest score of 45.1. A paired T test revealed that the improvement was statistically highly significant (*p*=0.002).

Table 2 presents the distribution of the participants according to the scores they obtained in post-training test as compared to those in the pre-training test. The results depict that there was significant improvement in the scores after the training as compared to those of pre-training. The improvement was particularly marked among those who had scored lowest before the training. It was also noticed that the knowledge of



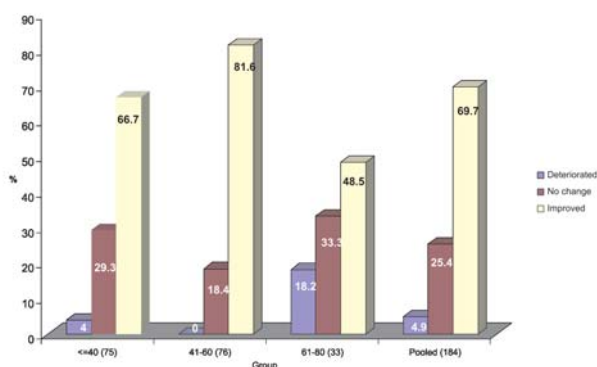
the participants on the topic of STI before the training was reasonably good. The training was so effective that 28% scored more than 80% post-training as against none before the training.

**Table 2 Per cent Distribution of scores according to grading**

Pre test Distribution according to scores	Post test Distribution according to Scores				Total (N=184)
	<=40	41-60	61-80	>=81	
<=40	1.6	12.0	19.0	8.2	40.8
41-60	0.0	7.6	22.3	11.4	41.3
61-80	1.1	2.1	6.0	8.7	17.9
Pooled	2.7	21.7	47.3	28.3	100.0

To assess the actual extent of changes, as compared to the pre-training scores at the group level, the percent of participants showing improvement, deterioration and no change was calculated. The post-training scores, which were higher than each individual's pre-training test score were considered as *improvement*, those which were less than the pre-training test were as *deterioration* and the same scores at both points of time as *no change*. The results are presented in Fig.2 When all the pre-test score ranges were considered, while about 70% showed improvement, about 5% showed deterioration in the scores with the rest 25% remaining in the same score ranges as at the pre-training. Only 4% scored less than the lowest pre-training score of <=40 showing deterioration, while 29% showing no change. Chi square test revealed that the improvement in the scores in general were statistically significant ((p < 0.05).

**Fig.2 Comparison of Pre and Post Test Performance**



Similar analysis for each topic covered was also carried out mainly to find out whether the performance of the participants was different in specific topics. The results are presented in Table 3. While in most of the topics the performance of the participants improved, in the case of the topic on STI, the percent of participants showing improvement was not as satisfactory as with the other topics, pointing to the fact that probably the knowledge of the participants regarding STIs

was relatively good before the training itself.

**Table-3 Cohort analysis of Pre and Post Evaluation**

Topic	Improvement*	No change*	Deterioration*
Lab Diagnosis and Counseling	71.6	15.7	12.7
ART	76.5	4.9	18.6
OIs	76.5	11.8	11.8
PEP & Infection Control	69.6	20.6	9.8
STI	39.2	38.2	22.5
Staging and Disease Progression	57.8	20.6	21.6

Thus, all the three methods of analysis revealed that the learning imparted during the four- day program had helped the participants to enhance their knowledge and skills.

*Follow up assessment:* Sustaining the knowledge and the skills acquired during the training are perhaps more important than the performance immediately after the training. Follow-up assessment therefore would reflect as to whether the participants were putting into practice the expertise achieved in the training during their day to day routine patient care. Before the training, 54% of the doctors exhibited "right attitude" i.e. willing to care for and treat HIV patients without fear of stigma and discrimination, whereas after six months of training 74% of the trained doctors developed the "right attitude". In fact, the percentage of clinicians treating HIV cases increased from nil to 78%.The proportion of participants having "correct knowledge" on the appropriate regimens and treatment protocols also continued to be higher (48% vs. 66%). It was difficult to collect data for follow up assessment as many of the physicians had relocated to other institutions/ hospitals.

**Figure 3: Clinical Performance after 6 months of Training**

**Fig. 2 Clinical Performance after 6 months of training**

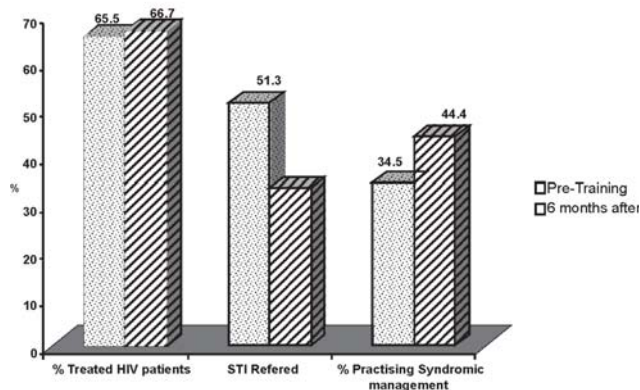
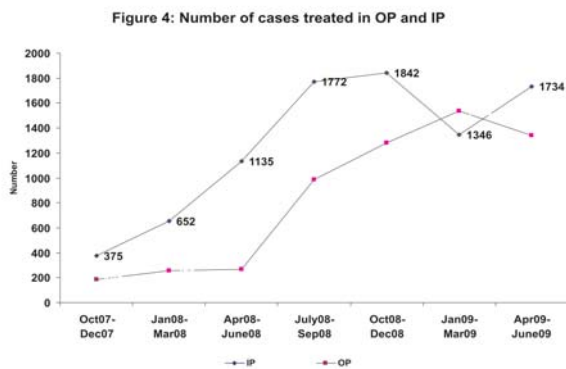


Fig. 3 presents the results of clinical performance of the physicians 6 months after training as measured by the actual number of cases reported by each institution. Earlier, 51% of the clinicians used to refer STI cases to other facilities. As a result of training, only 33% were referring the cases of HIV/AIDS to other institutions, indicating that higher number of them started treating. There was also evidence that the physicians were applying the skills learnt during training in their daily clinical practice as revealed by the fact that higher proportion of the trained doctors were practicing syndromic case management. Although the participants' knowledge levels on the topic of STI were good but they were not converting their knowledge to practice. These trends are encouraging and with continued interaction, the changes are likely to get strengthened.

The impact of the training on HIV clinical care services was also assessed by comparing the quarterly (October to December 2007) performance with respect to the number of OP and IP cases treated with that during the quarter April to June 2009, as per the reporting formats received. It may be mentioned that the training commenced in the month of September 2007. The number of patients admitted in the wards of all the partnering institutes which had participated in the training program increased gradually from 375 in the initial quarter to 1,734 in the quarter April to June 2009. It appeared that more number of the patients were being treated as inpatients. The number of patients treated as outpatients also increased from 185 to 1,343 in the quarter April to June 2009 (Fig. 4).



Post Exposure Prophylaxis (PEP) was emphasized in the training, for promoting healthy and safe working environment to the health care providers. Each Medical College has a PEP cell comprising of 2 – 3 trained doctors. These doctors are the nodal officers for reporting any occupational exposure within the hospital since they are well versed with administra-

tion of PEP drugs. Some PEP drugs are also placed in the casualty to be utilized (if required) during any emergencies that occur. The Casualty Medical Officer disperses the drugs after consulting the nodal officers. The contact telephone numbers of the nodal officers are available with all concerned staff of all the departments. The information about the PEP cell is disseminated during the training program. With the increase in the number of clinicians trained, the number of PEP cells established at the partnering institutes also rose from 5 in 2007 to 16 in 2009. The PEP cells were established gradually at regular intervals and in every quarter at least 2-3 PEP cells were set up.

### DISCUSSION

The results show remarkable progress in the knowledge, attitude and practice of the trained physicians although some of them exhibited deterioration, which could be due to some confounding factors like lack of interest in the topic, low attention span or inability to correlate the session with actual practice. These perhaps point to the need for sustained contact and exchange of information periodically.

Even though the training had a considerable beneficial impact on individual clinicians and consequently the institution, it has been observed that by the time of follow up assessment, many of the trained physicians had moved out of the respective institution indicating a high turnover. This could also be considered as a spin-off benefit of the training, as the services of such trained physicians will be available to other institutions as well.

In spite of the turnover, the data on clinical services at these institutions clearly indicates that in the institutes which had nominated participants for the training, more out-patient and in-patient cases were being treated; PEP cells were established. This indicates that as a result of training, the clinicians have not only been providing good quality clinical services but were also building the capacities of their subordinates and colleagues. Training of physicians from the institute is percolating downwards to all other staff of the department or hospital, as evidenced by the fact that despite the trained physicians opting for better opportunities elsewhere, the clinical services being rendered at the institute continued to function effectively and efficiently. It was encouraging to note that building capacities of a few physicians could help in enriching the competencies and abilities of a health facility. The results, thus, clearly indicate that the scientifically conducted hands-on-training yielded positive results in motivating the clinicians, in changing their attitudes – with the bedside teaching helping them to overcome

their fear of contracting the infection - and in improving their knowledge and skills. This experience could be replicated elsewhere. There is of course a need for constant monitoring and appraisal of the training programs so as to make appropriate corrections, where necessary.

### CONCLUSION

The results reveal that a program for enhancing the skills of physicians about HIV disease, that provides hands on experience can increase the pool of physicians who are able, willing and confident of treating HIV-infected patients is required. Given the possibility of expanding HIV epidemic, it is essential for physicians in private practice to provide care to HIV patients. The training program enabled APAIDSCON to gain insight on the level of increase in knowledge of the participants before and after the training and helped in planning future capacity building programs.

### RECOMMENDATIONS

Although this study has shown very encouraging outcomes it had some shortcomings, and for future replication the following points should be taken into consideration:

1. Since follow up data is crucial for any evaluation, there is a need to plan a strategy to track all the physicians who have moved to other institutions, through electronic data base.
2. The questions asked in the pre, post and follow up should be reframed so that the bias of answering the same questions is overcome
3. To authenticate the results for future studies it would be advisable to conduct observational study at the place of work

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### REFERENCES

1. National AIDS Control Organization, HIV Sentinel Surveillance and HIV Estimation 2007: A Technical Brief [document on internet]. Available from [http://nacoonline.org/upload/Publication/M&E Surveillance, Research/ HIV Sentinel Surveillance and HIV Estimation 2007\\_A Technical Brief.pdf](http://nacoonline.org/upload/Publication/M&E_Surveillance_Research/HIV_Sentinel_Surveillance_and_HIV_Estimation_2007_A_Technical_Brief.pdf)
2. Sengupta A, Nundy S. The private health sector in India. *BMJ*, 2005, 331: 1158
3. Naidoo, P, Barriers to HIV Care and Treatment by Doctors: A review of the literature, *SA Fam Pract.*, 2006; 48 (2): 53
4. Leonard Rubenstein, Journalists against AIDS Nigeria, AIDS- 2006: Unprotected doctors, afraid of getting HIV, deny care to patients, *August 22, 2006* :: Press Release, Physicians for Human Rights, Boston

# Acute Neurotoxicity With Appropriate Dose of Isoniazid – A Case Report

Md. Aleemuddin Naveed

*Assistant Professor Pulmonary Medicine., Rajiv Gandhi Institute of Medical Sciences Adilabad-504001. A.P*

## ABSTRACT

Isoniazid (INH) is most frequently used in combination with other drugs for the treatment of tuberculosis or as monotherapy for treatment of latent tuberculous infection. Seizures due to anti-tubercular chemotherapy are a rare side effect. INH causing status epilepticus has been very rarely reported to cause seizures. We present a patient who, after 5 months of treatment with appropriate dose of INH, evolved to status epilepticus. Seizures could be controlled only after administering of pyridoxine.

**Key words:** *Isoniazid, Acute neurotoxicity, Status epilepticus, Seizures, Pyridoxine.*

## INTRODUCTION

There have been several reports of INH causing seizures<sup>1-2</sup> and this effect is thought to be due to the inhibition of GABA synthesis in the CNS. Review of all the cases of drug-induced seizures reported to the California Poison Control System revealed that of 386 cases, 23 (5.9%) was due to INH<sup>3</sup>. It is among the most common causes of drug-induced seizures in United States<sup>4</sup>. Therapeutic doses of INH may occasionally precipitate convulsions in patients with known epilepsy or in patients with subclinical deficiency of pyridoxine that is seen in pregnancy, cancer, uraemia or chronic liver disease<sup>5</sup>.

### Case History

A 26-year-old male was started on category-I antituberculosis treatment under RNTCP, which contains INH 600 mg/ alternate day about 5 months ago, after being found to be smear positive. He developed seizures at home after his dinner and was brought to our hospital via 108 emergency ambulance services. He received 10 mg of diazepam intravenously in the ER (emergency room) that stopped his seizure for 2-3 minutes. His seizure started again and he received, in ER, 4 mg of lorazepam and 600mg of phenytoin intravenously without any control over seizures. He was started on phenytoin drip. Seizuring activity could not be controlled for the next 2 hours. Considering the history of consuming INH, we gave him 2gm of pyridoxine (50 tablets of 40 mg each crushed and administered through ryles tube as injection pyridoxine was not available). The seizures disappeared after 90 minutes.

Other possible causes of seizures were meticulously ruled out. His sodium was 140 Meq/L, potassium 4.0 Meq/L, and chloride 112 Meq/L. The blood sugar level was 140mg/dL. The serum calcium, magnesium and phosphate level were within normal limits. Liver function test (LFT), amylase, lipase and ammonia level were within normal limits. HIV was nonreactive. CT scan of brain did not reveal any obvious pathology, like a mass or hemorrhage that could lead to seizures. After regaining consciousness the patient informed that he was taking only recommended dose of INH alternate day. He also denied any history of epilepsy. INH was restarted after 3 days. After second dose of INH patient again developed status epilepticus which was controlled using same dose of pyridoxine and other anticonvulsants. Later on INH was omitted from the regimen. 6 months of follow up by the patient remained uneventful without any seizure.

## DISCUSSION

Side-effects to anti-tubercular drugs are fairly common but there are a few side effects that are rare. INH is one of the most effective and cheapest among anti-tuberculous drugs. It is rarely associated with serious adverse effects that include hepatitis, peripheral neuropathy, cutaneous reactions and mental changes<sup>6</sup>. Ingestion of toxic amounts of INH causes recurrent seizures, profound metabolic acidosis, coma and even death. In adults, toxicity can occur with the acute ingestion of as little as 1.5 g of INH. Doses larger than 30 mg per kg often produce seizures<sup>7</sup>. However, our patient denied any history of overdose. To present with

severe acute INH neurotoxicity, in the absence of overdose or any comorbid condition that would predispose to such a severe adverse reaction is rare. Review of literature reveals that, there have been less than ten cases of routine dose of INH causing seizures reported earlier. Symptoms of neurotoxicity are most likely due to an inhibition of vitamin B6 metabolism and thereby depletion of gamma-aminobutyric acid (GABA) in the CNS so the administration of pyridoxine, an antidote for INH-induced seizures<sup>8-10</sup>. Treatment of INH toxicity must address correction of  $\gamma$ -aminobutyric acid deficiency with pyridoxine replacement and management of life-threatening events. For poisonings in which the amount of INH ingested is known, pyridoxine is dosed on a gram-for-gram basis<sup>11</sup>. In the management of the comatose patient as well as those with status epilepticus, it is recommended that intermittent infusions of pyridoxine 5 g/5 min mixed with 5% to 10% dextrose and water be administered. This infusion can be repeated every 20 minutes<sup>12</sup>. In severe toxic reactions, exchange transfusion<sup>13</sup>, peritoneal dialysis<sup>14</sup>, and hemodialysis<sup>15</sup> have been efficacious in removing this drug from the bloodstream because protein and tissue binding is minimal.

### CONCLUSION

Pyridoxine deficiency should be suspected and its supplementation initiated in any patient on antituberculous treatment presenting with seizures and metabolic acidosis even if there is no history of overdose. Prognosis is good when treatment is administered early.

### REFERENCES

1. Temmerman, W, Dhondt A, Vandewoude K. Acute isoniazid intoxication: seizures, acidosis and coma. *Acta Clin Belg.* 1999; 54: 211–216
2. Asnis DS, Bhat JG, Melchert AF. Isoniazid overdose: four case reports and review of the literature. *Ann. Pharmacother.* 1993; 27:444–446
3. Thundiyil JG, Kearney TE, Olson KR. Evolving epidemiology of drug-induced seizures reported to a Poison Control Center System. *J Med Toxicol.* 2007;3(1):15-9.
4. Bloch AB, Rieder HL, Kelly GD, Cauthen GM, Hayden CH, Snider DE. The epidemiology of TB in the U.S.: implications for diagnosis and treatment. *Clin Chest Med.* 1989;10:297-313.
5. Alvarez FG, Guntupalli KK. Isoniazid overdose: four case reports and review of the literature. *Intensive Care Med.* 1995;2:641-4.
6. Girling DJ. Adverse effects of anti-tuberculosis drugs. *Drugs.* 1982;23:56-74
7. Romero JA, Kuczler FJ. Isoniazid overdose: recognition and management. *Am Fam Physician.* 1998;57(4):749-52.
8. Wallace, K.L. Antibiotic-induced convulsions. *Crit. Care Clin.* 1997;13:741–762
9. Williams, H. L. and Bain, J. A.: Convulsive effect of hydrazines: relationship to pyridoxine. *Int. Rev. Neurobiol.* 1961;3: 319–348
10. Wason S, Lacouture P. G, and Lovejoy F. H. Single high-dose pyridoxine treatment for isoniazid overdose. *JAMA.* 1981;246:1102–1104
11. Minns, Alicia B, Ghafouri, Nazli, Clark, Richard F. Isoniazid-Induced Status Epilepticus in a Pediatric Patient After Inadequate Pyridoxine Therapy. *Pediatric Emergency Care.* 2010; 26:380-81
12. Lheureux, Philippe; Penaloza, Andrea; Gris, Mireille. Pyridoxine in clinical toxicology: a review. *European Journal of Emergency Medicine.* 2005;12(2):78-85
13. Katz BE, Carver MW. Acute poisoning with isoniazid treated by exchange transfusion. *Pediatrics.* 1956;18:72-6.
14. Cocco AE, Pazouek LJ. Acute isoniazid intoxication management by peritoneal dialysis. *N Engl J Med.* 1963;269:852-3.
15. Konigshausen TH, Altrogge G, Hein D, Grapensee B, Potter J. Hemodialysis and hemoperfusion in treatment of most severe INH poisoning. *Vet Hum Toxicol.* 1979;21:12-15

# Prostate-Specific Antigen Variations in Moroccan Patients with Histologically Proven Benign Prostatic Hyperplasia

I. Sadaoui<sup>1,2</sup>, H.A.H. Joutei<sup>2</sup>, N. Elgnaoui<sup>2</sup>, A. SEDDIKI<sup>3</sup>, S. Nadifi<sup>1</sup> et H. Benomar<sup>2</sup>

<sup>1</sup>Department of Medical Genetics Faculty of Medicine and Pharmacy-Casablanca- Morocco <sup>2</sup>Department of Anatomic Pathology of Pasteur Institute-Casablanca- Morocco, <sup>3</sup>Department of Urology of Racine Center- Casablanca- Morocco

## ABSTRACT

Benign prostatic hyperplasia (BPH) is the most common benign disease of prostate gland and it has a great prevalence in aged men; however, the effect of benign prostatic hyperplasia (BPH) on PSA level is less well understood.

In order to improve the ability of PSA to distinguish cancer from BPH, it is necessary to understand the characteristics of PSA in a population of men without prostate cancer. Because of the increase in the aging male population in Morocco, the role of PSA in the assessment of patients with BPH and lower urinary tract symptoms (LUTS) should be examined.

We examined whether there was a relationship among the serum PSA level, weight of resection, prostate inflammation and patient's age to estimate clinical implication of the PSA on diagnosis and treatment of BPH.

Our results indicated that PSA level is statistically correlated with age and weight of resection and subclinical prostatic inflammation could be the etiology of an elevated serum PSA in men with benign prostatic hyperplasia.

**Keywords:** PSA; Benign prostatic hyperplasia; subclinical prostatic Inflammation

## INTRODUCTION

Benign prostatic hyperplasia (BPH) is the correct term to describe the histopathologic, hyperplastic changes noted in the aging prostate and mediated by circulating and intraprostatic androgens<sup>1,2</sup>. Clinicians commonly use the term BPH to describe a clinical syndrome consisting of 3 components: lower urinary tract symptoms (LUTS), benign prostatic enlargement (BPE), and bladder outlet obstruction (BOO)<sup>3</sup>.

Although serum prostate-specific antigen (sPSA) is a good indicator as a tumor marker for diagnosis of prostate cancer, it has a disappointing sensitivity and specificity. There are several factors that might be associated with the abnormal elevation of sPSA concentration, such as aging, race, BPH, prostate volume, diagnostic and therapeutic procedure<sup>4</sup>.

It is important to note that elevated PSA levels may indicate the presence of very treatable urinary conditions, such as benign prostatic hyperplasia (BPH) or prostatitis, and do not necessarily indicate prostate cancer<sup>5</sup>.

The most common non-cancerous cause of elevated PSA levels is benign prostate hyperplasia (BPH). As men age, particularly after age 50, the prostate volume increases. The most common symptom with BPH is difficulty urinating. About 80 percent of men will develop some aspect of BPH in their lifetime which may cause a false elevation of PSA values.

Another common cause of false elevation of PSA value is prostatitis usually causing symptoms similar to a bladder infection, such as burning, frequency and urgency to urinate. However, many men with prostatitis have no symptoms. The inflammation from prostatitis may cause PSA to leak into the bloodstream and causes the PSA level to be higher than normal<sup>6</sup>.

If the elevation of serum PSA is thought to be caused by asymptomatic prostatitis with high aggressiveness score in BPH patients without clinical prostatitis, it might prevent unnecessary repeated biopsies<sup>7</sup>.

The aim of this study is to explain the variations in PSA during benign prostatic hyperplasia. The cor-

relation between PSA level and patient's age and weight of resection is well established, the role of sub-clinical inflammation is still being evaluated.

### PATIENT AND METHODS

We conducted a retrospective study involving patients who underwent surgical resection of BPH in the Department of Urology of Racine Center and the Department of anatomy pathology of Pasteur Institut-Casablanca, between January 2005 and December 2007. Inclusion criteria were:

- Determination of total serum PSA made within three months prior to surgery, before any manipulation (DRE, survey, endoscopic transurethral ...).
- Determination made by immunometry (chemiluminescence), ELISA and immunoassay.
- No further clinical or histological evidence of prostatic adenocarcinoma or high-grade intraepithelial neoplasia.
- 201 observations including 75 cases of transvesical prostate adenomectomy and 25 cases were selected by transurethral resection (TUR).
- The inflammation was categorized using the standardized histopathological classification system for chronic prostatitis of NIH, to determine the influence of prostatic inflammation on serum PSA levels.

### RESULTS

#### A. Age of patients

The average age was  $69 \pm 10.32$  years at the time of surgery with a minimum of 42 years and a maximum of 99 years.

#### B. Serum PSA level before surgery

The average preoperative serum PSA was 12.19ng/mL for a median of 11ng/mL with a minimum of 1ng/mL and a maximum of 25ng/mL.

The standard deviation was 5.29. The distribution of the average serum PSA according to the type of surgical procedure is detailed in Table I.

List of Tables

	Serum PSA according to AHV(ng/ml)	Serum PSA according to RTU (ng/ml)
Average	11,09	9,8
Mediane	8,9	6,3
Standard Deviation	9,2	7,8

Table I: Distribution of the average serum PSA according to the type of surgical procedure

The normal value of PSA that we accepted as the gold standard is 4ng/ml according to the reference technique. The percentage of patients with an increased serum PSA level before surgery was 89.6% which 43.56% was higher than 10ng/mL.

#### C. pathological Study

##### 1. Weight of adenomyomectomy specimens or TUR chips

The average weight was 24.87g with a median of 10g with a minimum of 2g and a maximum of 110g. The standard deviation was 24.23.

The characteristics of the weight of resection according to the type of surgery are detailed in Table II.

	Weight of AHV (g)	Weight of RTU (g)
Average	74	15,16
Mediane	65	10.01
Standard Deviation	41,01	13,99

Table II: The characteristics of the weight of resection according to the type of surgery

##### 2. Study of inflammation

In a set of 201 prostatectomy specimens and TUR chips, we found 92 cases with signs of inflammation which represent 16.33% of the studied population.

#### D. Analysis of the results

1. Statistical study between preoperative serum PSA and the different studied parameters.

##### 1.1. PSA and patient age

We observed a significant correlation between serum PSA and patient age ( $p = 0.0015$ ) (Fig. 2).

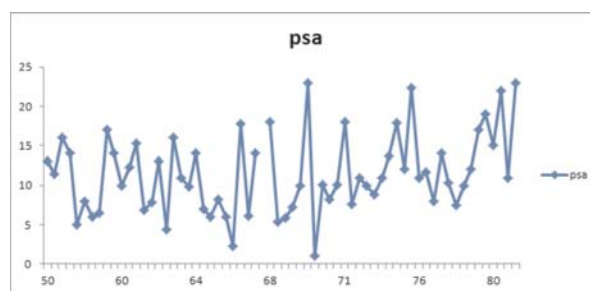


Figure 2: Distribution of serum PSA levels according to age

##### 1.2. PSA and weight of resection

We observed a significant correlation between serum PSA level and weight of resection ( $p = 0.0012$ ) (Fig. 3).

We could not compare the evolution of PSA levels after the surgical procedure in our series of study.

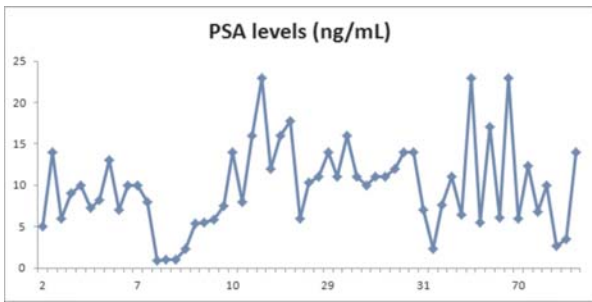


Figure 3: Distribution of serum PSA levels before surgery and weight of resection

**1.3. PSA and inflammation**

For the 92 cases diagnosed with prostatic inflammation, we analyzed the PSA according to age and we compared it with the same age groups for cases without histological signs of inflammation (Fig. 4). We observed a significant correlation between serum PSA and the presence of inflammation ( $p = 0.233$ ).

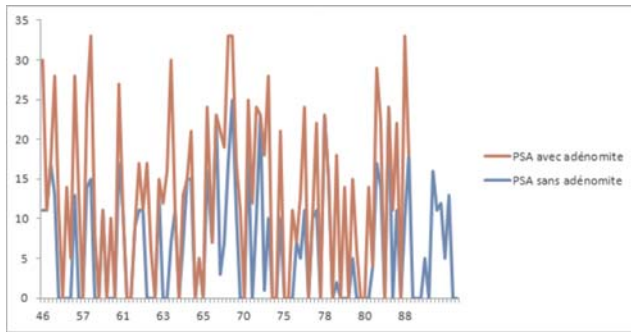


Figure 4: Distribution of PSA according to age with and without inflammatory signs (adenomite)

**2. Statistical correlation between other variables**

We observed a significant correlation between the weight of the resection and patient age ( $p = 0.0213$ ) (Fig. 5). By cons, we did not observe a correlation between weight and inflammation of resection ( $p = 0.56$ ) and between age and inflammation ( $p = 0.63$ ).

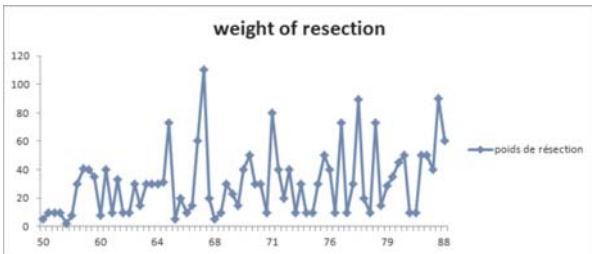


Figure 5: Distribution of the weight of resection according to age

**DISCUSSION**

Benign prostatic hyperplasia (benign prostatic hyperplasia) is very common in men. By the age of fifty,

many men are affected by urinary problems resulting from BPH.

In France, nearly 2 million men have urinary problems and half of them are medically treated for BPH. On average, one in five male will require surgical treatment for their urinary symptoms<sup>8</sup>.

In patients aged 60 to 70 years, urinary disorders account for 20 to 50% of health problems and prostate surgery (resection or prostatectomy) is the procedure most commonly performed at age 65. Therefore, it is a social phenomenon affecting public health and human from the fifties<sup>9</sup>.

**PSA AND PATIENT AGE**

Our study shows that PSA levels increase with age in a statistically significant way. This concept is well established in the literature. In fact, starting from the fifties, many men are affected by urinary problems resulting from BPH. It is interesting to note that the first histological changes were identified in prostate already from the age of 30. These changes will result in no symptoms at the age of 50 years with one in two men. From the eighth or ninth decade of life, all men are affected.

Some authors have explained the increase of serum PSA level with age by the parallel increase of prostate volume with age<sup>10</sup>.

Indeed, progressive prostate growth has been confirmed in population-based studies. Median prostate growth has been noted to be approximately 1.6% per year. As men age, symptoms worsen and obstruction and prostate volume increase<sup>11</sup>.

**Correlation between serum PSA level and weight of resection**

We observed a statistically significant correlation between serum PSA and weight of resection ( $p < 0.05$ ).

Stamey found elevated levels of serum PSA of 0.31 ng in the RTU and 0.29 ng in the AHV for a gram of tissue of BPH. In our series, we did not have postoperative PSA level, which does not allow us to verify this observation<sup>12</sup>.

**Correlation serum PSA level and prostate inflammation**

In our study, we observed a significant correlation between serum PSA levels before surgery and the presence of histological signs of inflammation.

These results were partially reported by the literature. Indeed, Kandirali E. and Patrizia L. et al Sami et



al found the same results<sup>13</sup>. The extents of inflammation positively correlated with the total PSA level. Regarding the aggressiveness of inflammation grade, the authors indicated that it positively correlated with the serum PSA level and PSAD.

### CONCLUSION

Our results indicated that PSA level is statistically correlated with age and weight of resection and sub-clinical prostatic inflammation could be the etiology of an elevated serum PSA in men with benign prostatic hyperplasia.

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### REFERENCES

1. Kirby RS et al. *Textbook of Benign Prostatic Hyperplasia*, 2004, 576: 267.
2. Carrie J. B et al. *Androgens in health and disease*, Humana Press, 2003, 1: 448
3. Hong W et al. *Medicine cancer, BC-Deckerm Edition Holland-FREI*, 2010, 8: 2010-2021.
4. Heidelbaugh J et al. *Clinical men's health: evidence in practice*, Elsevier Health Sciences, 2007, 1: 608.
5. Clyburn B et al. *Adult Medicine*, Blackwell publishing, 2003,1: 109.
6. Loughlin R et al. *100 Questions & Answers: About Prostate Disease* Jone and Barlett publishers, 2006,1: 134.
7. Epstein J et al. *Biopsy interpretation of the prostate*, Wolters Kluwer Health, 2007,4: 358.
8. Gilbagh J et al. *Men's private parts: a pocket reference to prostate, urologic, and sexual health*, Crown publishers, 2002,2 : 160.
9. Madersbacher S et al. *The Prostate Study Group of the Austrian Society of Urology. Prevalence of lower urinary tract symptoms in Austria as assessed by an open survey of 2.096 ; en. Eur Urol*, 1998, 34: 136-41.
10. Curtis Nickel J. *Benign Prostatic Hyperplasia: Does Prostate Size Matter? Rev Urol.*, 2003, 5 (4) : 12-17.
11. Hemat R. A et al. *UROTEXT*, 2007,1: 740.
12. Kandirali E et al. *Association of Extent and Aggressiveness of Inflammation with Serum PSA Levels and PSA Density in Asymptomatic Patients. Urology*, 2007,70 (4) : 743-747.
13. Stamey TA et al. *Prostate specific antigen as a serum marker for adenocarcinoma of the prostate. N Engl J Med*, 1987, 317: 909-16.
14. Patrizia L et al. *Correlation between inflammatory cells (T and B lymphocytes, macrophages) in prostate biopsies and elevated PSA levels in a PSA screening population. Urology*, 2002,59 (1) : 68-72.

# Incidence, Correlates and Outcomes of Low Birth Weight – A One Year Longitudinal Study

Nitin Joseph<sup>1</sup>, Subba S H<sup>2</sup>, Vijaya.A.Naik<sup>3</sup>, Mahantshetti N.S<sup>4</sup>, B. Unnikrishnan<sup>5</sup>, Maria Nelliyanil<sup>6</sup>,  
Mallapur<sup>7</sup>, Shashidhar Kotian<sup>8</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Associate Professor, Department of Community Medicine, Kasturba Medical College, Mangalore, Manipal University, India. <sup>3</sup>Professor, Department of Community Medicine, J.N.Medical College, Belgaum, India., <sup>4</sup>Professor, Department of Pediatrics, J.N.Medical College, Belgaum, India. <sup>5</sup>Professor, Department of Community Medicine, Kasturba Medical College, Mangalore, Manipal University, India. <sup>6</sup>Post graduate student, Department of Community Medicine, Bangalore Medical College, Bangalore, India. <sup>7</sup>Selection Grade Lecturer, Department of Community Medicine, J.N.Medical College, Belgaum, India. <sup>8</sup>Selection Grade Lecturer, Department of Community Medicine, Kasturba Medical College, Mangalore, Manipal University, India.

## ABSTRACT

**Background:** Birth weight is a reliable and sensitive predictor of a newborn's chances for survival, growth and long term physical and psychosocial development. Thus knowing the magnitude and associated risk factors of low birth weight (LBW) will help in minimizing its incidence in the community.

**Aims:** To find out the incidence of LBW babies, its risk factors and its effects during the first year of life.

**Study design:** This longitudinal study was done in three subcentre areas of South India.

**Subjects:** All the 194 babies born from November 2004 to April 2005 formed the birth cohort.

**Outcome measures:** Weight of the newborn was recorded in the initial visit followed by monthly follow up visits to enquire about their morbidities.

**Results:** The incidence of LBW among 194 babies was 2.48 per 1000 live births. The risk factors significantly associated with LBW were age at first pregnancy below 19 years, less than 100 or no intake of iron and folic acid tablets (IFA) during antenatal period, birth spacing of less than 2 years between pregnancies and babies of Scheduled caste or tribe (SC/ST) families. Incidence of episodes of all morbidities was more and that of anemia was significantly more among LBW compared to normal birth weight babies during the first year of life.

**Conclusions:** LBW was affected by multiple risk factors with consequent effect on occurrence of morbidities. Such factors need to be affectively controlled to improve child health and development.

**Key words:** *Low birth weight, Incidence, Correlates, Outcomes, Morbidities, Community, Longitudinal study.*

## INTRODUCTION

Birth weight is a reliable and sensitive predictor of a newborn's chances for survival, growth and long term physical and psychosocial development.<sup>1</sup> Babies with low birth weight (LBW) are at a greater risk of dying during infancy. There is also a significant risk of increased morbidities and developmental problems

during childhood associated with it. At the family level, the cycle of poor nutrition perpetuates itself across generations. LBW girls, in the absence of positive intervention to break the cycle, grow poorly, become stunted women and are more likely to give birth to LBW babies.<sup>1</sup> LBW is thus a good indicator of mother's nutritional status. Prevalence of LBW in a country is a good summary measure reflecting its public health

problems and has been a very sensitive public health indicator for all the developing countries including India. In India over 30% of newborns are estimated to be of LBW.<sup>2</sup> Recognizing the importance of birth weight measurement, the 34<sup>th</sup> World Health Assembly in 1981 included it as one of the global indicators for monitoring of health of the community.<sup>3</sup> Birth weight is routinely measured and recorded in babies delivered at health institutions. In most of the developing countries, majority of newborns are delivered at home and are unlikely to be weighed.<sup>4</sup> Available data on magnitude as well as risk factors of LBW from different parts of the world are based on institutional deliveries and thus cannot be considered representative of the large population born at home. There is a need of conducting community based studies to find risk factors of LBW. With this background a longitudinal community based prospective study was undertaken to find out the incidence of LBW babies, to find out its association with socio demographic and obstetric factors and its effects during the first year of life.

### METHODS

A longitudinal study was conducted on a birth cohort of 194 infants who were followed up for a period of one year. It was carried out in the field practice area, Kinaye of Jawaharlal Nehru Medical College in Belgaum District of Karnataka State, in South India.

Kinaye has a primary health centre with five subcentres under it, of which three were randomly selected for the study namely Santibastwad, Machhe and Peeranwadi. 'Subcentre' is the peripheral most outpost of health delivery in India and each one caters for approximately 5000 population. Study period was from November 2004 to April 2006. All children born from November 2004 to April 2005 formed the birth cohort that was followed up. During the initial phase, the investigator visited houses of mothers within 10 days of childbirth for measuring and recording birth weights. After taking consent from the mother, weight of baby was recorded using a portable beam type of weighing machine. In case of babies delivered in health facilities birth weight was collected from available documents /certificates. Base line data pertaining to socio demographic profile, antenatal care, chewing habits etc of the mothers were also recorded on a pretested proforma. Thereafter monthly follow up visits were done for one year (till the completion of infancy) to enquire about their morbidities which was followed by a detailed clinical examination. Document verification was done in case child had illness in between the visits.

Inclusion Criteria: All newborns of mothers who

were permanent residents of the study area and who were available for follow-up for one year and singleton pregnancies. Exclusion Criteria: Babies born to mothers who had come to parental house for delivery.

It is a common cultural practice in India for pregnant women to come to their parental house few months before delivery and stay there till few months after. This is to obtain better care and support during these vital periods. When the baby is few months old, they go back to their place of residence. That would make them unavailable for a full year of follow up.

Data analysis was calculated in rates and proportions using SPSS Inc. Illinois, USA version 10.0. Socio economic status was calculated using Modified B G Prasad's classification of 2004.<sup>5</sup>

### RESULTS

Of the total 194 deliveries, 49(25.3%) took place at home, 67(34.5%) at government health centres or hospitals and 78(40.2%) at private hospitals. Majority of postnatal mothers 169 (87.1%) were between 19-29 years, were literates 137(70.6%) and were of poor socio economic class IV 92(47.4%) & V 82(42.3%).

Consanguineous marriage was seen among 60(30.9%) mothers and 78(40.2%) of them were married below the age of 18 years. Also 82(42.3%) of the mothers were below the age of 19 years when they were pregnant for the first time.

Out of the total 194 babies, majority 104(53.6%) were females.

Mean and standard deviation of birth weight of the newborns was 2.64±0.47 Kg and it was 2.68 ±0.43Kg for males and 2.60±0.38 Kg for female babies respectively.

A total of 48(24.8%) newborns were of low birth weight. Proportion of LBW babies were slightly more among males 23(25.6%) compared to females 25(24%). (Table 1)

**Table 1: Gender wise distribution of infants according to birth weight.**

Birth weight (Kg)	Males		Females		Total	
	No.	%	No.	%	No.	%
1.5-2.0	1	1.1	4	3.8	5	2.6
2.0-2.5	22	24.4	21	20.2	43	22.2
2.5-3.0	51	56.7	71	68.3	122	62.8
3.0-3.5	14	15.6	6	5.8	20	10.3
3.5-4.0	2	2.2	2	1.9	4	2.1
Total	90	100.0	104	100.0	194	100.0

$\chi^2=7.33$ , DF=4, P=0.119

Greater proportion of LBW babies were of illiterate mothers (31.6%) compared to that of literate mothers (21.9%). The proportion of LBW babies among the poorest socio economic status families (Class V) was 29.3% compared to 21.4% among the rest.

LBW were seen significantly more 22(34.9%) in families of Scheduled caste and tribe families (backward castes in India) compared to 26(19.8%) among others. ( $\chi^2= 4.76, P=0.029$ )

Percentage of LBW with respect to age at first pregnancy (among 50 primiparous mothers) was significantly more in less than 19 years age group 7(58.3%) compared to other age groups 6(15.8%). ( $\chi^2= 8.579, P=0.003$ )

The relative risk was found to 3.69 times more in the former than the latter.

LBW was seen more common among consanguineous marriages 18(30%) compared to non consanguineous marriages 30(22.4%). Proportion of LBW babies were more in working mother 14(35%) compared to house wives 34(22.1%). Out of 13 mothers with history of preeclampsia or eclampsia during their antenatal period, 5(38.5%) gave birth to LBW babies compared to 43(23.8%) among the rest.

The proportion of LBW babies was slightly higher among mothers with less than 3 antenatal care visits (ANC) visits 10(27.8%) compared to those with 3 or more ANC visits 38(24.1%).

In the present study it was found that percentage of newborns with low birth weight significantly decreased with increased intake Iron and Folic Acid (IFA) tablets during antenatal period ( $\chi^2=4.36, DF=1, P=0.037$ ). (Table 2)

**Table 2: Association between birth weight of newborns and Iron & Folic acid tablets (IFA) supplementation during mother's antenatal period.**

IFA Supplementation	LBW babies	NBW babies	Total
Not taken	7 (38.9%)	11(64.7%)	18(100%)
<100 tablets	20(30.3%)	46(69.7%)	66(100%)
≥100 tablets	21(19.1%)	89(80.9%)	110(100%)
Total	48	146	194

$\chi^2=4.36, DF=1, P=0.037$

Proportions of LBW babies were more among mothers who were habituated to chewing tobacco 6(35.3%) as compared to those who were not 42(23.7%).

LBW was seen more among preterm babies 4(40%) compared to normal or post term babies 44(23.9%). The percentage of LBW with respect to birth order 1, 2, 3

was found to be 13(26%), 21(23.3%), 15(38.5%) respectively.

Among 144 multiparous mothers, LBW was seen significantly more among mothers having birth interval of less than 2 years 20(39.2%) compared to when it was more than 2 years 15(16.1%). ( $\chi^2=9.54, P= 0.002$ )

Risk factors like parity of mothers, history of birth asphyxia, congenital anomalies in new born, type of family and paternal tobacco smoking or chewing habits were seen more among normal birth weight (NBW) babies than LBW babies.

In the present study, the incidence of morbidity episodes (Respiratory tract infections, Diarrhoea, Skin diseases, Otitis media, Anaemia, Vitamin A deficiency, Eye Infections etc) in first year of life was found to be slightly higher among infants with low than normal birth weight. (Table 3)

**Table 3: Association between birth weight of infants and incidence of morbidity disorders.**

Birth Weight	No. of infants	Total episodes of morbidities till the end of one year	Incidence per infant per year
LBW	48	161	3.35
NBW	146	475	3.25
Total	194	636	3.28

$\chi^2=0.109, DF=1, P=0.741$

It was observed that 24 (50%) infants with LBW were anemic and they developed 31 episodes of anemia at the end of 1 year at an incidence rate of 0.65/infant/year. 42(28.8%) infants with NBW were anemic and they developed 48 episodes of anemia till the end of 1 year at an incidence rate of 0.33/infant/year. This difference in episodes of anemia was found to be statistically significant ( $\chi^2=9.004, DF=1, P=0.002$ ). (Table 4)

**Table 4: Association between LBW and anaemia in infants.**

Birth weight	Infants with anaemia	Infants without anaemia	Total
LBW	24(50%)	24(50%)	48(100%)
NBW	42(28.8%)	104(71.2%)	146(100%)
Total	66	128	194

$\chi^2=25.846, DF=1, P=0.000$

Delayed milestones during infancy were seen in 16(33.3%) babies with LBW compared to 45(30.8%) babies of NBW. ( $\chi^2=0.106, P=0.745$ )

Out of 4 babies with malnourishment at the end of infancy, 3 were of LBW.

## DISCUSSION

Birth weight is an important predictor of neonatal survival and thus has long been the subject of clinical and epidemiological investigations. The magnitude of LBW is a sensitive indicator of public health of a community. The incidence of LBW in our study was found to be lesser than incidence of LBW observed by other Indian studies such as by Mondal (28.5%)<sup>6</sup>, Hirve et al (29%)<sup>7</sup> and Biswas et al (31.3%).<sup>1</sup> Such occurrence of LBW differentials among different population groups of same race might be due to ethnic/genetic factors or due to varying time frame when these studies were done.<sup>8</sup>

In a number of previous studies including the present one it was observed that mother's age at pregnancy was significantly associated with LBW.<sup>(7,9-12)</sup> This is because mothers below 20 years at the time of pregnancy might have reproductive and anatomical immaturity. Similarly, physical exhaustion could be the reason behind deliveries within 2 years of birth of the previous child significantly resulting in LBW babies as observed in other studies.<sup>(11, 13, 14)</sup>

The present results are in agreement with some of the previous works<sup>(7, 10, 15)</sup> that poor economic condition increases the risk of delivering a LBW baby. This is because poor mothers suffer from nutritional deficits resulting in poor weight gain during pregnancy resulting in LBW babies. This could also explain the significant association of LBW babies found more among mothers of Scheduled caste and Schedule tribe families in our study. However as the present study lacks information on participant mother's nutritional profile we cannot further substantiate our inferences.

Mother's education might affect birth weight indirectly as better informed they are, better will be their level of antenatal care, nutrition and spacing between births. This could be the reason behind greater number of LBW babies of illiterate mothers than of literate mothers in our study similar to observations of previous studies.<sup>(1, 10, 11, 15, 16)</sup>

Mother's with history of consanguinity were also found to give birth to more number of LBW babies. Though not a significant association, it gives hint towards genetic factors involved in etiology of LBW babies.

Another important observation was LBW babies being more common among working mothers. This was similar to the observations of Vietnam study<sup>17</sup> were farming mothers and Thailand study<sup>11</sup> were agricultural labourers doing hard physical work or having to walk more than 2 hours to their work place giving birth to more number of LBW babies.

The proportion of LBW babies were more among mothers with fewer numbers of antenatal visits as observed in ours and other's studies.<sup>(1, 9, 11, 13, 14, 16 - 20)</sup> Infrequent antenatal visits (less than 3) will deny mother of periodic obstetric examination and advices on good antenatal care and low cost nutritious foods. Also in this study LBW was significantly more among mothers who did not take or took less than 100 IFA tablets during pregnancy. This emphasizes the additional benefit of IFA tablets in improving the birth weight of newborns hence should be prophylactically taken by all pregnant mothers for the required number of days.

LBW babies seen more among tobacco chewing mothers in our study is due to the vasoconstrictor influence of nicotine causing placental insufficiency.<sup>21</sup> This association was however not significant, probably because exposure risk to tobacco is lesser when it is chewed than smoked. Significant association in smoking mothers giving birth to LBW babies was observed in studies done in other parts of the world.<sup>(11, 13, 15, 20)</sup>

LBW babies were seen more among mother's with positive history of pre eclampsia and eclampsia during gestational period. Other studies too have shown a significant association of toxemia with LBW.<sup>(11, 16)</sup>

LBW being found among a greater proportion of preterm babies in this study has been supported by other studies where significant association was seen.<sup>(7, 13, 16, 22)</sup>

Repeated births are known to deplete maternal nutrition and stores of iron. This could be the reason why LBW was seen more commonly among babies of birth order 3 and above. Similar observations were made in other studies were LBW frequency was most from birth order 4 and beyond.<sup>(6, 11, 20)</sup> Greater proportion of LBW babies among birth order 1 than 2 in our study could possibly be due to, more than half of LBW babies in the former category belonging to mothers aged below 19 years at the time of delivery.

In our study the incidence of morbidity episodes during first year was higher among LBW infants compared to NBW infants. This was similar to the observations of a study done in rural Malawi.<sup>23</sup> In another study done in Egypt it was found that infants with LBW had episodes of respiratory tract infections for a longer duration.<sup>24</sup> This means that LBW status increases the susceptibility towards infections.

The percentage of infants with anaemia and incidence of anaemic episodes till the end of infancy was significantly more among LBW babies than NBW babies in our study. This was comparable to the observations made in another study done in Thailand.<sup>25</sup> The

significant association of LBW and susceptibility of anaemia during infancy should alert the mothers to feed their LBW babies with more of iron rich foods during weaning period and if required iron supplements additionally. The proportion of LBW babies being more among infants who became malnourished by the end of infancy again stresses the importance of additional nutritional care required for LBW infants.

LBW status has also seen to influence the mental development as proportion of delayed milestones was seen more among LBW babies than NBW infants.

### CONCLUSION

The incidence of LBW was found to be 2.48 per 1000 live births. The significant risk factors for LBW observed were age at pregnancy below 19 years, birth spacing of less than 2 years, babies belonging to SC/ST families and IFA supplementation of less than 100 tablets during antenatal period. With respect to the outcomes of LBW, greater morbidity episodes in first year of life were noted when compared with that of NBW infants. This was significant with respect to anemia. Therefore LBW has long lasting effects on future health being of children. Understanding the extent of LBW and its risk factors will help in formulating an effective maternal and child health care programme. The health professionals should then target limited resources for improving maternal education and nutritional status. They should provide wider availability of contraception and make sure that mother at greatest risk of delivering a LBW infant receives appropriate care.

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### REFERENCES

1. Biswas R, Dasgupta A, Sinha RN, Chaudhuri RN. An epidemiological study of low birth weight newborns in the district of Puruliya, West Bengal. *Indian J Public Health* 2008;52:65-71.
2. Kumar A. Primary newborn care. *Health Action* 2002;15:5-6.
3. World Health Organisation, Development of indicators for monitoring progress towards "Health for all by year 2000". *Health for All Series, No. 4, 1981, Geneva.*
4. United Nations Children's Fund and World Health Organization, *Low Birth Weight: Country, regional and global estimates.* UNICEF, New York, 2004, p 1-9.
5. Agarwal AK. Social Classification: The Need to Update in the Present Scenario. *Indian J Community Med* 2008;33:50-1.
6. Mondal B. Low birth weight in relation to sex of baby, maternal age and parity: A hospital based study on Tangsa tribe from Arunachal Pradesh. *J Indian Med Assoc* 1998;96:362-4.
7. Hirve SS, Ganatra BR. Determinants of low birth weight: A community based prospective cohort study. *Indian Pediatr* 1994;31:1221-4.
8. Schlep FP, Pongpaew P. Analysis of low birth weight rates and associated factors in rural and urban hospital in Thailand. *J Trop Pediatr* 1985;31:4-8.
9. Gebremariam A. Factors predisposing to low birth weight in Jimma Hospital south western Ethiopia. *East Afr Med J* 2005;82:554-8.
10. Karim E, Mascie-Taylor CG. The association between birthweight, sociodemographic variables and maternal anthropometry in an urban sample from Dhaka, Bangladesh. *Ann Hum Biol* 1997;24:387-401.
11. Chumnijarakij T, Nuchprayoon T, Chitinand S, Onthuan Y, Quamkul N, Dusitsin N, et al. Maternal risk factors for low birth weight newborn in Thailand. *J Med Assoc Thai* 1992;75:445-52.
12. Wang CS, Chou P. Risk factors for low birth weight among first-time mothers in southern Taiwan. *J Formos Med Assoc* 2001;100:168-72.
13. Coutinho PR, Cecatti JG, Surita FG, Souza JP, Morais SS. Factors associated with low birth weight in a historical series of deliveries in Campinas, Brazil. *Rev Assoc Med Bras* 2009;55:692-9.
14. Mavalankar DV, Gray RH, Trivedi CR. Risk factors for preterm and term low birthweight in Ahmedabad, India. *Int J Epidemiol* 1992;21:263-72.
15. Stojanoviæ M, Bojaniæ V, Musoviæ D, Miloseviæ Z, Stojanoviæ D, Visujiæ A, et al. Maternal smoking during pregnancy and socioeconomic factors as predictors of low birth weight in term pregnancies in Nis. *Vojnosanit Pregl* 2010;67:145-50.
16. Siza JE. Risk factors associated with low birth

- weight of neonates among pregnant women attending a referral hospital in northern Tanzania. *Tanzan J Health Res* 2008;10:1-8.
17. Dinh PH, To TH, Vuong TH, Höjer B, Persson LA. Maternal factors influencing the occurrence of low birthweight in northern Vietnam. *Ann Trop Paediatr* 1996;16:327-33.
  18. Nair SN, Rao PRS, Chandrashekar S, Acharya D, Bhat VH. Socio-demographic and maternal determinants of low birth weight: A multivariate approach. *Indian J Pediatr* 2000;67:9-14.
  19. Janjua NZ, Delzell E, Larson RR, Meleth S, Kristensen S, Kabagambe E, et al. Determinants of low birth weight in urban Pakistan. *Public Health Nutr* 2009;12:789-98.
  20. Vega J, Sáez G, Smith M, Agurto M, Morris NM. Risk factors for low birth weight and intrauterine growth retardation in Santiago, Chile. *Rev Med Chil* 1993;121:1210-9.
  21. Park K. Preventive Medicine in Obstetrics, Paediatrics and Geriatrics. In: Park K, editor. Text book of Preventive and Social Medicine 18<sup>th</sup> Ed. Jabalpur: Banarsidas Bhanot Publishers; 2005. pp. 460.
  22. Tema T. Prevalence and determinants of low birth weight in Jimma Zone, Southwest Ethiopia. *East Afr Med J* 2006;83:366-71.
  23. Kalanda B, Verhoeff F, le Cessie S, Brabin J. Low birth weight and fetal anaemia as risk factors for infant morbidity in rural Malawi. *Malawi Med J* 2009;21:69-74.
  24. Rahmanifar A, Kirksey A, McCabe GP, Galal OM, Harrison GG, Jerome NW. Respiratory tract and diarrheal infections of breast-fed infants from birth to 6 months of age in household contexts of an Egyptian village. *Eur J Clin Nutr* 1996;50:655-62.
  25. Tantracheewathorn S, Lohajaroensub S. Incidence and risk factors of iron deficiency anemia in term infants. *J Med Assoc Thai* 2005;88:45-51.

## Soft Drinks and Oral Health - A Review

Pallavi S.K<sup>1</sup>, Rajkumar G.C<sup>2</sup>

<sup>1</sup>Senior Lecturer, Rajiv Gandhi Dental College & Hospital, Bangalore, Karnataka, <sup>2</sup>Professor, M.R Ambedkar Dental College & Hospital, Bangalore, Karnataka

### ABSTRACT

Soft drink consumption has increased dramatically across all demographic groups, especially among children and teenagers. Soft drinks have many potential health problems, including dental caries and enamel erosion. Soft drinks containing inherent acids and sugars have both acidogenic and cariogenic potential. Many studies showed a positive relationship between caries and dental erosion and the consumption of soft drinks. Compared with caries, dental erosion seems to have much stronger relationship with soft drinks. It is necessary to educate patients about the harmful effects of excessive soft drink consumption and to advise them with the following tips to prevent dental erosion and caries: limiting soft drinks intake, choosing the low erosive soft drinks, improving the drinking habit, avoiding brushing tooth within 1 hour after consuming acidic food, and using fluoride toothpaste.

**Key Words:** Soft drinks, dental caries, erosion

### INTRODUCTION

Urbanization and economic development result in rapid changes in diet and lifestyles. Market globalization has a significant and worldwide impact on dietary excess leading to chronic diseases<sup>1</sup>. In socioeconomically developing countries, the change from a traditional lifestyle to a Western lifestyle has, among other things, led to an increase in sugar consumption from food and beverages<sup>2</sup>. Soft drink consumption has increased dramatically across all demographic groups, especially among children and teenagers. The popularity of soft drinks has been increasing year after year, due in part to their sweet taste, and in part to the aggressive and pervasive advertising campaigns run by soda companies<sup>3</sup>.

### SOFT DRINK

Soft drink (also referred to as soda, pop, soda pop or fizzy drink) is a non-alcoholic beverage typically containing water and a flavoring agent. Many are carbonated and sweetened, and may contain additional ingredients such as fruit juice.

### COMPOSITION

The first carbonated soft drinks, which were named as such in order to clearly differentiate them from hard, alcoholic beverages, and the technology to make them, were imported from the Europeans, who had discovered how to force carbon dioxide gas into water back

in the sixteenth century. The original bubbly drinks were carbonated mineral waters mimicking those found in therapeutic natural springs and the first of these were patented in the United States in 1810<sup>4</sup>. Generally compositions of soft drink are:

**Sugar:** Most of the soft drinks contain the monosaccharide glucose and fructose and the disaccharide sucrose<sup>5</sup>.

**Artificial Sweetener:** like aspartame, acesulfame-K, saccharin or sucralose. These sweeteners have a number of possible side effects: migraines, memory loss, heart complications, depression and increased cancer risk.

**Caffeine:** Caffeine is used to increase the flavor in soft drinks, but it is also very addictive. Caffeine stimulates the nervous system and increases the heart rate. It also increases slightly the excretion of calcium.<sup>6</sup>

**Carbon Dioxide:** Carbon dioxide makes soft drinks fizz but it is also a waste product.

**Phosphoric or Citric Acid:** Acids are added to soft drinks to give them a nice tingling feeling when they are swallowed. These acids also act as a preservative to keep the soft drink fresh and crisp-tasting.

**Preservatives:** Preservatives are put into soft drinks so that they last longer. However, Juicing-for-health.com explains that preservatives like sodium benzoate or sulfur dioxide can cause asthma, rashes,



hyperactivity, fainting, shock, or a coma.

**Coloring:** Soft drinks may contain artificial coloring. These coloring ingredients make the drink look more appealing to drink. For example, caramel coloring agent gives the drinks a rich brown color. Artificial colorings, especially Yellow No. 5, promote attention-deficit hyperactivity disorder in some children. Yellow No. 5 also causes hives, asthma, and other allergic reactions in a small number of individual.<sup>6</sup>

### IMPACT ON HEALTH

Excessive consumption of soft drinks adversely affects health. While there are questions regarding artificially sweetened diet soft drinks and their effect on health, the evidence that consuming soft drinks sweetened with sugar or high fructose corn syrup can result in harmful effects has been thoroughly researched and documented.<sup>7</sup>

In 1998, the Center for Science in the Public Interest published a report which examined statistics relating to the soaring consumption of soft drinks, particularly by children, and the consequent health ramifications, including tooth decay, nutritional depletion, obesity, osteoporosis, type-2 diabetes, and heart disease.<sup>6</sup>

### A DANGER TO ORAL HEALTH

Soft drinks contain high amounts of sugar and acids, which are added to give sodas their characteristic good taste. Unfortunately, both these components pose significant risks to oral health. Soft drinks have many potential health problems, including dental caries and enamel erosion.

**Dental caries:** Dental caries may result from a long-term high intake of soft drinks. When sucrose intake exceed 15-20 kilograms per person per year is directly associated with caries prevalence, when sucrose is consumed between meals. 375 ml can of soft drink contain in excess of 40 gm of sucrose, thus one can of sugared soft drink per day for 1 year will in itself account for 15 kilograms of sucrose per year.<sup>8</sup>

A frequent exposure to dietary acids will have ecological effects on the oral biofilm and can shift the supra gingival oral flora toward aciduric micro-organism. As the intra-oral pH falls, the number and proportion of aciduric organism such as mutans streptococci and lactobacilli increases, and the proportions of acid-sensitive species fall. The reduction in pH caused by the drink not only enhances the competitiveness of cariogenic organism, but also inhibits the growth and metabolism of non-caries associated species.<sup>8</sup>

A recent large study of young children in Iowa

found "intake of regular soda pop was the strongest predictor of the extent of caries"<sup>6</sup>. There is also a strong association between the frequency of between-meal consumption of soda pop and caries.<sup>9, 10</sup>

Strong associations between high DMFS (decayed missing filled surfaces on teeth) scores and soft drink consumption in persons aged 25 and above have been seen. Serious problems will occur particularly in people who have dry mouths (caffeine, medications, exercise and certain ailments cause dry mouth).<sup>11</sup>

It has also been observed that the children with a high carbonated soft drink consumption pattern showed significantly higher caries experience, even compared with those children with a high juice consumption pattern<sup>12</sup>. The reason being sugar substrates in 100% juice are primarily fructose and glucose, whereas the substrate in regular soda pop and regular beverages from powder is sucrose and/or high-fructose corn syrup (i.e., fructose and glucose). Glucosyltransferase from *Streptococcus mutans* uses sucrose but not fructose or glucose to form extracellular glycans that facilitate dental plaque adherence to the enamel surface. Linkages between glycans are rigid and increase the porosity of the plaque, which could facilitate diffusion of sugars and acid within the plaque and increase caries risk. In the laboratory, sucrose seems to promote *Streptococcus mutans* selection.<sup>10</sup>

### Dental Erosion

Dental erosion (erosive tooth wear) is the situation of a chronic loss of dental hard tissue that is chemically etched away from the tooth surface by acid and/or chelation without bacterial involvement. Soft drinks containing inherent acids and sugars have both acidogenic and cariogenic potential.<sup>13</sup> Many studies showed a positive relationship between caries and dental erosion and the consumption of soft drinks.<sup>14,15</sup> Compared with caries, dental erosion seems to have much stronger relationship with soft drinks.<sup>13</sup>

It is found that over time, exposing dental enamel to carbonated beverages weakens and permanently destroys enamel.<sup>16,17</sup>

Regular black soft drink contains orthophosphoric acid. It is well known that orthophosphoric acid will dissolve the protective pellicle layer deposited by saliva onto teeth, and will etch both enamel and dentine. Citric acid in soft drink sequesters calcium ions from saliva, preventing remineralization, etches dentine and causes dental erosion.

More importantly, these various acids are effective buffers, giving the drink high titratable acidity and making their pH reducing effects in the mouth greater

than the protective buffering action of saliva. This explains why enamel and dentine hardness decreases after exposure to soft drinks and erosion areas develop.<sup>8</sup>

In an study carried out by researchers at the University of Melbourne, showed damage to tooth enamel by acid erosion was reported by 25-45% of those surveyed.<sup>18</sup> Sugared versions of soft drinks proved to be more erosive than their diet counterparts.<sup>19</sup>

The erosive potential of drinks is mainly represented by their pH and the buffering capacity. Carbonated drink could reduce surface hardness of enamel and dentine. Carbonated drinks have lower pH than fruit juices. The buffering capacities are in the following order: fruit juices > fruit-based carbonated drinks > non-fruit-based carbonated drinks.<sup>13</sup>

Studies have shown that dental erosion is also associated with the drinking methods. Holding the drink longer in the mouth leads to a more pronounced pH drop<sup>14</sup>. Drinking with an increasing flow rate and with decreasing outlet diameter could increase the erosion depth. The effect is also strengthened when acid temperature grows higher.<sup>13</sup>

## PREVENTION

**Individual approach:** Obviously, lowering or eliminating soft drink consumption entirely is not a very likely solution.

1. Substitute different drinks with beverages containing less sugar and acid such as water, milk and 100 percent fruit juice.<sup>20</sup>
2. Rinse with water: After consuming a soft drink, flush your mouth with water to remove vestiges of the drink that can prolong exposure of tooth enamel to acids.<sup>16</sup>
3. Avoid any erosion-inducing habits such as sipping, swishing or holding drinks in the mouth. Do not brush teeth for at least one hour after an erosive challenge (such as consumption of a highly acidic beverage).<sup>21</sup>
4. Fluoride toothpaste and mouth rinse: Fluoride reduces cavities and strengthens tooth enamel, so brush with a fluoride-containing toothpaste s. Rinsing with a fluoride mouthwash also can help.
5. Professionally applied fluoride treatment.<sup>22</sup>

**For school children:** American Dental Association opposes contractual arrangements in schools that promote increased access to soft drinks for children, thereby influencing consumption patterns.<sup>4</sup>

The American Academy of Pediatrics has stated that the “providing soft drinks in schools can lead to childhood obesity” and should focus on providing more nutritious, lower calorie beverages such as water, milk,

100% fruit juice and vegetable juice. Communities and schools are uniting across America to pass legislation banning the sale of soft drinks in schools especially during meal times. However, much more effort needs to focus on competitive foods, foods sold at school stores and at fundraisers.<sup>1</sup>

**Public Health approach:** The Center for Science in the Public Interest offers the following suggestions for reducing the consumption of soft drinks.<sup>6</sup>

- Individuals and families should consider how much soda pop they are drinking and reduce consumption accordingly. Parents should stock their homes with healthful foods and beverages that family members enjoy and, for the most part, not keep soft drinks—especially non-diet drinks—in the refrigerator.
- Physicians, nurses, dentists, and nutritionists should routinely ask their patients how much soda pop (and other low-nutrition foods) they are consuming and advise them, when appropriate, to consume less.
- Labels on non-diet soft drinks should state that frequent consumption of those drinks promotes obesity, diabetes, and tooth decay, osteoporosis and other health problems.
- Local, state, and federal governments should be as aggressive in providing water fountains in schools, government buildings, parks, and other public spaces as the industry is in placing vending machines.
- School systems and other organizations catering to children should stop selling or advertising soft drinks.
- Organizations concerned about children’s health, dental and bone health, heart disease, and cancer should collaborate on campaigns to reduce soft drink consumption.
- State and local governments should consider levying small taxes on soft drinks.
- Federal agencies should sponsor more scientific research to further explore the effects of soft drink (and refined-sugars) consumption on nutrient intake, obesity, dental caries and erosion, osteoporosis, kidney stones, and heart disease.

## PERSPECTIVE FROM SOFT DRINK INDUSTRY TRADE ASSOCIATION:

Soft drink consumption has become a highly visible and controversial public health and public policy issue. The industry trade association in the United States (the American Beverage Association, formerly the National Soft Drink Association) counters nutrition

concerns with several key points: (1) the science linking soft drink consumption to negative health outcomes is flawed or insufficient, (2) soft drinks are a good source of hydration, (3) soft drink sales in schools help education by providing needed funding, (4) physical activity is more important than food intake, and (5) it is unfair to “pick on” soft drinks because there are many causes of obesity and there are no “good” or “bad” foods. Similar positions have been taken by other trade associations such as the British Soft Drinks Association and the Australian Beverages Council.<sup>23</sup>

## CONCLUSION

The contemporary changes in beverage patterns have the potential to affect oral health. Though there is limited epidemiological evidence assessing the association between oral health and soft drink consumption, it consistently indicates that soft drinks adversely affect dental caries and enamel erosion. Although the diseases are different in their histological appearance, the two conditions occurring concurrently could be deleterious to dental hard tissues. Moreover, numerous in vitro and animal studies have consistently shown enamel erosion with the use of soft drinks. Given this evidence it would seem appropriate to encourage children and adolescents to limit their intake of soda.

## REFERENCE:

1. WHO: Risks to oral health and intervention: Diet & nutrition- WHO [www.who.int]
2. Anne Nordrehaug Åström, Joyce Rose Masalu: Oral health behavior patterns among Tanzanian university students: a repeat cross-sectional survey: BMC Oral Health. 2001;1(1):2.
3. Joseph Devine: Soft Drinks - A Danger To Your Oral Health: EzineArticles.com
4. American Dental Association - Diet and Oral Health – Oral Health Topics-ADA; www.ada.org
5. Martin-Villa MC, Vidal-Valverde C, Rojas-Hidalgo E: Soluble sugars in soft drinks: Am J Clin Nutr. 1981 Oct; 34(10):2151-3.
6. Michael F Jacobson, Liquid Candy: How Soft Drinks are Harming Americans' Health: Centre for Science in the Public Interest, Washington DC 1998; 2nd Ed. 2005: 1-28.
7. Erin O'Brien: Harmful Effects of Drinking Soft Drinks: May 2010: eHow.com
8. Walsh, Laurence J: Black cola drinks, oral health and general health: an evidence-based approach: Oral health issues. ADA News Bulletin, 372 December: 22-24.
9. AI Ismail, BA Burt, and SA Eklund: The cariogenicity of soft drinks in the United States: J Am Dent Assoc, Vol 109, No 2, 241-245
10. Teresa A. Marshall, Steven M. Lev, Barbara Broffitt, John J. Warren, Julie M. Eichenberger-Gilmore, Trudy L. Burns, Phyllis J. Stumbo, P: Dental Caries and Beverage Consumption in Young Children: Pediatrics Vol. 112 No. 3 September 2003, pp. 184-191.
11. Australian Dental Association: The Truth About Black Cola Drinks And Dental Health: National Dental Update: ADA: November 2008- www.ada.org.au
12. W. Sohn, B.A. Burt, M.R. Sowers: Carbonated Soft Drinks and Dental Caries in the Primary Dentition: Journal of Dental Research: March 2006 vol. 85 no. 3 Pg- 262-266
13. Ran Cheng, Hui Yang, Mei-ying Shao, Tao HU, Xue-dong: Dental erosion and severe tooth decay related to soft drinks: a case report and literature review: Journal of Zhejiang University science B; 2009 10(5):395-399
14. Ann-Katrin Johansson, Peter Lingström, Thomas Imfeld, Dowen Birkhed: Influence of drinking method on tooth-surface pH in relation to dental erosion: European Journal of Oral Sciences: Volume 112, Issue 6, pages 484–489, December 2004
15. Luo Y, Zeng XJ, Du MQ, Bedi R: The prevalence of dental erosion in preschool children in China. J Dent. 2005 Feb;33(2):115-21.
16. Soda Attack: Soft Drinks, Especially Non-colas and Iced Tea, Hurt Hard Enamel: Oral Health Resources: General Dentistry July/August 2004 issue- www.agd.org.
17. J. Anthony von Fraunhofer, Matthew M. Rogers: Dissolution of dental enamel in soft drinks: General Dentistry July/August 2004 issue:308-12
18. Australian dental association: Drinks and Dental Decay: ADA: Aug 2005- www.ada.org.au
19. Jain P, Nihill P, Sobkowski J, Agustin MZ: Commercial soft drinks: pH and in vitro dissolution of enamel: Gen Dent. 2007 Mar-Apr;55(2):150-4; 155, 167-8
20. Colgate world of care: Soda or Pop? It's Teeth Trouble by Any Name: Oral & Dental Health Basics - www.colgate.com
21. Aubrie Mazza: Oral hygiene habits of college students: unhealthy eating and high levels of stress put them at risk: Health Care Industry-Access, Jan, 2008
22. Brimacombe C: The effect of extensive consumption of soda pop on the permanent dentition: A case report. Northwest Dentistry 2001;80:23-25.
23. Lenny R. Vartanian, Marlene B. Schwartz and Kelly D. Brownell: Effects of Soft Drink Consumption on Nutrition and Health: A Systematic Review and Meta-Analysis: April 2007, Vol 97, No. 4 American Journal of Public Health 667-675

# A Study of Epidemiological and Anthropometric Predictors of Type-2 Diabetes Mellitus in Rural Coastal Andhra Pradesh

Pradeep Sukla<sup>1</sup>, Karun Dev Sharma<sup>1</sup>, Sipra Komal Jena<sup>1</sup>, Durga Prasad<sup>2</sup>

<sup>1</sup>Department of Community Medicine, G.S.L. Medical College & General Hospital, Rajahmundry. A.P. <sup>2</sup>General practitioner, village Raghdevapura Sitanagaram Mandal, Dist East Godavari, Andhra Pradesh.

## ABSTRACT

**Back ground:** A study in rural coastal Andhra Pradesh. **Objective:** - To study the prevalence, epidemiological and anthropometric determinants associated with Type – 2 Diabetes mellitus (DM).

**Material & Method** - A population-based cross- sectional study.

**Results:** - Out of 204 study subjects, 111 were females and 93 males. The prevalence of type-2 DM, pre diabetes and non diabetes was 9.8 %; 10.3 %, and 79.9 % respectively. Difference between mean fasting blood glucose and mean post- load blood glucose among diabetics and non-diabetics was found to be highly significant. ( $p < 0.01$ ). The mean differences in systolic as well as diastolic blood pressure (BP) of diabetics and non-diabetics were shown to be statistically significant. The mean difference in body mass index (BMI) and waist hip ratio (WHR) values among diabetics and non-diabetics, diabetics and pre-diabetics were statistically significant.

**Conclusion:** BMI, level of BP and WHR are significant determinants of Type 2 diabetes in rural population.

**Key words:-** epidemiological & anthropometrical determinants, Type – 2 Diabetes Mellitus, body mass index, waist hip ratio, blood pressure.

## INTRODUCTION

Diabetes mellitus is clinically and genetically a heterogeneous disorder characterized by abnormal marked hyperglycemia due to deficiency of insulin secretion or resistance of the body's cells to the action of Insulin or combination of both. The International Diabetes Federation (IDF) estimated that there are 100 million people with diabetes world wide that is about 6 % of all adults <sup>1</sup>. According to Sarah wild et al the prevalence of diabetes for all age-groups worldwide was estimated to be 2.8% in 2000 and 4.4% in 2030. The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030. The greatest absolute increase in the number of people with diabetes will be in India <sup>2</sup>. The number of individuals with diabetes will rise from 84 million to 228 million in developing countries. The greatest increase will be in India from 19.4 million to 57.2 million <sup>3</sup>.

Screening of the high risk groups such as subjects  $\geq 40$  years can be a rewarding exercise for diagnosing hidden diabetics <sup>4</sup>. A standard 2 hour OGTT is sufficient to diagnose or exclude all forms of diabetes mellitus. The 2 hour OGTT glucose level between 140 mg/dl and 200 mg/dl indicates "impaired glucose tolerance". Glucose levels  $\geq 200$  mg/dl at 2 hours confirms a diagnosis of diabetes mellitus<sup>5</sup>.

Diabetes mellitus is no more restricted to urban elites rather it has entered into the rural population. The attributed causes in the increase of the disease in rural population are socio-economic improvement among the rural people leading to life style changes, physical inactivity and changes in food habit. The World Health Organization (WHO) had shown a simplistic relationship between BMI and the risk of co morbidity, in which a normal range was considered between 18.5 and 24.9 kg/m<sup>2</sup>. A positive association

between obesity and the risk of developing type 2 diabetes has been consistently observed<sup>6</sup>. It has become accepted since last 10 years that a high waist hip ratio (WHR) >1.0 in men and >0.85 in women indicates abdominal fat accumulation. WHR is a powerful determinant of risk of type 2 diabetes<sup>4</sup>.

The present study is carried out to get an insight into the prevalence, epidemiological & anthropometric determinants of type 2 DM in a rural population.

**Objective:** - To assess the prevalence, of type - 2 diabetic mellitus in the rural population e" 40 yrs of age in the study area. To assess the epidemiological and anthropometric determinants of the disease.

## MATERIAL AND METHODS

**Type of Study:** - A population based cross-sectional study

**Study Area:** - Rural health and training centre, the field practice area of department of community medicine of the medical college and general hospital, in coastal Andhra Pradesh.

**Study Design:** - A population-based cross-sectional study .

**Sample Size:** - Of the 10 villages under the study area, two villages were randomly selected by lottery method. From an estimated total 2232 house-holds in the two selected villages, 223 (i.e. 10 %) of the houses were selected by systematic random sampling technique. From each house hold only one family member, ≥ 40 yrs of age, was selected . If there was no family member ≥40 yrs of age, the next house was visited. Thus the sample size for the study was 223. Of these 223 subjects, 21 withdrew before the onset of the study citing personal reasons. Thus 202 study subjects gave written consent and constituted the final sample size. During the survey, 2 old cases of diabetes, already on treatment, (self -reported) were included in the study. Thus the total sample size was 204.

**Period Of Study:** - 15<sup>th</sup> to 25<sup>th</sup> May, 2009.

### Inclusion Criteria

- Residents e" 40 yrs. of age.
- Residents possessing 'ration card' as a proof of permanent residence Residents giving "written consent"

### Exclusion Criteria

- Residents < 40 yrs. of age.
- Residents not possessing ration card
- Residents not giving "written consent"

**Methods:** - The study subjects were initially screened by random blood sugar method (venous blood sample, glucose oxidase / peroxidase method), the participants having blood sugar ≥ 140mg % were further subjected to oral glucose tolerance test (OGTT) fasting and post load (blood sugar analysis after 2 hrs. of administration of 82.5 gms. of commercially available glucose orally with 300ml of water) to classify as diabetic (≥200mg%), pre diabetic (140-199mg %) and non diabetic (<140mg %). An interview schedule was used to collect demographic data from the study subjects. The physical examination was conducted on each and every study subject separately and parameters such as pulse rate, BP, lean body-weight and waist & hip circumferences were recorded.

**Study tools:** - Pre-designed and pre-tested interview schedule, medical equipment (stethoscope, standardized B.P. instrument, weighing machine and semi-automatic blood glucose analyzer and other accessories such as syringes & needles, rectified spirit, and measuring tape).

**Variables:** - Following variables were assessed in the study age, sex, BMI, waist-hip ratio, blood pressure.

## STATISTICAL METHODS

The data was represented in the form of percentages, mean and statistical tests such as Analysis of variance (ANOVA) test were applied.

### Ethical clearance:

Ethical clearance was provided by institutional ethical committee .

## RESULTS

Out of 204 study-subjects, maximum subjects 29.4 % (60/204) were in 40-44 yr of age group followed by 21.6 % (44/204) in age group 45-49 years and 20.1 % (41/204) in 50-54 years of age group (Table 1).

45.6 % (93/204) of the study subjects were males and 54.4 % (111/204) were females (Table 1).

Of the 202 new study subjects who were subjected to random blood sugar estimation 73.8 % (149/202) demonstrated blood sugar levels of < 140g % and 26.2 % (53/202) demonstrated blood sugar levels of ≥ 140mg %.

On subjecting the 53 participants having blood sugar ≥ 140 mg % to OGTT - fasting, 28.3 % (15/53) demonstrated blood glucose values in the range between 78-86 mg % (mean = 82.48 mg %) ; 39.6 % (21/

53) demonstrated blood glucose values between 100-123 mg % (mean 116 mg %) and 32.1 % (17/53) demonstrated blood glucose values between 126-149 mg % ( mean =140 mg %).

**Table 1 Showing distribution of age and sex among study subjects**

Age-Group	Male (a)	% (a/c*100)	Female (b)	% (b/c*100)	Total (c)	%
40-44	35	58.3	25	41.7	60	29.4
45-49	22	50.00	22	50.0	44	21.6
50-54	15	36.6	26	63.4	41	20.1
55-59	11	39.3	17	60.7	28	13.7
60-64	7	31.8	15	68.2	22	10.8
65-69	2	33.3	4	66.7	6	2.9
e"70	1	33.3	2	66.7	3	1.5
Total	93	45.6	111	54.4	204	100.00

On post-load analysis, 26.4 % (14/53) demonstrated blood glucose values in the range of 90-127 mg % (mean=112.84 mg %) and were designated as Non-diabetics, 39.6 % (21/53) demonstrated blood glucose values in the range of 140-168 mg % (mean=154 mg %) and were designated as pre diabetics; and 33.9 % (18/53) demonstrated blood glucose values in the range of 200-268 mg % (mean = 224.05 mg %) and were designated as new diabetics Two self-reported diabetics were confirmed by random blood sugar estimation and labeled as old diabetics. On applying student's

't' test, difference between mean fasting blood glucose among diabetics and non-diabetics and similarly mean post- load blood glucose in the same groups (i.e. diabetics and non diabetics) was found to be highly significant. (p < 0.01).

The prevalence of diabetes, pre diabetes and non diabetes in our study was 9.8 % (20/204) ; 10.3 % (21/204), and 79.9 % (163/204) respectively (Table 2). A study conducted by Kutty V.R., Soman C.R., Joseph A, Vijaya Kumar, in Southern Indian state of Kerala found the prevalence of DM to be 12.4%<sup>7</sup>. In a rural population of Andhra Pradesh, 13% of adults aged e" 30 years were found out to have Diabetes and 16% with Pre-diabetes.<sup>8</sup>

The mean values of BMI in diabetics, pre-diabetics and non-diabetics were 26.52 kg/m<sup>2</sup>, 23.52 kg/ m<sup>2</sup> and 20.39 kg / m<sup>2</sup> respectively. Among diabetics 75 % (15/20) had BMI e" 25 i.e. over-weight. In pre-diabetics and non-diabetics, the corresponding values were 38.1 % (8/21) and 19 % (31/163) respectively (Table- 2). The mean difference in BMI values among diabetics and non-diabetics, diabetics and pre-diabetics was statistically significant at 0.05 level (variance ANOVA test). Similar results have been found out by A. Ramachandran et al<sup>9</sup>.

Among diabetics, 45% (9/20) had hypertension (i.e. BP e" 140/90 mm of Hg) whereas among pre-dia-

**Table 2 : Showing distribution of BMI among Diabetics, prediabetics and non diabetics**

Age-Group	Diabetic					Pre Diabetic					Non Diabetic					Total (d)
	BMI (kg/m2)			ST (a)	% (a/d *100)	BMI (kg/m2)			ST(b)	% (b/d *100)	BMI (kg/m2)			ST (c)	% (c/d *100)	
	UW	NW	OW		UW	NW	OW			UW	NW	OW				
40-44	1	1	4	6	10	1	1	2	4	6.7	10	30	10	50	83.3	60
45-49	0	0	3	3	6.8	1	2	3	6	13.6	15	16	4	35	79.5	44
50-54	0	3	3	6	14.6	1	2	2	5	12.2	13	11	6	30	73.2	41
55-59	0	0	4	4	14.3	0	1	1	2	7.1	3	13	6	22	78.6	28
60-64	0	0	0	0	0.0	0	3	0	3	13.6	7	8	4	19	86.4	22
65-69	0	0	0	0	0.0	0	1	0	1	16.7	3	1	1	5	83.3	6
e"70	0	0	1	1	33.3	0	0	0	0	0.0	1	1	0	2	66.7	3
Total	1	4	15	20	9.8	3	10	8	21	10.3	52	80	31	163	79.9	204

Classification of adults as per BMI (kg/m<sup>2</sup>) UW (under weight) - 16-18.49, NW (normal weight) -18.5-24.99, OW (over weight) ->25

ST - Sub Total

betics and non-diabetics 33.33% (7/21) and 11.7% (19/163) were hypertensive respectively (Table 3). The mean difference in both systolic and diastolic BP among diabetics and non-diabetics was statistically significant at 0.05 level (ANOVA test). Whereas between the diabetics and pre-diabetics only the mean-difference in systolic BP was shown to be statistically significant.

(Variance ANOVA test). Similar results have been found out by V Mohan, CS Shanthirani, R Deepa<sup>10</sup>.

Among male diabetics, pre-diabetics and non-diabetics, 66.7 % (8/12), 33.3 % (3/9) and 22.2 % (16/72) had WHR values e" 1.00 respectively (Table 3). Among female diabetics, pre-diabetics and non-diabetics, 75

% (6/8), 58.3% (7/12) and 39.6% (36/91) had WHR values  $\geq 0.85$  respectively (Table 4). The mean difference in WHR values among male diabetics and non-diabetics, pre-diabetic and non-diabetic was significant at 0.05 level (ANOVA test). The mean difference in waist-hip ratio values among female diabetics and non-diabetics, pre-diabetics and non-diabetics was significant at 0.05 level (ANOVA test). Similar results have been found out by A. Ramachandran et al <sup>9</sup>.

**Table 3: Showing distribution of Blood Pressure among Diabetics, Pre diabetics and Non diabetic study- subjects**

Age-Group	Diabetic		Pre Diabetic		Non Diabetic				Total				
	BP (mm.Hg)		Sub -Total (c)	% (a/c *100)	BP (mm.Hg).		Sub -Total (f)	% (d/f *100)	BP (mm Hg)		Sub -Total (i)	% (g/i * 100)	
	$\geq 140/90$ (a)	$< 140/90$ (b)			$\geq 140/90$ (d)	$< 140/90$ (e)			$\geq 140/90$ (g)	$< 140/90$ (h)			
40-44	3	3	6	50	1	3	4	25.0	4	46	50	8.0	60
45-49	2	1	3	66.7	1	5	6	16.7	3	32	35	8.6	44
50-54	1	5	6	16.7	2	3	5	40.0	5	25	30	16.7	41
55-59	2	2	4	50	1	1	2	50.0	1	21	22	4.6	28
60-64	0	0	0	0	1	2	3	33.3	3	16	19	15.8	22
65-69	0	0	0	0	1	0	1	100.0	2	3	5	40.0	6
$\geq 70$	1	0	1	100	0	0	0	0.0	1	1	2	50.0	3
Total	9	11	20	45	7	14	21	33.3	19	144	163	11.7	204

**Table 4: Showing distribution of WHR among diabetics, pre diabetics and non diabetics in male and female study- subjects**

Age-Group	Diabetic				Pre Diabetic				Non Diabetic				Total
	WHR		Sub Total (c)	% (a / c * 100)	WHR		Sub -Total (f)	% (d / f * 100)	WHR		Sub-Total (i)	% (g / i * 100)	
Males	$\geq 1$ (a)	$< 1$ (b)			$\geq 1$ (d)	$< 1$ (e)			$\geq 1$ (g)	$< 1$ (h)			
40-44	2	2	4	50.0	1	1	2	50.0	8	22	30	26.7	36
45-49	2	1	3	66.7	1	2	3	33.3	3	13	16	18.8	22
50-54	2	0	2	100.0	1	1	2	50.0	2	9	11	18.2	15
55-59	1	1	2	50.0	0	2	2	0.0	1	4	5	20.0	9
60-64	0	0	0	0.0	0	0	0	0.0	1	7	8	12.5	8
65-69	0	0	0	0.0	0	0	0	0.0	1	1	2	50.0	2
$\geq 70$	1	0	1	100.0	0	0	0	0.0	0	0	0	0.0	1
Total	8	4	12	66.7	3	6	9	33.3	16	56	72	22.2	93
Females	$\geq 0.85$	$< 0.85$	Sub Total	%	$\geq 0.85$	$< 0.85$	Sub Total	%	$\geq 0.85$	$< 0.85$	Sub Total	%	Total
40-44	2	0	2	100	1	1	2	50.0	6	20	26	23.1	30
45-49	0	0	0	0	2	1	3	66.7	8	11	19	42.1	22
50-54	2	2	4	50	1	2	3	33.3	8	8	16	50.0	23
55-59	2	0	2	100	0	0	0	0.00	7	6	13	53.9	15
60-64	0	0	0	0	2	1	3	66.7	3	9	12	25.0	15
65-69	0	0	0	0	1	0	1	100.0	2	1	3	66.7	4
$\geq 70$	0	0	0	0	0	0	0	0.00	2	0	2	100.0	2
Total	6	2	8	75	7	5	12	58.3	36	55	91	39.6	111

## CONCLUSION

BMI, hypertension and waist-hip ratio values were strongly associated with diabetic study subjects as compared to pre-diabetics and non-diabetics in our study.

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## REFERENCES

1. Sicree R, Shaw J, Zimmet P. Diabetes and impaired glucose tolerance in India. Diabetes Atlas. In: Gan D, editor. Belgium: International Diabetes Federation; 2006.p.15-103
2. Sarah wild et al, Global Prevalence of Diabetes Estimates for the year 2000 and projections for 2030, Diabetes Care, May 2004 vol. 27 no. 5 1047-1053.
3. Martorell R. Diabetes and Mexicans: why the two are linked. Prev Chronic Dis, 2005 Jan, vol 2, no.1, 1-5. Available from: URL: [http://www.cdc.gov/pcd/issues/2005/jan/04\\_0100.htm](http://www.cdc.gov/pcd/issues/2005/jan/04_0100.htm). (last accessed on 19 Oct 2010)
4. K. Park, Diabetes, Epidemiology of chronic and non – communicable diseases and conditions, Text book of preventive and social and medicine 19<sup>th</sup> edition (Bhanot Publications, Jabalpur), p 330-335.
5. Available from [http://en.wikipedia.org/wiki/Glucose\\_tolerance\\_test](http://en.wikipedia.org/wiki/Glucose_tolerance_test) (last accessed on 18 Oct 2010).
6. Chamukuttan Snehalatha , Vijay Viswanathan, , Ambady Ramachandran, Cutoff Values for Normal Anthropometric Variables in Asian Indian Adults , Diabetes Care, May 2003, vol. 26 no. 5, 1380-1384.
7. Kutty V.R, Soman CR, Joseph A, Vijaya kumar K,. Type 2 Diabetes in Southern Kerala: variation in prevalence among geographic divisions within a region, National Med. Journal India-2000: 13: 287-292.
8. Bruce Neal, a study in Rural South Indian population on prevalence of Diabetes and Pre-diabetes, source: Eurekalert India- Survey Reports, category – Indian Health News, Thursday June, 29, 2006 at 10:59: 20 P.M.
9. Ramachandran et al., High prevalence of diabetes and impaired glucose in India : National urban diabetes survey, diabetologia (2001) 44: 1094-1101.
10. V Mohan, CS Shanthirani, R Deepa, Glucose Intolerance (Diabetes and IGT) In a Selected South Indian Population With Special Reference To Family History, Obesity And Lifestyle Factors – The Chennai Urban Population Study (CUPS 14), JAPI , vol. 51 , august (2003) 771-777.



# A Study of Psychiatric Co-Morbidity in Cases of Renal Failure, Undergoing Hemodialysis

Prakash Chandra<sup>1</sup>, Rahul M Deo<sup>2</sup>, B K Singh<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of Psychiatry, SIMS Hapur, <sup>2</sup>Consultant Psychiatrist, Nasik, <sup>3</sup>Ex-HOD, Dept of Psychiatry, PMCH, PATNA

## ABSTRACT

A study of patients with renal failure undergoing hemodialysis was conducted at renal dialysis unit and OPD of psychiatry department, at Patna medical college & hospital to establish point prevalence of psychiatric co-morbidity in these patients. Patients of all age group, from all economic classes were recruited. Patients were assessed for common mental disorders using the MINI (MINI International neuropsychiatric interview). They were defined according to ICD 10/DSM IV criteria. Total 60 patients were assessed in which 30 patients satisfied the criteria for the different common mental disorders. Hopelessness, restlessness, were most common presentation. Suicidal ideation was significantly associated with these patients.

**Key words** - Hemodialysis, GAD, Psychotic disorders

## INTRODUCTION

Patients with renal failure, on hemodialysis have been found to exhibit increased levels of psychological disturbances (Scribner et al 1960, Maher et al 1960, Boen et al

1962, Hegstran et al 1960, Gutich et al 1964, Schumacher et al 1965, Schupak & Marrill 1965, Pendras & Erickson 1966, Ozcusumez G 2003, Pat et S.S shah V.S 2002).

Abram et al (1975) observed that sexual interest and ability are likely to be affected (Sensky T 1993, Levy 1975) in these patients. Psychiatric morbidity in patients undergoing hemodialysis is high and there is evidence that the suicide rate is above that of general population (Siddiqui et al 1970, Abram 1971, Foeter et al 1973, Bruner 1976 & Kaplan 1876).

## MATERIAL AND METHOD

Study was performed on 60 cases of renal failure who were diagnosed clinically and on the basis of relevant investigations. They were admitted in renal dialysis unit of Patna medical college & hospital, Patna. Patients who were willing to participate, who could communicate verbally and were suitable for the hemodialysis were interviewed. Patients were selected from all age groups, from both sexes, from all commu-

nities, from all socio-economic class. Patients with previous history of mental illness, not able to communicate and history of drug abuse were not included. Selected patients were assessed for common mental disorders using the MINI (It is a brief structured interview for major axis I disorders of DSM IV and ICD-10. Validation and reliability score of MINI is comparable to SCID or CIDI. It can be administered in much shorter period of time (mean 15 minutes). MINI is divided into modules identified by letters, each corresponding to a diagnostic category. At the beginning of each module, screening questions corresponding to main criteria of disorders are presented. At the end of each module, diagnostic boxes permit the interviewer to indicate that whether the diagnostic

Criteria have been met or not. Towards the end of study, collected data were coded and tabulated in respective proformas and subjected to statistical analysis to answer the aims and objectives of this study. Analysis was done by applying CHI-SQUARE test and statistical significance was observed.

### Interview was done in 3 stages.

- 1<sup>ST</sup> before starting the dialysis
- 2<sup>ND</sup> immediately after the dialysis
- 3<sup>RD</sup> during follow up in OPD & during intermittent

dialysis. Interview included detailed history from patients and relatives, physical examination of the patients, pathological tests etc.

## RESULT & DISCUSSION

Sample consisted of 60 patients who fulfilled the inclusion and exclusion criterias. Control group of 60 patients were chosen from general medical wards with renal failure, but not on hemodialysis. Results are shown from Table no. 1- 5. Treatment of Chronic renal failure (CRF) by hemodialysis is a relatively new procedure which has been in use after 1960. It can prolong the life of patients who would have otherwise died due to their physical illness.

Aim of this study was to define and understand the stresses to which the average renal patients are subjected to. Underlying this aim was the hope that such understanding will lead in developing means of helping the patients undergoing hemodialysis in achieving an optimal adjustment. Patients reaction during dialysis were divided into 3 stages

- (a) Reaction before dialysis
- (b) Reaction during dialysis
- (c) Reaction after dialysis

Before the dialysis, patients shown increased incidence of apprehension, insomnia, irritability etc. During the dialysis, patients were anxious, irritable and depressed. They often became aggressive and irritable. After the dialysis, there was sense of relief and hope. When Kaplan De Nour (1979) compared adolescent patients with adult patients, he observed that adolescent patients had poor compliance to diet and drugs with poor rehabilitation. They show more hostile attitude but less psychiatric complications and suicidal ideation than the adult patients. It was reported that patients with higher I.Q showed better co-operation, adjustment and rehabilitation. In the present study, we observed that if the patient adjust well, their family will probably have better reciprocal adjustment. Likewise if the family is able to react in a supportive manner the patient is certainly likely to benefit.

TABLE 1, Shows that psychiatric complications in the age group 41 – 60 is highest 51.7%, which can be explained due to increased liabilities with physical, social and economical stresses and strains of life being highest in this age group. This table also shows that greater number of cases being male. Salmons(1981) observed that men may find that their role in the family has changed. They are now dependent and this feeling may create psychiatric complications.

TABLE-1. Sample characteristics

CHARACTERISTICS	STUDY GROUP	CONTROL GROUP
<b>1.Age groups(yrs)</b>		
0-20	8(13.3%)	10(16.6%)
21-40	21(35%)	26(43.3%)
41-60	31(51.7%)	24(40%)
MEAN AGE	38.38+/- 12.94	35.5+/- 12.9
<b>2. Gender</b>		
Male	44(73.3%)	45(75%)
Female	16(26.6%)	15(25%)
<b>3. Religion</b>		
Hindu	42(70%)	45(75%)
others	18(30%)	15(25%)
<b>4. Domicile</b>		
Urban	45(75%)	44(73.3%)
Rural	15(25%)	16(26.6%)
<b>5. Occupation</b>		
Manual worker	10(16.6%)	24(40%)
Business	8(13.3%)	8( 13.3%)
Others	42(70%)	28(46%)
<b>6.Marital status</b>		
Married	45(75%)	42(70%)
Unmarried	10(16.6%)	15(25%)
Divorced	5( 8.3%)	3(4.9%)
<b>7. Economic status</b>		
Upper	21(35%)	15(25%)
Lower	39(65%)	45(75%)

Hindu patients constitutes the bulk of study group, which is explained by their more preponderance over other communities.

TABLE 2, Shows that most common psychiatric symptoms were hopelessness, restlessness, sleeplessness, loss of appetite. It was significant in comparison to control group.

TABLE 3, Shows most common psychiatric diagnosis: GAD, Depression, Organic brain syndrome. Gordon et al (1973) found that 47% of their patients suffered from intermittent depression. Kaplan (1971) observed 53% of patients were depressed.

TABLE 4, Shows that 40% of patients developed psychiatric complications during first 20 sessions of dialysis. Later incidence decreases due to better understanding.

**TABLE-3. Psychiatric disorders in hemodialysis patients**

Disorder	Study group	Control group
G AD	12(40%)	4(33.3%)
Depression	11(36.66%)	4(33.3%)
Psychosis	2(6.66%)	NIL
Org. brain syndrome	5(16.6%)	4(33.3%)

**TABLE- 4. Correlation of Psychiatric complications with no. of dialysis session**

No. of dialysis session	No. of cases showing psych. complications	Percentage(%)
1-20	12	40%
21-40	10	33.30%
41-60	08	26.60%

TABLE 5, Shows that maximum 40% of patients developed psychiatric complications during first 4 months of intermittent dialysis. Reichsman (1972) observed 3 distinct stages during maintenance hemodialysis

**TABLE-5. Correlation of Psychiatric complications with duration of hemodialysis**

Duration to develop Psych. complications	No. of cases showing psych. complications	
0- 4 months	13	43%
5- 8 months	10	33.30%
9- 12 months	07	23.10%

- (a) "Honeymoon" period
- (b) Period of discouragement
- (c) Period of long term adaptation

Onset of 1<sup>st</sup> stage occurs 1-3 weeks after the 1<sup>st</sup> hemodialysis with duration ranging from 6 weeks to 6 months. During this stage patients had full hope and confidence.

2<sup>ND</sup> stage-all confidence and hope disappeared and they became helpless and sad. It lasted for 3-12 months.

In the 3<sup>RD</sup> stage patients accepts their limitations and starts adapting with circumstances.

Denial is seen as the most commonly used defence mechanism by the dialysis patients. The attitude of staff members seems to be the most important factor in the management of these patients. Their co-operation makes dialysis patients more adjustable.

**CONCLUSION**

Psychiatric morbidity was significantly higher in patients with renal failure on hemodialysis, than in those who were not on hemodialysis. Hopelessness and GAD were the most common psychiatric morbidity associated with. Majority of psychiatric complications appeared during first 20 sessions of hemodialysis within 4months.

**REFERENCES**

1. Abram H.S. The psychiatrist, the treatment of chronic renal failure and the prolongation of life part I, Am.J.Psychiatry,1968;124:10, 45-52,
2. Foster G.G, Chon G.L, Mckezney F.P. Psychological factors and individual survival on chronic renal hemodialysis , 2 yrs follow up part I, Psychosom,med,1973,35:1, Jan- Feb.
3. Kaplan de nou, Adolescents adjustment to chronic hemodialysis, Am.J.Psychiatry, 1979,136, April.
4. Maher J.F,Schreiner G.E, WatersT.J, Successful intermittent hemodialysis- longest reported maintenance of life in true oliguria (181days) Tr.Am.Soc.Int.Org,1960,6:123-27.
5. Patel SS, Shah VS, Psychosocial variables, quality of life and religious beliefs in ESRD patients treated with hemodialysis, Am. J. Kidney dis. 2002, 40(5):1013-22
6. Reichman E, Levy N.B , Problems in adaptation to maintenance hemodialysis, Arcs Int. Med,1972 130, 859-65.
7. Siddiqui J.Y ,Fitz A.E, J.A.M.A, 1970, 212,1350.
8. Gordon F F, Psychobiologic factors on chronic renal failure, follow up, Part-I
9. Winokur M.Z, J W Kaplan, Intelligence and adjustment to chronic hemodialysis, J Psychosom Res, 1973 ,17: 29-34.

# The Common and Uncommon Cestodal Infestation Encountered in Routine Histopathological Practice from a Semi-urban Population in South India and Their Public Health Importance

Ramkumar Kurpad R.<sup>1</sup>, Shuba S<sup>2</sup>, Prakash H Muddegowda<sup>3</sup>, Jyothi B Lingegowda<sup>4</sup>

<sup>1</sup>Professor, Department of Pathology, VMKV Medical College, Salem., <sup>2</sup>Consultant Physician, Vinayaka Missions hi-tech hospital, Salem, <sup>3</sup>Assistant Professor, Department of Pathology, VMKV Medical College, Salem, <sup>4</sup>Assistant Professor, Department of Pathology, VMKV Medical College, Salem.

## ABSTRACT

Parasites are encountered uncommonly in routine histopathologic practice. Among them, cestodes form a major bulk. Cysticercosis heads the list forming the bulk of cases followed by Hydatidosis and Sparganosis. Microscopic identification of inflammation with surrounding reactions along with other morphological features forms the mainstay of diagnosis of parasitic diseases on histopathology. Identification of the parasites on histopathological examination would reduce the cost-diagnosis ratio avoiding expensive serological investigation.

**Key words:** Parasitic infestation, Histopathology, Cestodes.

## INTRODUCTION

Generally parasitic lesions account for 0.1 to 0.5% of all histopathological lesions in our country. A majority of these are cestodal in nature. Tapeworms (cestodes) are segmented worms, the adult forms of which are encountered in gastrointestinal tract, whereas the larvae can be seen in almost any organ in the body.

The specimen most frequently submitted for detection of parasites is stool for the identification of ova or cysts. Specimens are obtained based on radiological investigations or are usually an incidental finding. The major advantages of histopathology are speed, low cost and presumptive identification. Hematological investigations like presence of eosinophilia in peripheral blood could give a clue about parasitic infestation.<sup>1,2</sup>

Ours being a semi-urban hospital with many patients coming from rural areas, we receive specimens resected as a subcutaneous nodule, abscess, lymphadenopathy, gynaecomastia or labeled as soft tissue sarcoma ultimately yielding a cestode with tissue reaction.

This article presents an overview of parasites encountered in our institution over the past two years.

## GROUP I

### Case details:

Case	Sex	Age (in years)	Location	Histopathology
1	Female	20	Neck	Intact larva
2	Male	18	Neck	Degenerated larva
3	Male	22	Thigh	Degenerated larva
4	Male	68	Neck (Submandibular)	Intact larva with secondaries (SCC)
5	Male	15	Chest wall	Intact larva
6	Female	28	Cervical lymphnode	Intact larva
7	Male	15	Neck	Intact larva
8	Female	8	Chestwall	Intact larva

## DISCUSSION

Cysticercosis is the commonest cestodal infection encountered in histopathological practice and forms a major public health problem worldwide. It occurs due to ingestion of contaminated vegetables and food or under cooked meat. Auto-infection can also occur.<sup>2</sup>

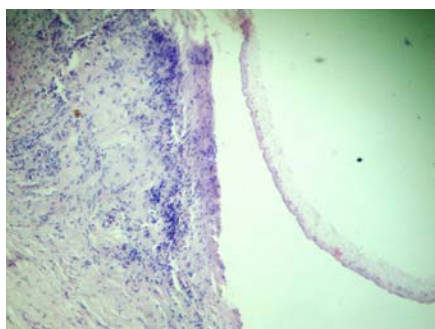
The life cycle of the cestode, *T.solium* involves an intermediate host, normally the pig, for the cystic form

of the parasite and a definitive host, normally man, for the adult form or the tapeworm. However, persons infected by *T.solium* eggs can also serve as hosts for the cystic form, which affects various tissues of the body, most commonly central nervous system followed by sub-cutaneous tissue, muscle, eye and rarely other parts of the body.<sup>2,3</sup>

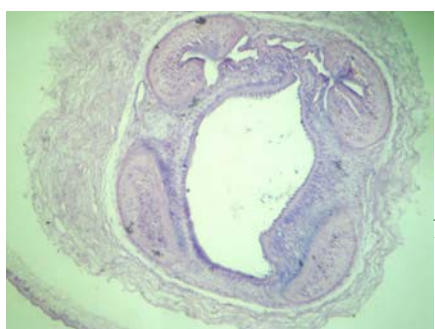
The diagnosis of human cysticercosis can be made by radiologic imaging, tissue biopsy, or serology. Radiologic imaging, including MRI and CT, currently is the most effective means for diagnosis.<sup>2,3</sup>

*Cysticercus* forms the commonest parasitic infection of the CNS (Neurocysticercosis). In the CNS, they cannot grow into worms, and remain as cysts indefinitely. The cysts are usually found in Cerebral cortex, but can occur in meninges of the base of the brain, in the ventricles and rarely in the spinal cord. Compared to other sites, diagnosis in these cases is not feasible as routine biopsy is impossible. Diagnosis usually rests on interpretation of patients symptoms, radiological studies and immunological tests for detection of anti-cysticercal antibodies (Enzyme - linked immunoelectrotransfer blot).<sup>2,3,4</sup>

Definite diagnosis on histopathology (Fig 1 A&B) requires visualization of the parasite. The live parasite has a single scolex with four suckers and a double row of hooklets. The cyst wall has an outer cuticular layer, a middle pseudo epithelial layer, and an inner reticular layer. In excision biopsies, only the cuticular layer of deadworm is appreciated on H&E stain.<sup>2</sup>



A



B

**Fig 1(A and B):** Section of *Cysticercosis* showing inflammatory host response (A) H&E (10x). Section of *cysticercosis* (B) H&E (10x)

Rarely can it present in the form of subcutaneous nodules in the chest, thigh or arms. Histopathology would reveal a cysticerci larvae with surrounding host response composed of fibrosis, chronic inflammatory infiltrate with eosinophils and sometimes giant cells. Sometimes, cysticercosis can coexist with secondaries in lymphnode or Hodgkins of mixed cellularity type. Due attention should be paid to any co-existent disease lest, we miss them. As similar changes are encountered, it is critical for the histopathologist to differentiate between inflammatory conditions caused by infectious agents from those with non-infectious etiology.<sup>1,3,4</sup>

## GROUP II

### Case details

A 37 year old farm laborer presented with history of cough and vague chest pain of few months duration. Chest radiograph revealed irregular masses in right middle zone with specks of calcification and fluid levels in a few of the cysts. Cyst was excised with lobectomy of the lung. The cystic mass measured 8x7x5 cm (Fig 2A). It was opalescent gray white in color. Cut section exuded about 50 ml of fluid and many daughter cysts with brood capsules.

Microscopy revealed a lamellated membrane (Fig 2B) with many scolices diagnostic of *Echinococcus*. Surrounding lung showed granulation tissue and bronchiectatic changes.



Fig 2 (A)

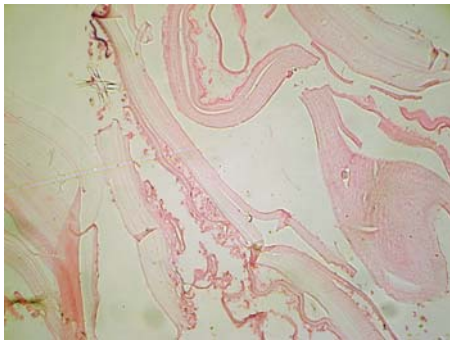


Fig 2(B)

**Fig 2 (A and B):** Gross specimen showing resected lobe of lung with fragments of laminate membrane (A). Microscopy showing numerous folded delicate laminate membranes (B). H&E (10x)

### DISCUSSION

Echinococcosis is a zoonotic infection caused by tapeworms of the Taeniidae family. Human infection is often considered an occupational public health problem for the sheep (intermediate host) farmers, ranchers, or shepherds in endemic regions. There is however, a risk of infection from dog (definitive host) contact, dog feces, or food contaminated with eggs of *E. granulosus*.<sup>2,5</sup>

The most common site for hydatid cyst is liver followed by lung and others. The cyst wall shows contribution from both the cestode as well as the host and is composed of three layers. The outer host layer or pericyst is composed of fibroblasts, giant cells and eosinophils. The middle laminated membrane is an acellular chitinous layer 2 mm thick. The inner germinal layer is thin and translucent. Scolices originate from the membrane in the form of evaginations called brood capsules. Special stains like modified AFB stain for hooklets and GMS stain for chitinous cellular wall can be done. Alternately, the hooklets can be visualized as refractile structures against background debris. It is the commonest cestode pathogen affecting the lung.<sup>2,5,6</sup>

The eggs develop into embryos which penetrate intestinal mucosa and enter various organs via portal circulation. The larvae develop into fluid filled hydatid cysts. Daughter cysts may develop from germinal layer giving rise to brood capsules. Sometimes the cysts may get secondarily infected with suppuration. Mode of presentation depends on the organ involved and location of cyst.<sup>2</sup>

FNAC is contraindicated in a suspected case as the rupture of cyst could lead to serious anaphylactic shock. Diagnosis of hydatidosis in man is made by

Casoni's test, by detecting protoscolices in hydatid cyst fluid or by detecting antibodies to cyst fluid antigen.<sup>2,5,6</sup>

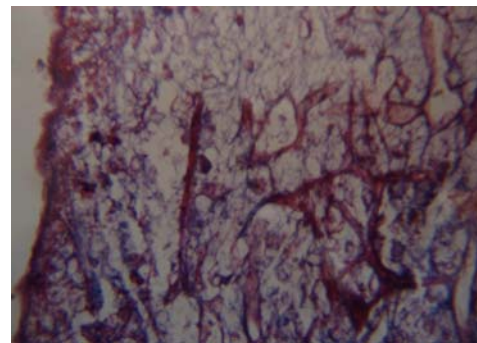
### GROUP III

#### Case details

A middle aged man was diagnosed with unilateral gynecomastia which was excised and sent for histopathology. The cystic mass was oval, greywhite in color 5x3 cm (Fig 3A). C/s revealed a worm 0.5cm long and 15 ml of turbid fluid. Microscopy revealed the worm having thick tegmentum with calcospherules in sub-tegmentum (Fig 3 B) which was surrounded by wall of granulation tissue diagnostic of Sparganosis.



A



B

**Fig 3 (A and B):** Excised specimen showing cut open cyst (A). Section of Parasite showing Calcareous spherules and muscle fibres (B) – Masson Trichrome stain (40x).

### DISCUSSION

Sparganosis are the larvae of *Diphyllobothrium* species of genus, *spirometra*. The parasite has a complex life cycle with dogs and cats as definitive hosts. Humans are usually involved as second intermediate hosts. It is transmitted by consumption of snakes and frogs (II intermediate host). Transmission to humans usually occurs through ingestion of water contaminated with infected Cyclops (I intermediate host) or consumption of contaminated meat. Sometimes appli-

cation of frogs as poultice over burns and wound also transmits the disease. Once a parasite enters the human body, an aberrant life cycle starts resulting in a cyst like structure.<sup>2,7</sup>

The histological features are similar in any tissue being characterized by a necrotizing and granulomatous inflammation with or without worm parasite in the lesions. The surrounding lesion is predominantly composed of eosinophils, plasma cells and lymphocytes. In the absence of worm, laminated calcospherules found in the cytoplasm of the proliferating macrophages and giant cells could be of diagnostic value.<sup>7</sup>

If the worm is viable, section of the worm would show dorsoventral flattening, thick, slightly wavy eosinophilic tegument overlaying a layer of radially oriented subparenchymal cells, well developed longitudinal bundle of smooth muscles consisted of dorsoventral and transverse fibres, arranged at right angle to each other.<sup>2,7</sup>

The microscopic differential diagnosis usually includes trichinosis, cysticercosis (racemose variant), and visceral larvae migrans.<sup>7</sup>

### CONCLUSION

Parasitic infections are endemic in the rural and semi-urban communities in developing countries. Utility of histopathology in diagnosis is well established. Histopathological identification of the parasite based on its morphological features, host tissue response and in unconfirmed cases, coupled with serology and molecular diagnosis could help to successfully characterize the parasite. Effective communication between clinicians, radiologists and pathologists often lead to correct diagnosis in many difficult to diagnose diseases.

Public health measures such as good sanitation and personal hygiene measures such as washing of hands with soap and water. Washing of utensils and vegetable with clean water, prevention of sewage contamination of drinking water, safe disposal of waste, play a vital

role in avoiding cestodal infections. Sanitary measures in abattoirs and treating pet dogs with Anti-helminthics also help.

Even though this article does not actually represent the incidence of cestodal infections in a population, it should be emphasized that pathologists play an important role in identifying the parasite.

Information should be passed onto general public and patients in particular regarding the potential role of cestodes in incidence of malnutrition and morbidity in populations so that preventive steps are initiated and appropriate measures are taken given to prevent spread of the disease.

### REFERENCES

1. Gupta E, Bhalla P, Khurana N, Singh T. Histopathology for the diagnosis of infectious diseases. *IJMM* 2009;27(2):100-106.
2. Kradin RL. Diagnostic pathology of infectious diseases. Saunder Elsevier, Philadelphia. 2010.
3. Diagnosis of Cysticercosis in endemic regions. Garcia HH, Martinez M, Gilman R, Herrera G, Tsang VCW, Pilcher JB, et al. *Lancet* 1991;338(8766) : 549-551.
4. A Histopathological study on human cysticercosis. Chi HS, Chi JG. *The Korean journal of parasitology* 1978;16(2):123-33.
5. Human cystic echinococcosis in a Uruguan Community: A sonographic, serologic and epidemiologic study. Cohen H, Paolillo E, Bonifacino R, Botta B, Parada L, Cabrera P, et al. *Am J Trop Med Hyg* 1998;59(4):620-7.
6. Carmona C, Perdomo R, Carbo A, Alvarez C, Monti J, Grauret R, et al. Risk factors associated with human cystic echinococcosis in Florida, Uruguay: Results of a mass screening study using ultrasound and serology. *Am J Trop Med Hyg* 1998;58(5):599-605.
7. Chi JG, Chi HS, Lee SH. Histopathologic study on human sparganosis. *The Korean journal of parasitology* 1980;18(1):15-23.

## Left Side Rectus Sternalis Muscle – A Case Report

Sugavasi.Raju<sup>1</sup>, G.Kanchana Latha<sup>2</sup>, Anandakumar.L.<sup>3</sup>

<sup>1</sup>Tutor, Department of Anatomy, <sup>2</sup>Professor & HOD Department of Anatomy, <sup>3</sup>Asst.Professor Department of Forensic Medicine, Rajiv Gandhi Institute of Medical Sciences, Kadapa- 516002. A.P, India.

### ABSTRACT

Rectus sternalis is an occasional muscle which lies along the side of the sternum. It may be confused as a tumor. The existence of sternalis muscle, its location, orientation and early identification are necessary in breast surgeries. Presence of sternalis muscle adjacent to the breast is of clinical significance. Rectus sternalis is a derivative of superficial part of rectus abdominis and supplied by intercostals nerve.

**Keywords ;** Pectoralis major, rectus abdominis, external oblique Apo neurosis.

### INTRODUCTION

The abdominal slip from the apponeurosis of external oblique is sometimes absent. The number of costal attachments and the extent to which the clavicular and costal parts are separated vary. Right and left muscles may decussate across the sternum. A superficial verticals lip or slips may ascend from the lower costal cartilages and rectus sheet to blend with the sternocleido mastoid or to attach to the upper sternum or costal cartilages. This is rectus sternalis the muscle may be partially or completely absent.

Myotome position of the somites gives rise to most of the skeletal muscles of the body. Muscles of the extremities develop from somatic mesoderm. Splanchnic mesoderm gives rise to cardiac muscle and most of the smooth muscles. Whereas mesoderm of the pharyngeal arches gives rise to some of the head neck muscles. The rectus sternalise muscle is a derivative of superficial part of the rectus abdominis muscle. Rectus sternalise is a flat ribbon shaped muscle that begins from the lower part of the ribs, rectus sheath and then courses upward. Finally inserting the upper part of sternum and ribs or the sternocleido mastoid muscle. Various authors have classified sternalis muscle under four main categories regarding the structure it has been derived from (a) pectoralis major, (b) from the rectus abdominis (c) from the sternocleido mastoid (d) from the panniculus carnosus.

### CASE REPORT

during the dissection classes for I MBBS students in the department of anatomy at RIMS medical college, kadapa, AP, India. The left rectus sternalis muscle has been noticed in a 35 year old male cadaver (Fig: 01). It was located at the anterior thoracic wall along the left lateral side of the sternum. It originated as a muscle belly from fascia of the rectus abdominis and external oblique apponeurosis and lower ribs of the left side chest wall. Finally it extends obliquely upwards inserted into the manubrium sternum as a tendon. It was measured 10 C.M in length and 20 cms in width in the middle of the muscle.



Figure No: 01 left side rectus sternalis muscle



## **DISCUSSION**

according to Bergman – ET- AL, Thompson S.A. this muscle is present in humans only. It is reportedly found in 3.5% of the population and is classified with the pectoral group of muscles. Generally it is unilateral, it is less common among men (6.4%) than women (8.7%) the incidence is 4 to 8% in Indians, 13.1% in Japanese, 3.3% in Filipinos and 1% in Chinese.

## **REFERENCES**

1. Bergman R.A, Thompson S.A, Atiti A.K, Saadeh F.A. companion of human anatomic variation. Munich urbaa and sehwarzenhery. 1988; 7-8
2. Sadler TW. Langmans medical embryology, 9<sup>th</sup> Ed, Baltimore, Lippincott Williams and Wilkins; 2004; 199-209.
3. Harrish K. Gopinath KS, sternalis muscle importance of surgery of the breast. Surg radial anant 2003;25;311-314
4. Grays anatomy – 39<sup>th</sup> Ed Human anatomy.
5. A.K Datta – 3<sup>rd</sup> Ed - Essential of Human anatomy, superior and inferior extremities.

# A Study to Compare the Micro-shear Bond Strength of Coronal Dentin and Pulp Chamber Dentin using three Dentin Bonding Systems.

Lakshmi Deepa Velagala<sup>1</sup>, Bolla Nagesh<sup>2</sup>, Indira Priyadharsini<sup>3</sup>, Sravanthi<sup>1</sup>, Bhargavi<sup>2</sup>

<sup>1</sup>Sr.Lecturer, Department of Conservative Dentistry & Endodontics, KLRs Lenora Institute of Dental Sciences, Rajahmundry, ANDHRAPRADESH. <sup>2</sup>Professor and HOD, Department of Conservative Dentistry & Endodontics, SIBAR Institute of Dental Sciences, Takkellapadu, ANDHRAPRADESH. <sup>3</sup>Sr.Lecturer, Department of Conservative Dentistry & Endodontics, KLRs Lenora Institute of Dental Sciences, Rajahmundry, ANDHRAPRADESH.

## ABSTRACT

**Objective:** To compare the micro shear bond strength of coronal dentin and pulp chamber dentin using three dentin bonding systems namely One bottle total etch system (XP Bond – 5<sup>th</sup> generation), two step self-etch system (Clearfil SE Bond – 6<sup>th</sup> generation) and All-in-one system (G Bond- 7<sup>th</sup> generation).

**Methods:** Thirty human mandibular molars were collected out of which sixty samples were prepared by sectioning each tooth into coronal dentin and pulpal floor dentin were obtained which were divided into two major groups. **Group I:** 30 Coronal dentin samples. **Group II:** 30 Pulpal floor dentin samples. Both the groups were further subdivided depending on bonding agent used. Subgroup Ia: XP Bond. Subgroup Ib: Clearfil SE Bond. Subgroup Ic: G Bond. Subgroup IIa: XP Bond Subgroup, IIb: Clearfil SE Bond, Subgroup IIc: G Bond. Resin composite was bonded to these samples and tested for micro-shear bond strength. The mean bond strengths & standard deviations were calculated & analyzed using One Way ANOVA test and Student t- test (unpaired) & HSD Post Hoc tests.

**Results:** Micro shear bond strength showed higher values to coronal dentin compared to pulpal floor dentin. All - in - one system (G Bond) showed least bond strength values to both the regions (coronal dentin & pulpal floor dentin. Clearfil SE Bond

**Key words:** Coronal dentin, Pulpal floor dentin, Total etch, Self etch, All-in one system, Microshear bond strength

## INTRODUCTION

We are in the era of adhesive dentistry. Adhesive restorations bond directly to the tooth structure and reinforce weakened tooth structure.<sup>1</sup> Restoration of endodontically treated teeth with resin based composite has increased due to development of better, more reliable bonding systems. Advantage of bonding, coupled with composite core buildup is the high bond strength to tooth structure & increased resistance to fracture<sup>2</sup>. When composite resin is used as a core material, it is very important to achieve a good bond to pulpal floor dentin, both to enhance retention & to maximize the seal.<sup>2</sup>

A reliable and durable bond to dentin has been more difficult to achieve. Dentin is complex biological structure whose structure and properties change with lo-

cation, age & disease. Variation in dentin depth & permeability can significantly influence the bond strength of direct resin based composite restorations. It is also probable that the bonds made to floor of pulp chamber vs coronal dentin may differ.<sup>3</sup> The tubule diameter is much smaller and tubule density is high making it a more challenging bonding substrate.<sup>4</sup>

Various bonding agents were being introduced into the market. Most recent developments have focused on simplification of multistep bonding processes using different approaches i.e. total etch, two step self etch & all in one system. The laboratory parameter most commonly used to measure the bonding effectiveness with dentin adhesives is micro shear bond strength. Hence the objective of this study was to compare and evaluate the microshear bond strength of coronal

dentin and dentin at floor of pulp chamber using three dentin bonding systems namely One bottle total etch system (XP Bond – 5<sup>th</sup> generation), two step self-etch system (Clearfil SE Bond – 6<sup>th</sup> generation) and one step self etch system / All-in-one system (G Bond – 7<sup>th</sup> generation).

## MATERIAL AND METHODS

### MATERIALS USED FOR THE STUDY

#### 1) Composite resin:

Clearfil APX (Kuraray)

#### 2) Bonding agents:

G Bond (GC) -7<sup>th</sup> generation

Clearfil SE Bond (Kuraray) – 6<sup>th</sup> generation

XP Bond (Dentsply) – 5<sup>th</sup> generation

#### 3) Acid etchant: 37% Phosphoric acid (d-tech).

#### 4) Storage media – saline

### PROCEDURE

Thirty human mandibular molars extracted for periodontal reasons were collected for the study and the teeth were cleaned with ultrasonic scalers and stored in saline. The occlusal enamel was removed perpendicular to the long axis of tooth with high speed diamond disc to expose a flat mid coronal dentin. Thirty, 2 mm thick slabs of coronal dentin were prepared from each tooth and then thirty, 2 mm thick pulpal floor dentin samples were prepared by sectioning at mid point between floor of the pulp chamber and root furcation.

These prepared dentinal slabs were finished with wet silicon carbide sand paper under a stream of water to create a uniform smear layer.

These sixty samples were divided into two major groups depending upon dentin location.

### GROUPING

GROUP I: 30 Samples of coronal dentin.

GROUP II: 30 Samples of dentin at floor of pulp chamber.

**Each group** was further subdivided into three subgroups of 10 samples each depending upon the bonding agent used. (sub group a - XP Bond, sub group b - Clearfil SE Bond, sub group c - G Bond)

**Sub group I a, II a** was bonded with two step Total

etch technique (XP Bond), **Sub group I b, II b** was bonded with two step self etch technique (Clearfil SE Bond) **Sub group I c, II c** was bonded with One step self etch technique (G Bond) according to manufacturers instructions. After applying the adhesive, polyethylene tube (1 mm diameter, 1 mm high) was placed and the adhesive was light cured for 10 sec. according to manufacturer's instructions thereby fixing the tube to dentin surface. Resin composite was placed in the tube and light cured. The intensity of curing light was measured by a portable radiometer, prior to each bonding procedure to confirm the values >600Mw/cm<sup>2</sup>. After the completion of composite resin buildup polyethylene tubes were removed with a sharp knife. All specimens were stored at 37°C in water.

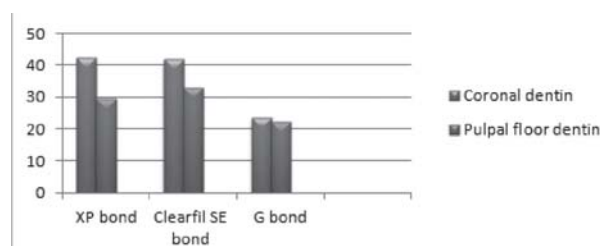
### Measurement of microshear bond strength

The specimens were attached to the universal testing machine. A thin wire (0.010 inches in diameter) was looped around resin composite cylinder and gently held flush against the dentin at resin dentin interface & loaded at a rate of 1 mm/min until bond failure occurred. The resin dentin interface for the test, the wire loop and the center of load cell were aligned as straight as possible to ensure correct application of the shear force.

The load at failure was recorded in Newtons/mm square & then converted to MPa. The data were submitted to statistical analysis using HSD Post Hoc tests for multiple group comparisons. p value of 0.05 or less was considered for statistical significance.

## RESULTS

In the present study coronal dentin showed high micro shear bond strengths compared to pulpal floor dentin (graph – 1).



Graph 1: Comparison of Bond Strengths Between Coronal Dentin & Pulpal Floor Dentin

No statistically significant differences were observed between the mean bond strengths between XP Bond & Clearfil SE in each region. (P> 0.05) Between XP Bond & G Bond, the mean bond strength of XP Bond was significantly higher than that of G Bond in both the regions. (P <0.05) Between Clearfil SE & G Bond,

the mean bond strength of Clearfil SE was significantly higher than that of G Bond in both the regions. ( $P < 0.05$ ) All - in - one system (G Bond) showed least bond strength values to both the regions (*table - 1 & table - 2*)

TABLE 1

**Tukey Hsd Post Hoc Test- Multiple Comparisons Between Coronal Dentin Subgroups**

		Mean Difference (I-J)	Std. Error	Sig.
Ia	Ib	.3800	2.3860	.986
	Ic	18.4700(*)	2.3860	.000
Ib	Ia	-.3800	2.3860	.986
	Ic	18.0900(*)	2.3860	.000
Ic	Ia	-18.4700(*)	2.3860	.000
	Ib	-18.0900(*)	2.3860	.000

\* The mean difference is significant at the .05 level

TABLE 2

**Tukey Hsd Post Hoc Test- Multiple Comparisons Between Pulpal Floor Dentin Subgroups**

		Mean Difference (I-J)	Std. Error	Sig.
IIa	IIb	-3.6000	2.4729	.328
	IIc	7.2000(*)	2.4729	.019
IIb	IIa	3.6000	2.4729	.328
	IIc	10.8000(*)	2.4729	.000
IIc	IIa	-7.2000(*)	2.4729	.019
	IIb	-10.8000(*)	2.4729	.000

The mean difference is significant at the .05 level

## DISCUSSION

GROUP I (coronal dentin group) showed significantly higher values of micro shear bond strength when compared to group II (pulpal floor dentin group). The results were in accordance with previous studies conducted by: *Kijsamanmith K et al<sup>2</sup>, Toba S.etal<sup>3</sup>, Akagawa H etal<sup>5</sup>,*

### The probable reasons postulated are:

1. Increase in bonding was due to morphological and structural variations in dentin.
2. Presence of more inorganic material in coronal dentin may be the cause for increased bond strength.
3. The density of dentinal tubules was very high in coronal dentin which is around 45,000 / mm<sup>2</sup> and even diameter of dentinal tubules was 2.5 mm much larger when compared to pulpal floor dentin.

Group Ia (coronal dentin with XP Bond) showed higher values of micro-shear bond strengths when compared group I b (coronal dentin with Clearfil SEBond) but were not statistically significant. Clearfil SE Bond showed almost similar values as XP Bond. This was in accordance with previous studies conducted by

*Akagawa H et al<sup>5</sup>, Toledano M et al<sup>6</sup>, Burrow MF et al<sup>7</sup>, Bouillaguet S. et al<sup>8</sup>*

### The probable reasons postulated are

1. Demineralization and resin infiltration in to collagen occur simultaneously to same depth of demineralized dentin. It is presumed that no gap or void exists.
2. Bond strengths are influenced by components of adhesive resin<sup>17</sup> – fillers, functional monomer, 10-MDP & also it's pH
3. Presence of highly hydrophilic 10- MDP monomer in its composition, which is believed to improve wetting of the moist tooth surface more over it has two hydroxyl groups that may chelate to calcium of dentin.
4. Fillers present in Clearfil SE bond were necessary to increase bond strength and improve mechanical properties of bonding agents<sup>9,10</sup>.

GROUP II (pulpal floor dentin): showed lower values of micro shear bond strength compared to group I. The results were in accordance with previous studies conducted by *Kijsamanmith K et al<sup>2</sup>, Toba S. et al<sup>3</sup>, Akagawa H .etal<sup>5</sup>,*

### The probable reasons postulated are

1. Ultra structure of dentin at floor of pulp chamber seems similar to secondary or reparative dentin and contains irregular, fewer and narrower tubules. These tubular irregularities may have occurred because of mineral deposits, organic components of odontoblastic process or peritubular deposits. These changes could impart penetration of monomers in to dentinal tubules resulting in poorer bonding to this region.
2. Pulpal floor dentin seems to be rich in organic components and low in mineral. Presence of greater organic content, resulted in reduced penetration of monomer.
3. Pre-dentin on floor of pulp chamber is thought to affect the bond strength. The reduced surface area of intertubular dentin available for bonding may also contributed to lower bond strength.

GROUP IIb (pulpal floor dentin with Clearfil SE Bond): Showed higher bond strengths when compared to group II a & group II c (pulpal floor dentin with XP Bond & G Bond). The results were in accordance with previous studies conducted by *Kijsamanmith K et al<sup>2</sup>, Toba S. et al<sup>3</sup>, Akagawa H . et al<sup>5</sup>*

### The reasons postulated are

1. Pulpal floor dentin is usually not contacted by any cutting instruments. So it is largely devoid of smear layer. Acid conditioning of primer in Clearfil SE bond appeared sufficient to demineralize the den-

tin and envelop collagen fibers and hydroxyapatite crystals.

2. Clearfil SE bond combines conditioning and priming in one-step and followed by adhesive application. Acidic conditioning primer dissolves smear layer and incorporates in to primer, as it demineralizes the dentin and envelopes the collagen fibers and hydroxyapatite crystals. As demineralization and resin infiltration in to collagen occur simultaneously to same depth of demineralized dentin. It is presumed that no gap or void exists<sup>11</sup>.
3. Camphoroquinone contained in the primer is likely to enhance adhesion to dentin because it generates free radicals that increase surface energy and wetting ability there by increasing bond strength.
4. Presence of highly hydrophilic 10- MDP monomer in its composition, which is believed to improve wetting of the moist tooth surface more over it has two hydroxyl groups that may chelate to calcium of dentin.
5. Fillers present in Clearfil SE bond were necessary to increase bond strength and improve mechanical properties of bonding agents<sup>9,10</sup>.
6. Use of 37% phosphoric acid with XP Bond quickly removes all inorganic matter in peritubular dentin causing deeper penetration of acid in to dentin resulting in over etching and subsequent collapse of collagen network thus leading to porous zone with in hybrid layer.

GROUP IIa (pulpal floor dentin with XP Bond) showed lower bond strengths when compared to group IIb, which was statistically insignificant. The results were in accordance with previous studies conducted: *Toba S. et al<sup>3</sup> & Akagawa H .et al<sup>5</sup>*

#### The reasons postulated are

1. Pulpal floor dentin is usually not contacted by any cutting instruments. So it is largely devoid of smear layer. Acid etching with 37% phosphoric acid will lead to over etching of surface leading to decreased bond strengths.
2. Pulpal floor dentin is rich in organic components and less in mineral. Use of 37% phosphoric acid will result in over etching and collapsing of collagen fibers leading to decreased bond strengths.

All - in - one system (G Bond) showed least bond strength values to both the regions (coronal dentin & pulpal floor dentin) The results were in accordance with previous studies conducted by *Sidhu et al & Yazici AR et al<sup>4</sup>*

#### The reasons postulated are:

1. Greater technique sensitivity compared to other bonding agents
2. Problem with water based All-in-one system mainly

arises from the hydrolytic instability of meth acrylate monomers used.

3. One step self etching adhesives are more hydrophilic than two-step self etching adhesives & they attract more water. As it is difficult to evaporate water from these adhesives, water will rapidly diffuse back from the bonded dentin into adhesive resin & subsequently, a lower mechanical strength results.

Although in the present study G Bond showed lower bond strengths, a recent study by *Burrow MF et al<sup>7</sup>* using G Bond showed good results. It is probable that the differences between the two studies may be due to the different methodologies employed.

### CONCLUSION

Simplification of self etching priming systems has not led to an improvement in bond strength. Though there is a tendency towards adhesives with simplified application procedures simplification does not guarantee improved or equal bonding effectiveness. The application of new components with improved hydrolytic stability, may help to solve the problems<sup>12</sup> of all-in-one systems. Further investigations should be carried out to determine whether additional etching<sup>13,14</sup> or application of additional more hydrophobic resin layer<sup>14</sup> prior to application of self etching solutions will provide any clinical benefits to retention rates. However, further studies are needed to investigate the bond strengths of these adhesive systems under clinically acceptable conditions.

### REFERENCES

1. Belli S, Zhang YI, Pereira PNR, Ozer F, Pashley DH: Regional bond strength of adhesive resins to pulp chamber dentin. *Journal of Endodontics* 2001; 27(8): 527-532.
2. Kijssamanmith K, Timpawat S, Harnirattisai C, Messer HH: Micro-tensile bond strength of bonding agents to pulpal floor dentin. *International Endodontic Journal* 2002; 35(10): 833-839.
3. Toba S, Veerapavati W, Shimada Y, Nikaido T and Tagami J: Micro shear bond strengths of adhesive resins to coronal dentin versus the floor of pulp chamber. *American Journal of Dentistry* 2003; 16(9): 51A-56A.
4. AR Yazici, C Celik, G Ozgunaltay, B Dayangac: Bond strength of different adhesive systems to dental hard tissues. *Operative Dentistry* 2007;32: 166-172
5. Akagawa H, Nikado T, Takada T, Burrow MF, Tagami J. Shear bond strengths to coronal dentin and pulp chamber floor dentin. *American Journal of dentistry* 2002;15(6):383-388.

6. Toledano M et al. Micro-tensile bond strength of several adhesive systems to different dentin depths. *American Journal of Dentistry* 2003; 16(5): 292-298.
7. Burrow MF, Kitasako Y, Thomas CD and Tagami J : Comparison of enamel & dentin Micro shear bond strengths of a two-step self etching priming system with five all-in-one systems. *Operative Dentistry* 2008; 33(4): 456-460.
8. Bouillaguet S, Gysi P, Wataha JC, Ciucchi B, Cattani M, Godin Ch and Meyer JM: Bond strength of composite to dentin using conventional, one-step, and self-etching adhesive systems. *Journal of Dentistry* 2001;29:55-61
9. Takahashi A, Sato Y, Uno S, Pereira PNR, Sano H. Effects of mechanical properties of adhesive resins on bond strength to dentin. *Dental materials* 2002; 18(3): 263-268.
10. Sensi LG, Lopes GC, Monoterio S, Baratien LN, Vieira LCC. Dentin bond strength of self-etching primers and adhesives. *Operative Dentistry* 2005; 30(1): 63-68.
11. Tamumiharja M, Burrow MF, Tyas MJ. Micro-tensile bond strengths of seven dentin adhesive systems. . *Dental materials* 2000; 16(3): 180-187.
12. Moszner N, Salz U and Zimmermann J. Chemical aspects of self etching enamel dentin adhesives: a systematic review. *Dental materials* 2005; 21:895-910
13. Proenca JP, Polido M, Osorio E, Erhardt MCG, Aguilera FS, Godoy FG, Osorio R and Toedano M. Dentin regional bond strength of self etch & total etch adhesive systems. *Dental materials* 2007; 23: 1542-1548.
14. Luhrs AK, Guhr S, Schilke R, Borchers L, Geurtsen W and Gunay H. Shear bond strength of self-etch adhesives to enamel with additional phosphoric acid etching. *Operative Dentistry* 2008; 33(2): 155-162.

# Study of Morphological Changes in Placenta in Pregnancy Induced Hypertension

Ramesh S T<sup>1</sup>, Rashmi M V<sup>2</sup>, Kodanda Swamy C R<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of pathology. <sup>2</sup>Associate Professor, Department of pathology. <sup>3</sup>Professor and Head of the Department, Department of pathology. Sri Siddhartha Medical College, Tumkur.

## ABSTRACT:

Hypertensive disorders of pregnancy have some definite adverse influence on the morphology of the placenta and growth of the fetus. The placental changes are more prominent with increased severity of the disease process. Of the 100 placentas, 29 placentas were from normal pregnancy, 42 placentas were from mild preeclampsia, 18 placentas were from severe preeclampsia and 11 from eclampsia.

The incidence of eclampsia is common in primigravida. Mean weight of placenta and mean birth weight of the fetus were decreasing with increasing grades of hypertension. The mean diameter of placenta and mean number of cotyledons were reduced with increasing grades of hypertension. The syncytial knot formation, hypervascularity, fibrinoid necrosis of villi, fibrosed villi and basement membrane thickening were seen predominantly in pregnancy induced hypertension.

**KEYWORDS:** Placenta, Pregnancy induced hypertension, Syncytial knot, Hypervascularity,

## INTRODUCTION

The placenta, among the fetal organs, is one of the least studied in human pathology. This fact is distressing because it probably is- with the fetal heart- the most important organ during intrauterine life. It accomplishes functions of respiration, excretion and haematopoiesis and secretes a number of hormones, all directly related to fetal nutrition and aimed at preparing the fetus for extrauterine life.<sup>1</sup>

Hypertensive disorders are common complications of pregnancy. Pregnancy may induce hypertension in previously normotensive or aggravate this condition in those who are already hypertensive. It was observed that hypertension causes low birth weight, low placental weight and other placental abnormalities.<sup>2, 3</sup>

## MATERIAL AND METHODS

The present study was undertaken in the Department of Pathology, Sree Siddhartha Medical College, Tumkur from September 2006 – September 2008.

The Study included –71 placentas from women with pregnancy induced hypertension and 29 placentas from

women with normal pregnancy i.e. disease free uncomplicated gestation. The birth weight, placental weight and fetal to placental ratio were calculated in each case. Fetal outcome was noted in each case.

Placenta with cord and membranes were collected immediately after delivery

Placentas were washed in running tap water dried and weighed. Measurements were taken along the greatest major dimension. The fetal surface was inspected for color, opacity, subchorionic fibrin and subchorionic haematomas.

The maternal surface was inspected for the number of cotyledons, presence of haematomas or depressions. Large amount of loose or adherent clot were weighed.

The placenta was sectioned at approximately 1-2 cm intervals, with maternal side down. The cut slices are examined for the presence of infarcts, thrombi and calcification. Sections are taken from cord, membrane, central area of placenta, infarcted and fibrotic areas.

Tissue was processed for paraffin embedding and stained with H and E. Special stains like PAS and

Masson's Trichrome were employed wherever necessary.

### OBSERVATIONS

The study evaluated 42, 18, 11 and 29 placentas of mild, severe preeclampsia, eclampsia and normal respectively.

The incidence of eclampsia is more common in primigravida whereas mild preeclampsia is more common in multigravida.

In present study the placental weight of all hypertensive cases varied between 300-500 grams while normal placentas weigh between 400-500 grams.

The feto: placental ratio was decreased with the severity of hypertension.

The incidence of stillbirth was 2.4%, 5.6% and 9.1% in mild preeclampsia, severe preeclampsia and eclampsia respectively.

Marginal insertion of cord was seen in 5.7% of placenta in severe preeclampsia.

The incidence of infarction was 100% in study group.

The syncytial knot formation, cytotrophoblastic proliferation, fibrinoid necrosis of villi and fibrosed villi were enhanced with severity of hypertension compared to controls.

Basement membrane thickening were seen predominantly in mild preeclampsia and eclampsia cases.

Endarteritis obliterans were seen in 45.3% of mild preeclampsia and 66.07% of severe preeclampsia.

The calcification were seen in 33.3% , 27.8% and 36.4% in mild preeclampsia, severe preeclampsia and eclampsia respectively.

The maternal floor infarction was seen in 28.6% of mild preeclampsia and 36.4% of eclampsia respectively.

### DISCUSSION

In present study, the incidence of eclampsia is common in primigravida whereas mild and severe preeclampsia were common in multigravida. This is in concordance with study of Maqueo M et al , who observed that incidence of eclampsia are more common in primigravida whereas mild preeclampsia are more common in multigravida. <sup>4</sup>

Das B et al, study observed that placental weight was more reduced in proteinuric patients and also

where the duration of hypertensive disorders was prolonged. Although still birth was not significantly increased in this study, but fetal asphyxia, low birth weight (LBW) were frequent when placenta was less than 300 grams.<sup>5</sup>

In present study, the placentas in the increasing grades of hypertension were weighing less compared to that of control. In present study, the fetal: placental ratio was decreasing with increasing grades of hypertension. These findings were in correlation with the findings of Mohan H et al and Das B et al study. <sup>6</sup>

Fox (1964) reported hypertrophy of placental mass in response to chronic hypoxia in hypertensive patients. This hypertrophy along with LBW contributes to low fetal placental ratio.<sup>7</sup>

In the study of Maqueo M et al, the incidence of still births in cases of severe preeclampsia and eclampsia were 18% and 22% respectively <sup>4</sup> .In present study, the incidence of still births was 2.4%, 5.6% and 9.1% in mild preeclampsia, severe preeclampsia and eclampsia respectively.

In present study, the syncytial knot formation was enhanced with increasing grades of hypertension compared to that of controls. These findings are in correlation with that of studies by Maqueo M et al, Sodhi S et al, Kher AV et al and Dutta KD et al.<sup>4, 8, 9, 10</sup> .Mohan M et al, in their study observed that with excessive syncytial knot counts had infants with neonatal asphyxia and low birth weight, while fetal outcome was not impaired in the control group of women in whom the syncytial knot counts were with in normal range. <sup>6</sup>

In present study, placenta from majority of cases in the toxemia was hypervascular. However hypovascularity were seen in the mild preeclampsia as well as in controls. In Sodhi S et al, placenta from majority of cases in the control group (80%) as well as study group (55%) were normally vascularised. However hypo and hypervascularity too were seen in a small proportion of cases and controls.<sup>8</sup>

The basement membrane thickening of villi was seen in 10.4% cases of controls, 85.7% of mild preeclampsia, 66.7% of severe preeclampsia and 81.8% eclampsia cases. These findings were in concordance with the studies of Kher AV et al and Sodhi S et al. In the present study, 10.34% of calcification was seen in controls whereas 33.3%, 27.8% and 36.4% in mild preeclampsia, severe preeclampsia and eclampsia respectively. <sup>8, 9</sup>

Mohan H et al, in their study, observed that placental calcification was found as frequently in the control



as in the study group and it appeared to have no correlation with the fetal outcome as reported by others. <sup>6</sup>

**CONCLUSION**

Pregnancy induced hypertension is the leading cause of maternal mortality and is an important factor in fetal wastage. The incidence is high in third world countries because of malnutrition, hypoproteinemia and poor obstetric facilities. The specific villous abnormalities encountered such as extensive infarction, cytotrophoblastic proliferation and thickening of basement membrane are due to reduced uteroplacental blood flow associated with hypertensive disease of pregnancy. Uteroplacental ischemia results in inadequate transfer of oxygen and nutrients to the fetus resulting in increasing incidence of hypoxia and growth retardation and fetal loss. Study of placental changes in pregnancy induced hypertension may help us to understand patho-physiological mechanisms and design treatment plans for better maternal and fetal outcome. Proper fetal growth and metabolism depends on the adequate exchange across the placenta. A well nourished newborn is the best evidence of adequate placental function. Even a minor insult to the placenta, in its development stage, in the form of short lived hypertension can hamper placental maturity leading to intrauterine growth retardation. Thus it is suggested that such minor ailments in a developmental stage should never be overlooked.

**BIBLIOGRAPHY**

1. Luis A. Cibils M.D. The placenta and new born infant in hypertensive conditions. Am J Obstet Gynecol 1974; 118, (2): 256-70.
2. Rath G, Garg K, Sood M .Insertion of umbilical cord on the placenta in hypertensive mother. J Anat Soc India. 2000; 49(2): 149-52.
3. Benireschke K.The placenta in the context of history and modern medical practice. Arch pathol Lab Med. 1991; 115: 663-7.
4. Maqueo M, Azuela JC, Vega MDDL. Placental pathology in eclampsia and preeclampsia. Obstet Gynecol. 1964; 24 (3): 350-5.
5. Das B, Dutta D, Chakraborty S, Nath P .Placental morphology in hypertensive disorders of pregnancy and its co-relation with fetal outcome. J Obstet Gynecol India. 1996: 40-6.
6. Mohan H, Sodhi S, Mohan PS, Jaiswal TS, Nagpal K, Rathee S .Fetal correlation with placental pathology in toxemia of pregnancy. J Obstet Gynecol India. 1989; 170-5.
7. FoxH .General pathology of the placenta. In: Fox H, Weills M, editors. Haines and Taylor obstet-

8. Sodhi S, Mohan H, Jaiswal TS, Mohan PS, Rathe CS .Placental morphology in hypertensive disorders of pregnancy and its co-relation with fetal outcome. J Obstet Gynecol India. 1996; 40-6.
9. Kher AV, Zawar MP.Study of Placental pathology in toxemia of pregnancy and its fetal implication. Ind J Pathol Microbol. 1981; 24: 245-51.
10. Dutta KD, Dutta B.Study of human placenta associated with pre-eclampsia and essential hypertension in relation to fetal outcome. Obstet Gynecol India. 1989; 757-68.

**TABLE-1**

**Comparitve Study of Parity Wise Distribution of Cases**

Study	Grade	Primigravida	Multigravida
Maqueo M <sup>4</sup>	Mild	20%	71%
	Severe	25%	60%
	Eclampsia	44%	47%
Present	Mild	35.7%	62.5%
	Severe	27.8%	72.2%
	Eclampsia	72.72%	27.28%

**TABLE-2**

**Comparitve Study of Weight Distribution of Placenta**

Study	weight(gm)	I	II	III	IV
Das B et al <sup>5</sup>	<300	-	5%	40%	55%
	301-400	1.5%	25%	35%	30%
	401-500	65%	60%	20%	15%
	>500	20%	10%	5%	-
Present study	<300	—	9.5%	-	36.4%
	301-400	—	26.2%	55.6%	36.4%
	401-500	93.1%	61.9%	38.9%	27.2%
	>500	6.9%	2.4%	5.5%	-

**TABLE-3**

**Comparitve Study of Fetal Placental Weight Ratio**

Group	Mohan H et al <sup>6</sup>	Das B et al <sup>5</sup>	Present study
<b>I. Control</b>	6.08 : 1	6.56 : 1	6.03:1
<b>II. Mild PE</b>	6.00 : 1	6.15 : 1	6.33:1
<b>III. Severe PE</b>	5.28 : 1	5.43 : 1	6.1:1
<b>IV Eclampsia</b>	5.18 : 1	5.21 : 1	5.74:1

**TABLE-4**

**Comparitve Study of Fetal Outcome:**

Group	Maqueo M et al <sup>4</sup>		Mohan H et al <sup>6</sup>		Present study	
	Live	Still	Liver	Still	Live	Still
	birth	birth	birth	birth	birth	birth
I	100 %	-	100 %	-	100%	-
II	88 %	12 %	100 %	-	97.6%	2.4%
III	82 %	18 %	100 %	-	94.4%	5.6%
IV	78 %	22 %	50 %	50 %	90.9%	9.1%

**TABLE-5**

**Comparitve Study of Syncytial Knots**

STUDY		I	II	III	IV
Maqueo M et al <sup>4</sup>		7 %	33 %	36 %	65 %
Sodhi S etal <sup>8</sup>	<30%	95%	60%	33.3%	100%
	>30%	5%	40%	66.67%	
Kher AV et al <sup>9</sup>	<30%	92%	70.5%	8.3%	40%
	30-50%>	8%	29.5%	33.3%	60%
	50%	-	-	58.4%	
Dutta KD et al <sup>10</sup>	-	9.4%	13.3%	28.58%	18.18%
Present study	<30%	48.3%	23.8%	16.6%	18.2%
	30-50%	37.9%	42.8%	72.2%	63.6%
	>50%	13.8%	33.4%	11.2%	18.2%

**TABLE-6**

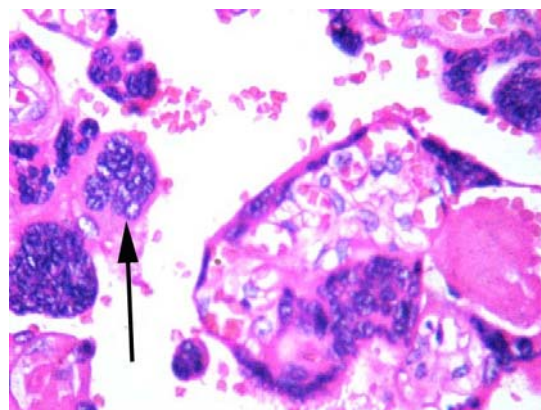
**Comparitve Study of Vascularity of Villi**

Study		I	II	III	IV
Sodhi S et al <sup>8</sup>	Normal	80%	60%	50%	50%
	Hypovascularity	5%		33.33%	
	Hypervascularity	15%	40%	16.67%	50%
Present study	Normal	62%	19%	16.7%	
	Hypovascularity	3.5%	9.6%		
	Hypervascularity	34.5%	71.4%	83.3%	100%

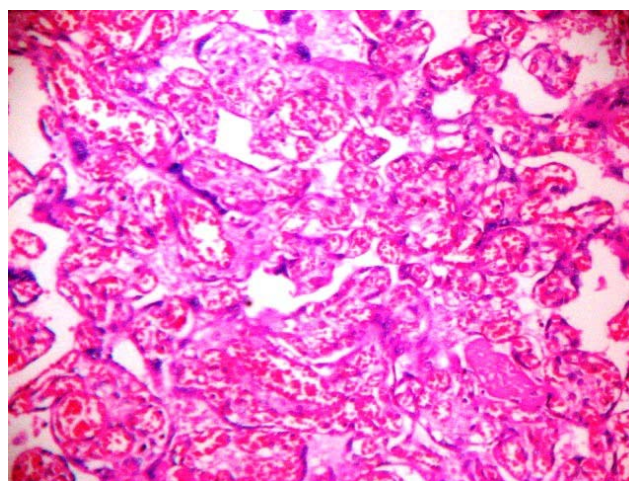
**TABLE-7**

**Comparitve Study of Basement Membrane Thickening of the Villi**

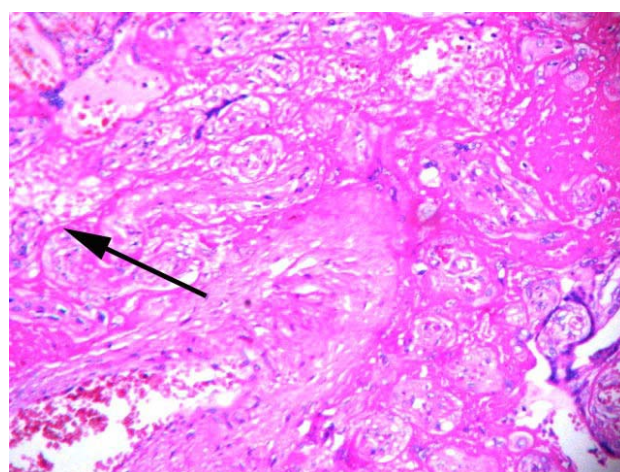
Study		I	II	III	IV
Kher AV et al <sup>9</sup>	< 3%	96%	82.4%	-	-
	> 3%	4%	19.6%	100%	100%
Sodhi S et al <sup>8</sup>	< 3%	100%	60%	16.67%	-
	> 3%	-	40%	83.33%	100%
Present study	< 3%	89.6%	14.3%	33.3%	18.2%
	> 3%	10.4%	85.7%	66.7%	81.8%



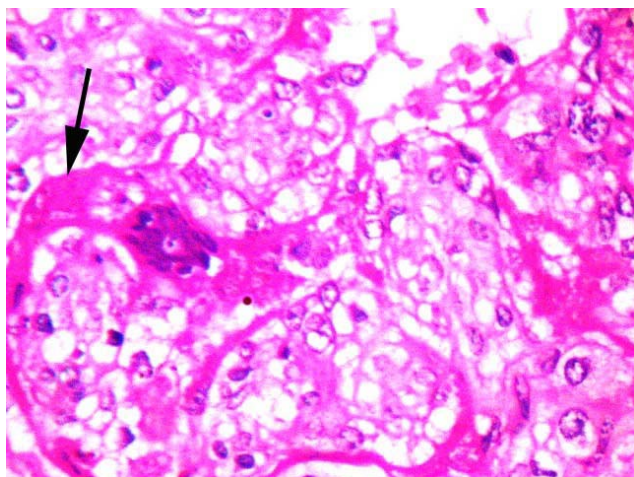
*Fig-1: Photomicrograph Showing Placental Villi With Syncytial Knots (Arrow) (H&E, X40).*



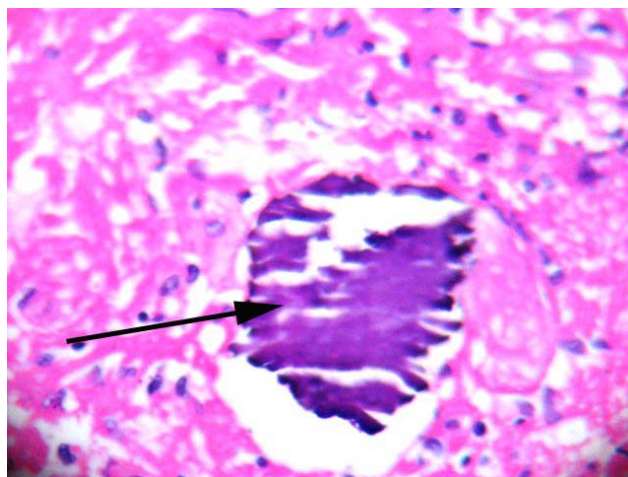
*Fig -2: Photomicrograph Showing Hypervascularity of Villi, (H&E,X10).*



*Fig-3: Photomicrograph Showing Basement Membrane Thickening of Villi (Arrow), (H&E, X10).*



*Fig-4: Photomicrograph Showing Basement Membrane Thickening of Villi (Arrow), (PAS, X40).*



*Fig-5: Photomicrograph Showing Calcification Of Villi (Arrow), (H&E, X40).*

*CONFLICT OF INTEREST: NONE DECLARED.*

# Prevalence of Tobacco Use & Its Correlate Factors among School Going Adolescents in Rural Areas of Haryana, India

Ramesh Verma<sup>1</sup>, Meena<sup>2</sup>, Pardeep Khanna<sup>3</sup>, Mohan<sup>4</sup>, Mukesh<sup>4</sup>, Shankar Prinja<sup>5</sup>, Varun Arora<sup>6</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Associate Professor, <sup>3</sup>Sr. Professor and Head, <sup>4</sup>Postgraduate student, <sup>5</sup>Senior Resident, Department of Community Medicine, Pt. B.D. Sharma PGIMS, Rohtak, <sup>4</sup>Senior Resident, School of public health, PGIMER, Chandigarh.

## ABSTRACT

Tobacco use is one of the major preventable causes of death and disability worldwide. WHO estimates that 4.9 million deaths annually are attributable to tobacco use.

**Research questions:** What is the magnitude of problem of tobacco users among school going adolescents in a rural block of Haryana?

**Objectives:** 1. To study the prevalence of tobacco use and 2. To assess the correlate factors of tobacco use.

**Study design:** A cross-sectional descriptive type of study.

**Setting:** Schools of Beri block, District Jhajjar. **Participants:** School going adolescents (10-19 years).

**Simple size:** Total sample size was 1260.

**Study variables:** Age, Sex, Type of tobacco products, Influencing factors, Awareness about health problems.

**Results:** Overall prevalence of 'ever users' of tobacco products was 203 (17.4%). Prevalence of ever users among boys and girls was 197 (27%) and 7 (1.6%) respectively. Prevalence of 'current users' of tobacco products was 169 (14.5%). Majority 89.6% of current users had initiated smoking between the age 10 and 14 years (median age 12 years). The differences in prevalence according to age ( $p < 0.001$ ) was statistically significant while in relation to caste was found non-significant ( $p > 0.067$ ).

## INTRODUCTION

The prevention of tobacco use in young population appears to be a great opportunity for decreasing burden of non-communicable diseases in India as it is home to one sixth of the global population. Tobacco use is one of the major preventable causes of death and disability worldwide. WHO estimates that tobacco attributes to 4.9 million deaths annually and expected to rise to 10 million in 2020, with 7 million of these deaths will be occurring in developing countries, mainly China and India.<sup>1</sup>

Currently about one-fifth of all worldwide deaths attributed to tobacco occur in India, more than 0.8 million people die and 12 million people become ill as a result of tobacco use each year. The deaths attrib-

utable to tobacco, in India, are expected to rise from 1.4% of all deaths in 1990 to 13.3% in 2020.<sup>2</sup> It is estimated that 5,500 adolescents begin consuming tobacco every day in India, joining the 4 million young people under the age of 15 who already regularly use tobacco. Tobacco users often take up use in their teens and the risks of tobacco use are highest among those who begin smoking early and continue for prolonged period.<sup>3</sup>

The Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply and Distribution) amendment Act, 2007 with a view to protect public health by prohibiting smoking in public places, banning advertisements of the tobacco products, banning sale of tobacco products to minors and near educational

institutions, prescribing strong health warnings including pictorial depiction on tobacco products and regulation of tar and nicotine contents of tobacco products.

In Haryana state, a Global Youth Tobacco Survey (GYTS) was conducted in 2003 among school students in grades 7-10. A two-stage cluster sample design was used in GYTS to produce representative data for all of Haryana. They revealed that 7.4% of students had ever smoked cigarettes (Boys = 8.6%, Girls = 3.8%), 7.1% currently use any tobacco product (Boys = 8.1%, Girls = 3.7%), 3.4% currently smoke cigarettes (Boys = 4.3%, Girls = 0.6%) and 4.0% currently use tobacco products other than cigarettes (Boys = 4.1%, Girls = 3.1%).<sup>4</sup>

The studies about tobacco use and its correlates like awareness, knowledge etc. among school students in Haryana are lacking. These factors may be specific to culture, traditions and other characteristics of the area. Identification of such factors may be potentially useful to formulate policy interventions needed towards Behaviour Change Communication (BCC) for prevention and control of tobacco use among school students. Therefore, the present study was carried out to assess the prevalence of tobacco use and its correlate factors among school going adolescents in rural areas of Haryana.

## MATERIAL AND METHODS

### Study area

The study was conducted in the block, Beri (Jhajjar district) which had the population 1,49,604 as on 31<sup>st</sup> March 2008. This block is served by one General hospital (Beri), Two Community Health Centres (Dighal and Dubhaldan), Three Primary Health Centres and 25 Subcentres. General hospital, Beri and Community Health Centre, Dighal are internship training centres which are rural field practice areas of Department of Community Medicine, Pt. B. D. Sharma PGIMS, Rohtak. This block has 37 government schools and 25 private schools.

### Study design

A cross-sectional type of descriptive study.

### Definitions of the variables

#### Ever users

Ever smoker or chewer was defined as one who had not smoked/chewed tobacco in the past 30 days preceding the survey but had tried in the past (even once or twice).

#### Current tobacco user

Current smoker or chewer was defined as those who

had smoked/chewed tobacco product on one or more days in the preceding month of the survey.

The tobacco use was mainly classified in two categories: smoking and smokeless. Tobacco was mainly smoked in the form of cigarette and bidi. Smokeless tobacco use in the form gutka (industrially manufactured tobacco product, contains areca nut, tobacco and other ingredients), betel quid, khaini and snuff which are also common in different parts of India.<sup>5</sup>

### Sample size determination and sampling method

The sample size required for this study was 1215 considering the prevalence 7.4% according to GYTS, Haryana with allowable error 20% (CI-95%) by using formula  $n = z_{1-\alpha/2}^2 p(1-p)/d^2$ . Therefore, it was proposed to cover a total of 1250 children in the age group of 10-19 years.

### Study subjects

School children of age group 10-19 years i.e. class of 6<sup>th</sup> to senior secondary (10+2), were included in the study.

### Data Collection

A list of all the government and private schools was obtained from the block education office of the block, Beri. Out of these, 10 schools were selected by systematic random sampling. The researchers contacted the principals of schools personally during January to June 2008. The objective and nature of the study explained and a verbal consent was sought to carry out the survey in the schools. All the students present at the time of visit were included for the survey and those, absent, were excluded.

The students of the selected classes were assembled in their class room. The purpose of the survey was explained and assurance, about the confidentiality of the information, was given to the students. After apprising, informed written consent was sought and informed that they were free to participate or not in the survey. Absence of the school personnel in the classrooms was ensured to encourage the students respond without reporting bias. All the information were collected on semi-structured pre-tested proforma.

## DATA ANALYSIS

Data were analysed using SPSS (Statistical Package for Social Studies) version 17.0 for descriptive statistics.

## RESULTS

All the schools, included in the study, were re-

sponded to the survey giving a school response rate of 100%. Among the study subjects, a total of 1166 subjects completed the interview giving a response rate of 93.28%.

### Demographic characteristics

The median age of study subjects was 15 years (minimum 10 years and maximum 19 years). Among the participants, 729(62.52%) were males and 437(37.48%) were females. The male to female ratio was 1.67:1.

### Prevalence of tobacco use

Overall prevalence of 'ever users' of tobacco products was 203(17.4%). Prevalence of ever users among boys and girls was 27%(197) & 1.6%(7) respectively. All tobacco users girls were ever users. Prevalence of 'current users' of tobacco products was 14.5%(169). Among current users cigarette & bidi smokers were 158(93.6%), smokeless products: 6(3.5%), both forms: 5(2.9%) (Table-I). The prevalence of 'current users' was observed highest in 17-19 years age group. The differences in prevalence according to age ( $p < 0.001$ ) were statistically significant while in relation to caste was found non-significant ( $p > 0.067$ ).

Table-I

#### Type of Tobacco Use Among Current Users

(n=169)

Type of tobacco	Number (%)
Cigarette & Bidi smoking	158 (93.6%)
Smokeless products	6 (3.5%)
Both forms	5 (2.9%)

### Age at initiation of tobacco use

Majority of current smokers (89.6%, 142/158) had initiated smoking between the age 10 to 14 years (median age 12 years) while two third (4/6) of smokeless tobacco users had initiated between the ages 13 to 17 years (median age 15 years). Among ever smokers, 68.4% (128/187) had initiated before 14 years of age and 75%(12/16) of ever smokeless users had initiated before 15 years of age.

### Smoking pattern and access to tobacco products

Among the current cigarette/bidi smokers, 62.9% were smoking at least one cigarette/bidi per day, 22.7% were smoking once or twice a week and 14.4% once or twice in a month. The average number of cigarettes/bidi smoked in a day was 3.2. Most of them (66.8%) smoked in the shops or tea stalls followed by a 'secret place' (15.3%), home (7.1%) and other public places (10.8%) (Table-II).

Majority of current users (68%) had purchased tobacco products from a shop/tea stall or street vendor, 17.7% purchased through a friend and 10% borrowed from friends. Few users (4.3%) had stolen tobacco from their house.

Table-II

#### Place of Smoking Among Current Tobacco Users

(n=169)

Place of smoking	Number
Shops or Tea stalls	113 (66.8%)
Secret place	26 (15.3%)
Home	12 (7.1%)
Other places	18 (10.8%)

Among the current smokeless tobacco users, 62.4% were using 'gutka', 28.4% 'pan masala' (tobacco with aromatic spices), 12.2% 'jarda' (dried tobacco leaves for chewing), and the remaining were using combinations of different types of chewable tobacco.

The study also revealed that the current users had spent an average amount of 8 Indian rupees/day for tobacco products while only 39% of students had sufficient money to buy tobacco products.

Table-III

#### Factors that influenced current tobacco users

(n=169)

Influencing factors	Number (%)
Peer groups	78(46.2%)
Family members/relatives	26(15.4%)
Enjoyment	23(13.6%)
Curiosity	20(11.8%)
Movies	11(6.5%)
Celebrities	8(4.7%)
Teachers	3(1.8%)

Almost half (46.2%) of the children were influenced by peer groups, 26 (15.4%) by family members or relatives, 11(6.5%) by movies, 23(13.6%) and 20(11.8%) for enjoyment and curiosity respectively. Celebrities (4.7%) and teachers (1.8%) were also major factors which influenced the consumption of tobacco among the adolescent students (Table-III).

### Cessation

A larger proportion of the students who were either currently smoking (62.4%) or using chewable tobacco (76.3%) thought to quit, whereas a nearly half of current users (smokers, 45.5% and smokeless tobacco users, 48.9%) had actually tried to quit. However, current smokers and tobacco chewers (32.7% and 43.9%, respectively) had ever sought help to quit to-

bacco products and in most instances sought advice from peers group.

**Table-V**

**Knowledge about health problems among tobacco and non-tobacco users**

Health problems	Tobacco usersn- 203	Non-tobacco usersn-957
Cough	138(67.9%)	691(72.2%)
Tuberculosis	59(29.0%)	312(32.6%)
Heart problems	41(20.1%)	243(25.4%)
GIT problems	48(23.6%)	267(27.8%)
Cancer	49(24.1%)	216(22.5%)
Discolouration of teeth	37(18.2%)	129(13.5%)
Others	68(33.4%)	355(37.1%)
Don't know	31(15.3%)	130(13.6%)

Table-V shows 84.7% of the tobacco users had knowledge about one or more health problems and of these cough (67.9%), tuberculosis (29%), GIT problems (23.6%), heart problems (20.1%), discoloration of teeth (18.2%), cancer (24.1%) and others (33.4%). Over 2/3rd of students considered smoking (66.1%) and chewing (65.3%) harmful to health. Significantly more tobacco users reported that 'Smoking or Chewing is harmful to health' than never tobacco users.

## DISCUSSION

The purpose of the study was to estimate the prevalence of tobacco use and assess the correlate factors. The sample size was determined using data from GYTS, Haryana and obtained a representative sample from the rural area. This study was carried out among the school adolescent students of rural area. In our study, the median age was 15 years which was higher than that of GYTS surveys. Similar finding was also observed in a study conducted in 2000 by Sinha et al on tobacco use among students in Bihar (India).<sup>6</sup>

However, the prevalence of tobacco users in this study was less than that reported from Kerala.<sup>7</sup> GYTS report Bihar<sup>6</sup> and USA where nearly one-third of the students were currently using tobacco products.<sup>8</sup> It is important to note the prevalence was low compared to western countries which have strict legislation, heavy taxes and massive information campaigns. Such difference was found in GYTS survey also.<sup>9</sup>

A community-based survey from Eastern Nepal reported a similar rate of prevalence in the age group 14–25 years. However, the study reported that the prevalence of smoking increased with age.<sup>10</sup> Similar increasing trends of tobacco use with age was reported by WHO.<sup>11</sup>

The study from Kerala revealed that the age at initiation appears to be declining, similar results was also observed from this study.<sup>7</sup> The age at initiation for smoking was less than that for chewable products. This may be due to the growing popularity of the smoking products, easy accessibility and availability in rural areas. A small proportion (2.9%) of students was currently using both forms of tobacco. It appears that smoking is often preceded by the use of chewable tobacco. The widespread use of tobacco products among a substantial portion of adolescent school children could be an indication of a future increase in overall adult tobacco use.

Nearly half the students either tried to quit tobacco use or sought help to quit tobacco use from peer group. Therefore, counselling and quit-line programmes need to be started at the schools to help the current users.

Majority of students (more than two third) responded that tea stalls and shops are selling tobacco products and are easily available. Most students purchased tobacco products from street vendors or shops and were not denied by the virtue of their age. Although sale of tobacco products is banned in India but this is not properly implemented. The use of tobacco products among adolescents may deter by strict implementation of Cigarettes and other tobacco products (Prohibition of advertisement, and regulation of trade and commerce, production, supply and distribution) amendment act, 2007.

Average number of cigarettes smoked per day was about three and approximate three-fifths of the students smoked one or two cigarettes per day. The common place of smoking was tea stalls, shops and other public places. Strict implementation of legislations like prohibition of sales of tobacco products and banning of smoking in public places might be helpful in curbing the tobacco use among adolescents.

The socioeconomic status was assessed during this study among these school students. It was observed that students from upper socioeconomic status may be getting higher pocket money and therefore they could afford to buy tobacco products. Current tobacco use was also associated with having pocket money. In this study the students were spending Rs.8 per day. Shah et al revealed among street children expense over 6 rupees per day on tobacco.<sup>12</sup>

Those students who had better knowledge of health risks of tobacco use were less likely to have 'ever used' any tobacco products. Similar observations were made in studies from Indonesia<sup>13</sup> and Argentina,<sup>14</sup> therefore, it may be beneficial to introduce separate lessons on health risks of tobacco use at schools and colleges.

Among the factors, students who reported that one or more family members smoking or chewing tobacco were more likely to be ever users of tobacco. As the number of family members using tobacco increased by a unit, the risk of tobacco used increased 1.5 times. Similarly having purchased tobacco products by children for a family member was also associated with tobacco use. About 35% of the children reported that at least one family member uses tobacco. The students those were consuming tobacco products were strongly influenced by peers, parents and teachers. Similar observations were also reported by studies from Kerala.<sup>7</sup> Behaviour change communication should be imparted among school children by school teachers and health functionaries to change the behaviour towards tobacco use.

A recent report demonstrated an increase in oral cancer incidence among tobacco users in India.<sup>15</sup> This is supported by a comparison of the age specific incidence rates of mouth cancers (ICD143-5) during 1983-1987 and 1995 which showed that the incidence had significantly increased in the younger population (< 50 years). The prevalence of chewing product use in Bhavnagar, Gujarat showing increasing trends among younger generations.<sup>16</sup> These trends indicate that smokeless tobacco use and incidence of oral cancer are increasing among the younger population.

### CONCLUSION

Tobacco use in any form (smoking or smokeless) is prevalent among the school students. Cigarette smoking was the most popular form of tobacco use. Knowledge of health risk, household asset, peer influences and social norms like tobacco use among teachers and family members, buying tobacco products for a family member were associated with tobacco use. Psychosocial factors have an important role to play in initiation of this habit. It has been observed that a large number of adolescents pick up this habit from their family members, peers, teachers or the film heroes. Targeted school intervention strategies by counselling and education are necessary. Enforcement of regulations on sale of tobacco products may also be useful. Legislations on the use of tobacco products need to be strengthened to decrease availability, accessibility and affordability of tobacco products to these age groups.

### REFERENCES

1. World Health Organisation. Reducing Risks, Promoting Healthy Life. World Health Report, 2002. Geneva: WHO;2003.
2. Patel DR. Smoking and children. *Indian J Pediatr.* 1999; 66(6):817- 824.
3. Peto R, Zaridze D. Tobacco: A major international health hazard. Proceedings of an international meeting. Moscow, 4-6 June 1985. *IARC Sci Publ* 1986;74:1-319.
4. World Health Organisation, Centre for disease control and prevention. India-Haryana Global Youth Tobacco Survey (GYTS). Geneva: WHO;2003 [cited 2010 April 15]. Available from: [http://www.searo.who.int/LinkFiles/GYTS\\_India\\_Haryana.pdf](http://www.searo.who.int/LinkFiles/GYTS_India_Haryana.pdf)
5. Bhonsle RB, Murti PR, Gupta PC. Tobacco habits in India. In: Gupta PC, Hamner JE, Murti PR, editors. Control of tobacco-related cancers and other diseases, Proceedings of an international symposium, January 15-19, 1990. Mumbai: Oxford University Press; 1992:25-46.
6. Sinha DR, Gupta PC, Pednekar M. Tobacco use among students in Bihar (India) [serial on the Internet]. *Indian J Public Health.* 2004 [cited 2010 April 15]; 48(3):111-7.. Available from: [http://www.searo.who.int/LinkFiles/GYTS\\_Rep\\_Bihar.pdf](http://www.searo.who.int/LinkFiles/GYTS_Rep_Bihar.pdf)
7. Pradeepkumar AS, Mohan S, Gopalakrishnan P, Sarma PS, Thankappan KR, Nichter M. Tobacco use in Kerala: findings from three recent studies. *Natl Med J India.* 2005; 18:148-53.
8. Rigotti NA, Lee JE, Wechsler H: US college students' use of tobacco products: results of a national survey. *JAMA.* 2000; 284:699-705
9. Warren CW, Jones NR, Eriksen MP, Asma S. Global Tobacco Surveillance System (GTSS) collaborative group: Patterns of global tobacco use in young people and implications for future chronic disease burden in adults. *Lancet.* 2006; 367:749-53.
10. Niraula SR. Tobacco use among women in Dharan, eastern Nepal. *J Health Popul Nutr.* 2004; 22:68-74.
11. Pande B, Karki Y, Plant K. A study on tobacco economics in Nepal. In: Strong K, Bonita R, editors. The SuRF Report 1. Surveillance of Risk Factors related to Noncommunicable Diseases: Current status of global data. Geneva: WHO;2001.
12. CDC. Effectiveness of School-Based Programs as a Component of a Statewide Tobacco Control Initiative — Oregon, 1999—2000. *MMWR Morb Mortal Wkly Rep.* 2001; 50(31):663-6
13. Martini S, Sulistyowati M. The Determinants of Smoking Behaviour among Teenagers in East Java Province, Indonesia. Health, Nutrition and Population (HNP) Discussion Paper. Paper No. 32.Washington: The World Bank;2005 [cited 2010 April 15]. Available from: <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/IndonesiaYouthSmokingFinal.pdf>



14. Morello P, Duggan A, Junior AH, Anthony JC, Joffe A. Tobacco use among high school students in Buenos Aires, Argentina. *Am J Public Health.* 2001;91:219-24.
15. Gupta PC. Mouth cancer in India-A new epidemic? *J Indian Med Assoc.* 1999;97(9):370-373.
16. Gupta PC, Ray CS. Smokeless Tobacco Health in India and Southeast Asia. *Respirology.* 2003;8:419-31.

# A Comparative Study Between Propofol and Thiopentone With Lignocaine Spray For Laryngeal Mask Airway Insertion

Ravi kumar<sup>1</sup>, Parashuram R Jajee<sup>2</sup>

<sup>1</sup>Assistant professor, Department of Anaesthesiology, Navodaya medical college, Raichur, <sup>2</sup>Professor and HOD, Department of Anaesthesiology and pain palliative care, Sapthagiri institute of medical science and research centre, Bangalore

## ABSTRACT

**Objective :** To compare the success rate, suitability, airway reflexes and hemodynamic changes between propofol versus thiopentone with lignocaine spray for LMA insertion.

**Materials and Methods :** A study conducted on 100 ASA grade I or II patients aged 18-60 years scheduled for elective surgery for which an LMA was appropriate, were randomly allocated in to two groups, received diazepam 0.2 mg/ Kg IV and atropine 0.6 mg IV 3 minutes before induction. Group-1 received propofol 2.5 mg/ Kg IV (n=50). Group-2 received 30 mg of topical lignocaine spray to posterior pharyngeal wall, 3 minutes prior to thiopentone 5 mg/ Kg IV (n=50). All patients were preoxygenated for 3 minutes before the induction of anesthesia. Adverse responses (gagging, coughing, and laryngospasm, movement of head and limb, inadequate jaw relaxation), severity of reaction (mild, moderate and severe) and overall reaction were recorded and graded. Hemodynamic changes were recorded and compared.

**Results :** There was no significant difference between the two groups with regard to adverse responses, severity, overall reaction, pulse rate and diastolic blood pressure ( $p>0.05$ ). The fall in systolic blood pressure was significantly greater with propofol than thiopentone ( $p<0.01$ ).

**Conclusion :** Thiopentone preceded by lignocaine spray provided equal condition as of propofol for insertion of LMA with more hemodynamic stability.

**Keywords :** Intravenous; Thiopentone; Propofol; Laryngeal mask airway (LMA); Lignocaine/Lidocaine 10% aerosol spray.

## INTRODUCTION

The laryngeal mask airway (LMA) is an ingenious supraglottic airway device meant for spontaneous and controlled ventilation at modest levels ( $<15$ cms of  $H_2O$ ) of positive pressure<sup>1</sup>. Since its introduction the LMA has gained widespread acceptance for better control of the airway than the face mask and in difficult intubation by inserting at laryngeal inlet by using general or topical anaesthesia using local anaesthetics with depth by obtunding airway reflexes<sup>2</sup>. To achieve the depth with attenuation of airway reflexes for insertion of LMA, intravenous induction agents are most commonly used e.g., propofol or thiopentone<sup>3</sup>. In Indian set up LMA can be inserted using thiopentone with local anaesthetic spray<sup>3</sup>.

## MATERIAL AND METHODS

This prospective study was conducted on 100 adult, randomly assigned into two groups of 50 each, ASA grade-1 and 2 patients, aged between 18-60 years of either sex, undergoing elective surgeries.

Group-1: Propofol group

Group-2: Thiopentone with lignocaine spray group.

Patients were evaluated on the previous day of surgery and were kept fasting for 8 hours and informed consent was taken.

Investigations: Complete hemogram, blood sugar, ESR, urine routine, ECG done in patients with age above 40 years.

### Anaesthetic Technique

On arrival in the operating theatre, an IV line was secured and the patient's baseline vital data were recorded using pulse oximeter, NIBP and preoxygenated with 100% oxygen.

The LMA size was chosen and prepared for insertion accordingly to the manufacturer's recommendation. Both groups received injection diazepam 0.2 mg/Kg IV and injection atropine 0.6 mg IV 3 minutes prior to induction. Topical lignocaine spray 10% (30 mg) to posterior pharynx, 3 minutes prior to induction with thiopentone in group-2.

In group-1, LMA was inserted after achieving depth of anaesthesia by IV propofol 2.5 mg/ Kg over 30 seconds. Adverse responses was noted and graded after LMA insertion. Incremental dose of propofol 0.25 mg/ Kg was given for laryngeal reflex during insertion. In spite of it, if condition was not satisfactory, 50 mg of succinylcholine was given and patient was ventilated with 100% oxygen and LMA was then inserted. The cuff was inflated with the recommended volume of air.

In group-2, the patients were induced with thiopentone 5 mg/ Kg preceded by topical lignocaine spray and on introducing an LMA, laryngeal reflexes were noted and graded. In presence of reflexes, an incremental dose of thiopentone 1 mg/ Kg was given. If condition for insertion of LMA was not satisfactory, then 50 mg of succinylcholine was given and LMA was then inserted after 3 minutes of 100% oxygen ventilation.

The severity of response was classified as follows:

Mild: settled within 30 seconds without intervention.

Moderate: required an incremental dose of induction agent

Severe: required succinylcholine for successful insertion.

The hemodynamic parameters namely pulse rate, systolic and diastolic blood pressure were monitored before and after induction, immediately, 2 minutes and 4 minutes after insertion of LMA. The data was analyzed using chi-square test with Yate's correction or Fisher's exact 2-tailed wherever applicable and large sample z-test has applied.

### OBSERVATION AND RESULTS

One hundred adult patients of ASA grade-1 and 2 in the age group of 18-60 years of either sex posted for surgeries were randomly divided into two groups –

Group-1 and group-2. Group-1 denotes propofol and group-2 denotes thiopentone with lignocaine spray.

Statistically P>0.05 Not significant  
 P<0.05 Significant  
 P<0.01 highly significant

**TABLE-1 OVERALL REACTION TO LMA INSERTION**

Group	No. of Cases	Percentage
Group-1	10	20.00
Group-2	12	24.00

$\chi^2=0.233$  p>0.05 Not significant

There was no statistical significant difference in overall reaction to LMA insertion between group-1 and 2.

**TABLE-2 SEVERITY OF REACTION TO LMA INSERTION**

Severity of LMA insertion	Group-1 (n=50)		Group-2 (n=50)		p-value
	No. of Cases	Percent	No. of Cases	Percent	
Mild	6	12.00	8	16.00	>0.05 (NS)
Moderate	4	8.00	4	8.00	>0.05 (NS)
Severe	—	—	—	—	—

There was no statistical difference on chi-square test application between group-1 and 2 in mild and moderate reaction to LMA insertion.

**Table-3 Comparison of Incidence of Adverse Response between Group-1 and 2**

Adverse response	Group-1 (n=50)		Group-2 (n=50)		p-value
	No. of Cases	Percent	No. of Cases	Percent	
Gagging	2	4.00	2	4.00	>0.05
Coughing	1	2.00	2	4.00	>0.05
Laryngospasm	3	6.00	2	4.00	>0.05
Movement of head and limb	1	2.00	1	2.00	>0.05
Inadequate relaxation	3	6.00	5	10.00	>0.05
Total	10		12		

Statistical significant difference was not found in the incidence of adverse responses between two groups.

**Table-4 Comparison of pulse rate between group-1 and 2 (mean±SD for pulse rate)**

	Group-1 (n=50)	Group-2 (n=50)	p-value
	Mean±SD	Mean±SD	
Preoperative	82.94±6.74	81.12±8.05	>0.05
After induction	83.58±6.24	79.52±8.59	<0.05
Immediately after	84.40±6.03	82.72±7.63	>0.05
LMA insertion			
2 minutes after	83.24±6.14	81.12±8.02	>0.05
LMA insertion			
4 minutes after	83.06±6.37	80.72±7.93	>0.05
LMA insertion			

There was significant difference in pulse rate after induction in group-2 when compared to group-1. Otherwise, there was no statistical difference in pulse rate among group-1 and 2.

**Table-5 Comparison of systolic blood pressure between group-1 and 2 (mean±SD)**

	Group-1 (n=50)	Group-2 (n=50)	p-value	Significance
	Mean±SD	Mean±SD		
Preoperative	122.32±7.31	123.56±6.34	>0.05	Not significant
After induction	114.80±7.98	119.40±6.65	<0.01	Highly significant
Immediately after	120.16±7.14	122.32±5.43	>0.05	Not significant
LMA insertion				
2 minutes after	115.12±6.54	120.24±5.40	<0.01	Highly significant
LMA insertion				
4 minutes after	114.96±7.23	121.48±5.81	<0.01	Highly significant
LMA insertion				

There was no significant difference in systolic blood pressure in preoperative period and immediately after LMA insertion between two groups (p>0.05).

There was highly significant fall in systolic blood pressure after induction, 2 minutes, and 4 minutes after LMA insertion in group-1 when compared to group-2 (p<0.01).

**Table-6 Comparison of Diastolic Blood Pressure between Group-1 and 2 (mean±SD)**

	Group-1 (n=50)	Group-2 (n=50)	p-value	Significance
	Mean±SD	Mean±SD		
Preoperative	80.72±4.64	79.4±4.80	>0.05	Not significant
After induction	74.76±4.24	76.4±3.77	>0.05	Not significant
Immediately after	79.68±4.38	78.2±3.84	>0.05	Not significant
induction				
2 minutes	79.96±4.47	77.4±3.34	<0.01	Highly significant
4 minutes	76.64±4.77	78.12±3.78	>0.05	Not significant

There was no significant difference in diastolic blood pressure between two groups in preoperative,

after induction, immediately after LMA insertion and 4 minutes after LMA insertion (p>0.05). 2 minutes after LMA insertion, highly significant difference was found in group-2 when compared to 2 minutes after LMA insertion in group-1 (p<0.01).

### DISCUSSION

The LMA which is introduced blindly into the hypo pharynx to form a seal around the larynx will provide a clear airway and leave the anaesthetist's hands free<sup>6</sup>. For smooth insertion of a LMA airway reflexes can be suppressed by using succinyl-choline, opioids, extra doses of IV induction or inhalational agents, which in turn may cause muscle pain, cardio respiratory depression or delayed recovery respectively.

In our study, for attenuating airway reflexes, IV Propofol and thiopentone with lidocaine spray to oropharynx was used.

Disadvantages are seen with IV thiopentone and propofol when used alone. Grounds et al study has concluded hemodynamic instability of the propofol at equipotent dose<sup>4</sup>. McKealing study concluded lack of pharyngeal and laryngeal reactivity with propofol during laryngoscopy when compared with thiopentone<sup>5</sup>. Thiopentone when administered without pre-medication may produce undesirable responses like coughing, gagging or laryngospasm<sup>7</sup>.

Seavell CR and associates<sup>11</sup> concluded that thiopentone preceded with topical lignocaine spray provides conditions for insertion of LMA equal to those of propofol with more hemodynamic stability and a shorter period of apnoea with no statistical difference between the two groups with regard to gagging, coughing and laryngospasm.

Hence, an comparison study between propofol and thiopentone with lignocaine spray for LMA insertion has been made in this study after IV of diazepam 0.2 mg/ Kg and atropine 0.6 mg IV.

A total number of 100 patients were randomly divided into two groups of 50 each, belonging to age group 18-60 years of ASA grade 1 and 2 were included in this study.

Group-1: (propofol group) and group-2 (thiopentone with topical lignocaine spray group). Patient's response like presence or absence of gagging, coughing, laryngospasm, movement of head and limb, inadequate jaw relaxation, severity of response to LMA insertion were graded into mild, moderate and severe and were recorded. Pulse rate, systolic and diastolic blood pressure were recorded before, after induction, immediately, 2 minutes and 4 minutes after LMA

insertion.

### Patient Response and Reaction for Insertion of LMA:

Inadequate jaw relaxation in group-1 and group-2 were 3 and 5 respectively. On chi-square test, revealed no significant difference between the two groups ( $p > 0.05$ ).

Gagging was found in 2 patients each in both the group without statistical significant difference ( $p > 0.05$ ).

Coughing was noted in 1 patient and 2 patients in group 1 and 2 without statistical significant difference ( $p > 0.05$ ).

Laryngospasm was seen in 3 patients, 2 patients in group 1 and 2 without statistical significant difference ( $p > 0.05$ ).

Movement of head and limb was seen in 1 patient in each group without statistical significant difference ( $p > 0.05$ ).

In this study, the severity of reaction to insertion of LMA was graded into mild, moderate and severe. In group-1, 6 patients and 8 patients in group-2 were presented in mild reaction. In moderate reaction, there were 4 cases in each group. On chi-square test application, there is no significant difference between groups in the severity of reaction and observations were comparable.

In overall reaction, 10 cases of undesirable reaction in group-1 and 12 cases in group-2 were noted. On statistical analysis, no significant difference was found between the two groups ( $p > 0.05$ ).

Bapat P et al<sup>12</sup> has assessed the ease of insertion of LMA by comparing propofol with lignocaine or midazolam followed by thiopentone and costs of each technique. Excellent or satisfactory conditions were observed in 48 patients in the midazolam-thiopentone group, 46 in the propofol group and 34 in the lignocaine-thiopentone group ( $p = 0.0001$ ). The incidence of gagging ( $p = 0.042$ ), limb movement ( $p = 0.031$ ) and laryngospasm ( $p = 0.0001$ ) was higher in the lignocaine-thiopentone group. The conclusion was, less expensive fentanyl-midazolam-Thiopentone combination, provides equally good conditions, as fentanyl-propofol as for the insertion of LMA

Keerthi Kumar S<sup>3</sup> has compared the effectiveness of the commonly used induction agent, thiopentone with local anaesthetic spray to the larynx with that of propofol for insertion of LMA.

There was no significant differences in adverse responses between two groups ( $p > 0.05$ ). Overall suc-

cess rate in the propofol group was 99% and 99.5% in the thiopentone group. This showed that thiopentone in combination with a local anaesthetic spray is as good as propofol for insertion of LMA.

Seavell CR, Cook TM and Cox CM<sup>11</sup> have assessed conditions for insertion of LMA by comparing topical lignocaine spray with thiopentone and propofol. There were no significant differences between the two groups with regard to the incidence of gagging, coughing and laryngospasm ( $p > 0.05$ ). Hence, conclusion was, the effect of topical lignocaine spray prior to thiopentone allows placement of an LMA with as few complications as following a dose of propofol.

Cook TM, Seavell CR, Cox CM<sup>13</sup> have assessed the condition for insertion of a laryngeal mask airway by comparing topical or IV lignocaine prior to thiopentone induction. The group receiving topical lignocaine had a lower incidence of laryngospasm ( $p < 0.05$ ) required fewer attempts of successful insertion of LMA ( $p < 0.05$ ), coughed or gagged less frequently than either group receiving lignocaine IV ( $p > 0.05$ ). Overall, the conditions for laryngeal mask airway insertion were better in the topical group ( $p < 0.05$ ).

In 1998, Okuyama M and Nakamura I<sup>15</sup> have evaluated combination of pentazocine and thiamylal as induction agents for LMA insertion and compared this with propofol. Good and acceptable conditions for LMA insertion were obtained in 85.2%, 86.7%, 96.9% of propofol group, pentazocine 0.3 mg/ Kg with thiamylal 5 mg/ Kg group and pentazocine 0.6 mg/ Kg with thiamylal 5 mg/ Kg group respectively. They concluded pentazocine 0.6 mg with thiamylal 5 mg/ Kg provides suitable condition for LMA insertion.

By comparing the observations of the present study to the above mentioned studies, it shows that topical lignocaine spray to posterior pharyngeal wall prior to thiopentone induction decreases the adverse response, severity of reaction and increased the success rate of LMA insertion by attenuating the airway reflexes and irritability due to LMA and thiopentone. Hence, the superior condition for LMA insertion is obtained by topical lignocaine spray with thiopentone.

Brown GW<sup>8</sup> in 1991 compared the conditions for insertion of LMA using propofol and thiopentone and observed greater incidence of coughing in those who received thiopentone ( $p < 0.01$ ). The results were statistically significant.

Scanlon P<sup>9</sup> in 1993 studied patient's response to laryngeal mask insertion and observed that thiopentone was associated with an adverse response in 76% of patients compared with propofol in 26%. Gagging, laryngospasm and head movements were common

using thiopentone and 11% of thiopentone group insertion of LMA was impossible due to inadequate relaxation. All these observations were statistically significant.

Brown and Ellis<sup>10</sup> in 1995 have compared propofol and increased doses of thiopentone for laryngeal mask insertion. There was greater incidence of gagging in thiopentone groups compared with propofol ( $p < 0.001$ ).

Nishiyama T and Hanaoka K<sup>14</sup> in 1997 have compared patient response to laryngeal mask insertion using propofol with midazolam and propofol with thiopentone. The number of patients with difficult insertion or showing body movement or gagging were larger in the order of M-group > B-group > P-group. It was concluded that propofol group allowed the smooth insertion.

The observations in the present study when compared with above mentioned studies, it is noted that, in the above mentioned studies, thiopentone alone was used as an induction agent without any other supplementing agent to attenuate the airway reflexes and to prevent adverse responses during and after LMA insertion. In conclusion, the present study has shown that 30 mg of topical lignocaine spray to the posterior pharyngeal wall 3 minutes prior to induction of anaesthesia with equipotent dose of thiopentone, the conditions for insertion of laryngeal mask airway are as equal to as those following an equipotent dose of propofol, but with greater hemodynamic stability.

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#### REFERENCES

1. Thomas JG. Airway management. In: Miller RD editors. Miller's Anaesthesia. 6<sup>th</sup> Edition, Philadelphia, Elsevier Churchill Livingstone; 2005; 42: P. 1617-52.
2. Dorsch JA, Dorsch SE. Laryngeal mask airways. In: Dorsch JA, Dorsch SE, editors. Understanding Anaesthesia Equipment. 4<sup>th</sup> Edition, Philadelphia, Williams and Wilkins; 1999; 15: P. 463-504.
3. Kerthi Kumar S. A comparative study of agents for insertion of laryngeal mask airway. *Ind J Anesth.* 1998; 42: 27-9. Boey WK, Kumar A. Comparison of propofol and thiopentone as induction agents for laparoscopy. *Singapore Medical Journal.* 1991; 32(2): 150-3. McKealing K, Bali IM, Dundee JW. The effects of thiopentone and propofol on upper airway integrity. *Anaesthesia.* 1988; 43: 638-40. Grounds RM, Twigley AJ, Carli F et al.
4. The hemodynamic effects of intravenous induction – A comparison of effects of thiopentone and propofol. *Anaesthesia.* 1985; 40: 735-40.
5. McKealing K, Bali IM, Dundee JW. The effects of thiopentone and propofol on upper airway integrity. *Anaesthesia.* 1988; 43: 638-40.
6. Brodrick PM, Webster NR, Nunn JF. The laryngeal mask airway – A study of 100 patients during spontaneous breathing. *Anaesthesia.* 1989; 44: 238-41.
7. Boey WK, Kumar A. Comparison of propofol and thiopentone as induction agents for laparoscopy. *Singapore Medical Journal.* 1991; 32(2): 150-3.
8. Brown GW, Patel N, Ellis FR. Comparison of propofol and thiopentone for laryngeal mask insertion. *Anaesthesia.* 1991; 46: 771-2.
9. Scanlon P, Carey M, Power M. Patient response to laryngeal mask insertion after induction of anaesthesia with propofol or thiopentone. *Can J Anesth.* 1993; 40: 816-8.
10. Brown GW, Ellis FR. Comparison of propofol and increased doses of thiopentone for laryngeal mask insertion. *Acta Anaesthesiologica Scandinavica.* 1995; 39(8): 1103-4.
11. Seavell CR, Cook TM, Cox CM. Topical lignocaine and thiopentone for the insertion of laryngeal mask airway. *Anaesthesia.* 1996; 51: 699-701.
12. Bapat P, Joshi RN, Young E, Jago RH. Comparison of propofol versus thiopentone with midazolam or lidocaine to facilitate laryngeal mask insertion. *Can J Anaesth.* 1996; 43(6): 564-8.
13. Cook TM, Seavell CR, Cox CM. Lignocaine to aid the insertion of laryngeal mask airway with thiopentone: A comparison between topical and intravenous administration. *Anaesthesia.* 1996; 51(8): 787-90.
14. Nishiyama T, Hanaoka K. Anaesthesia induction for laryngeal mask insertion – Comparison of propofol with midazolam and propofol with thiopental. *Masui – Japanese Journal of Anaesthesiology.* 1997; 46(2): 188-92.
15. Okuyama M, Nakamura I. Comparison of propofol and pentazocine combined with thiamylal for laryngeal mask insertion. *Masui – Japanese Journal of Anaesthesiology.* 1998; 47(11): 1315-9.

# Hemisection - an Alternative Treatment For Vertically Fractured Mandibular Molars : A Case Report

Sachin Gupta<sup>1</sup>, Bhawna Gupta<sup>2</sup>, Ritu Goyal<sup>3</sup>

<sup>1</sup>Reader, Department of Periodontics, <sup>2</sup>Senior lecturer, Department of Operative Dentistry and Endodontics, Desh Bhagat Dental College and Hospital, Muktsar, Punjab, India, <sup>3</sup>Associate Professor, Department of Anaesthesia, Sarswathi Institute of Medical Sciences

## ABSTRACT

Diagnosis and management of vertical root fracture is a challenging task for the clinician. The most predictable treatment option for vertical root fractures would be extraction in case of anterior teeth, and hemisection or root amputation of the involved root in the multi-rooted teeth. This case report describes the treatment of a vertically fractured mandibular molar by hemisection followed by the placement of a three unit bridge combining the hemisected root and adjacent second premolar which is successfully in service for more than a year.

**KEYWORDS:** Hemisection, Mandibular Molar.

## INTRODUCTION

Early clinical detection and management of vertical root fractures remain a vexing issue that has caused needless suffering for patients as well as for dentists. Difficulties encountered in the identification and diagnosis of vertically fractured teeth has led to the clinical diagnosis of cracked-tooth syndrome, split root syndrome, vertical root fracture and others<sup>1</sup>. Vertical root fracture of endodontically treated tooth is a frustrating complication that leads tooth to extraction.

Vertical root fracture of endodontically treated tooth is a frustrating complication that leads tooth to extraction. Many factors that predispose teeth to vertical fractures cannot be altered or controlled by the practitioner. These include masticatory accidents<sup>1</sup>, natural tight cusp-fossa relationships, steep intercuspation or bruxism<sup>2</sup>. Clinical detection of fractures can be exceedingly difficult in the initial stages of development under beneath extensive restorations or in teeth after prosthetic treatment. Clinical signs and symptoms are often elusive in nature and may be difficult to detect or reproduce during patient examination. The patient's symptoms may mimic many other possible diagnoses such as sinus problem, vague headaches or ear pain. Subjective symptoms may often be predicated on the extent. Radiograph examination is of little value in the initial stages of vertical fracture<sup>3, 4, 5, 6</sup>.

In some cases surgical intervention may actually be necessary for fracture identification. Efficacious man-

agement of fractured teeth is highly dependent on a complete set of variables that are often not controllable by the practitioner, such as extent of fracture, tooth and root anatomy, position of fracture, masticatory function and previous dental intervention.

Modern advances in all phases of dentistry have provided the opportunity for patients to maintain a functional dentition for lifetime. Therapeutic measures performed to ensure retention of teeth vary in complexity. The treatment may involve combining restorative dentistry, endodontics and periodontics so that the teeth are retained in whole or in part. Such teeth can be useful as independent units of mastication or as abutments in simple fixed bridges<sup>7</sup>. The creative management of vertically fractured teeth is a crucial part of the problem-solving process.

Hemisection refers to sectioning of a mandibular molar into two halves followed by removal of the diseased root and its coronal portion. It is indicated where one of the root of molar is unsalvageable due to caries, periodontitis or iatrogenic mishaps<sup>8</sup>. It is thus a conservative option with acceptable prognosis. Load bearing capacity of these teeth has also been investigated and with adequate restoration, they have near normal functioning capacity in in-vitro<sup>9, 10</sup>. Published literature has demonstrated an adequate prognosis for hemisected teeth<sup>11, 12, and 13</sup>. The presented case report is about hemisection of a mandibular first molar.

### CASE REPORT

A 35-year old lady was referred to the OPD of Operative Dentistry/Endodontics at Govt Dental College, Rohtak. She had a complaint of pain in her left lower quadrant since last two weeks and persistent sinus tract (Fig1).

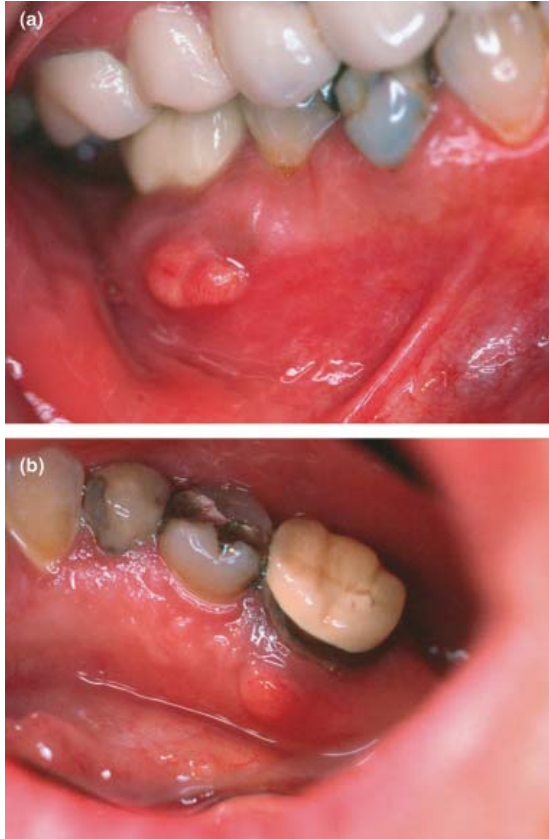


Fig 1-Persistent sinus tract

History revealed that a year ago, she got root canal treatment done in left mandibular first molar tooth # 36 followed by an extra coronal restoration. Her medical history was non contributory. The left mandibular second molar was missing. On radiographic examination there is a evidence of "J" shaped defect in relation to mesial root (Fig 2).



Fig 2-"J" Shaped Defect in relation to mesial root

The distal root was firm having sound bone all around it. The status of the RCT was satisfactory. On careful clinical exploration of the tooth, there is a evidence of root fracture in relation to mesial root of 36 (Fig 3).



Fig-3- Exploration of the defect

Various options were presented to patient, including extraction followed by placement of 2 implants to replace the tooth in the extraction site and the pontic area of tooth 37. Because the fracture was limited to the mesial root, hemisection followed by fixed partial denture was also suggested. She chose the second option. It was therefore decided to go for hemisection. Thorough scaling and polishing were performed before the hemisection. The patient was briefed on strict oral hygiene instructions for future maintenance. A mucoperiosteal flap was raised to expose the bony crest preparatory to the hemisection procedure. The mesial and distal roots were sectioned at the level of the furcation. The mesial root was extracted (Fig 4),



Fig 4- Complete removal of Root piece



and the flap was closed. A finishing diamond bur was used to smooth the mesial area of the distal root and its coronal portion. After healing of the tissues, fixed bridge involving retained distal half of mandibular first molar with sanitary pontic was given (Fig 5).



Fig 5-Bridge given #35,36,37,38

At 1- year recall visit, patient had no complaints regarding function and esthetics. Radio graphically; the tooth had healthy bone around it having intact lamina dura and uniform periodontal ligament space (Fig 6).

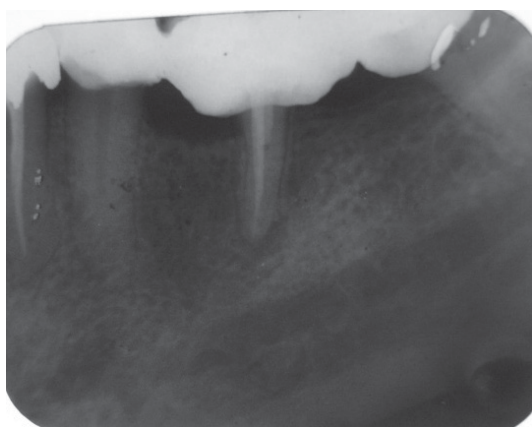


Fig 6- Post operative radiograph after 12 months

## DISCUSSION

Hemisection was selected for treatment of vertical root fracture in this patient. Implant therapy was considered but not chosen; instead, a 4-unit fixed partial denture, extending from the premolar to the third mandibular molar was completed. The mesial root was resected because of the location of the fracture. The distal root is preserved as it is broader and straighter, making it more suitable as an abutment<sup>14</sup>. The mesial root contains a longitudinal groove, which decreases its surface area and contraindicates the use of posts<sup>15</sup>.

Implant therapy is a predictable option with good functionality; however, in this case, the patient chose an alternative treatment because of financial considerations and her desire to retain a previously placed fixed partial denture. The implant option would have required placement of 2 implants to replace an extracted first molar and a missing second molar; the latter option would have required ridge augmentation. Hemisection allows for physiologic tooth mobility of the remaining root, which is thus a more suitable abutment for fixed partial dentures than an osseointegrated counterpart<sup>2</sup>. The smaller size of the occlusal tables, under-contouring of the embrasure spaces and ensuring that the crown margin encompasses the furcation are all factors in the high success rates observed with hemisection therapy<sup>6</sup>. Adequate plaque control is one of the biggest determinants in ensuring long term success of this prosthetic design. In our case at 1 year follow up the patient presented with well maintain oral hygiene around the prosthesis. In conclusion, hemisection may be a suitable alternative to extraction and implant therapy and should be discussed with patients during consideration of treatment options.

Interset of conflict: None

## REFERENCES

1. Rosen H. Cracked Tooth Syndrome. *J Prosthet Dent* 1982; 47: 36-43.
2. Meister F, Lommel TJ, Gerstein H. Diagnosis and possible causes of vertical fractures. *Oral Surg Oral Med Oral Pathol* 1980;49: 243-53.
3. Geurtsen W., Schwarze T., Gunay H. Diagnosis, therapy, and prevention of the cracked tooth syndrome. *Quintessence Int* 2003; 34: 409-17.
4. Tamse A, Fuss Z, Lustig J, Kaplavi J. An evaluation of endodontically treated vertically fractured teeth. *J Endod* 1999; 25:506- 8.
5. Tamse A., Fuss Z., Lustig J., Ganor Y., Kaffe I. Radiographic features of vertically fractured, endodontically treated maxillary premolars. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1999; 88: 348- 52.
6. Testori T, Badino M, Castagnola M. Vertical root fractures in endodontically treated teeth: a clinical survey of 36 cases. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2000;90: 224-7.
7. Basaraba N. Root Amputation and tooth hemisection. *Dent Clin of N Amer* 1969;13 : 121-7.
8. Kost WJ, Stakiw JE. Root amputation and hemisection. *JCanDentAssoc.* 1991 Jan;57(1):42-5.
9. Semeniuk VM, Guts AK, Putalova IN, Artiukhov AV.[Biomechanical grounds for use of lower molar segments after tooth preservation operations].*Stomatologija(Mosk).* 2004; 83:23-5.

10. Zhang SF, Zhang DM, Wang Y, Zhang T, Mao Y.[Stress analysis of different fixed prosthesis designs following molar hemisection therapy]. *Zhonghua Kou QiangYiXueZaZhi.* 2007; 42:395-8.
11. Park JB. Hemisection of teeth with questionable prognosis. Report of a case with seven-year results. *J IntAcad Periodontol.* 2009; 11:214-219.
12. Buhler H. Survival rates of hemisected teeth: an attempt to compare them with survival rates of alloplastic implants. *Int J Periodontics Restorative Dent.* 1994; 14:536-543.
13. Fugazzotto PA. A comparison of the success of root resected molars and molar position implants in function in a private practice: results of up to 15-plus years. *J Periodontol.* 2000; 72:1113-1123.
14. Rosenstiel SF, Land MF, Fujimoto J. *Contemporary fixed prosthodontics.* 4th ed. Edinburgh: Elsevier Mosby; 2006.
15. Saad MN, Moreno J, Crawford C. Hemisection as an alternative treatment for decayed multirouted terminal abutment: a case report. *J Can Dent Assoc.* 2009; 75:387-390.

# Hepatitis B Immunization Coverage Evaluation Amongst Slum Children

Sandeep Sachdeva<sup>1</sup>, Utsuk Datta<sup>2</sup>

<sup>1</sup>National Consultant, Directorate General of Health Services, Ministry of Health and Family Welfare, Nirman Bhawan, New Delhi-110108, <sup>2</sup>Prof. and Head, Dept. of Education and Training, National Institute of Health and Family Welfare [NIHFW], Munirka, New Delhi-110067

## ABSTRACT

**Objective:** To determine Hepatitis B immunization coverage among children aged 12-23 months residing in slums

**Methodology:** Using cluster sampling technique based on probability proportional to size, 210 [30x7] resident children were contacted. The data was collected during Oct' 2005 in the slums with approx. population of 429,130 in one randomly selected municipal zone of Delhi. Primary health facility (n=32) based performance reports for hepatitis b immunization was also assessed for data triangulation.

**Result:** Out of 210 eligible children, it was noticed that 100 (47.62%) had received all three doses of Hepatitis B vaccine whereas 19 (9.04%) and 17 (8.09%) received two & one dose respectively. The odd's of a child receiving all three-doses was found to be significant for birth order-one [OR 2.13, 95% CI: 0.93 to 4.88], birth in health institution [OR 2.13, 95% CI: 1.06 to 4.28] and awareness of mother for Hepatitis B vaccine [OR 3.40, 95% CI: 1.64 to 7.03]. Religion and gender of child had no statistically significant bearing on receiving recommended hepatitis B doses. Overall, health facilities reported 44.6% hepatitis-B III dose. **Conclusion:** Study reflects low Hepatitis b-III dose immunization coverage among children residing in slums.

**Key words:** hepatitis b, immunization, coverage evaluation

## INTRODUCTION

Hepatitis B infection, one of the major diseases of mankind is a serious global public health problem with 2 billion people infected worldwide and 350 million suffering from Chronic Hepatitis-B Virus (HBV) infection. Three quarter of the world population lived in areas where there is high level of infection.<sup>1</sup> Every year there are over 4 million acute cases of HBV and about 25% of carrier, 1 million people a year die from chronic active hepatitis, cirrhosis or primary liver cancer. In India, according to estimate there are nearly 43 million Hepatitis B carriers. Of the 25 million infants born every year, over one million runs the lifetime risk of developing chronic HBV infection. Estimates indicate that annually over 100,000 Indians die due to illness related with HBV infection.<sup>2</sup> Based on the prevalence of chronic hepatitis B carrier state in the general population, countries are broadly classified as having high (8% or more), intermediate (2-7%), or low (less than

2%) HBV endemicity. India falls in intermediate zone.<sup>3</sup>

In 1990, across the globe there were 12 countries, which were routinely administering children with Hepatitis B vaccine. Subsequently in the year 1991, the global advisory group of the Expanded Program on Immunization (World Health Organization) recommended that by the year 1997, Hepatitis B vaccine should be introduced into national immunization programs in all countries. The World Health Assembly approved this strategy in 1992.<sup>5</sup> By 2008, there were 193 countries in the world which were routinely vaccinating children with hepatitis B vaccine [WHO].

## BACKGROUND

Government of India started Hepatitis B immunization pilot project in 15 cities and 32 selected districts in the country in the year 2002. Hepatitis B vaccine is administered to a infant in an integrated manner along

with other vaccine [DPT] at 6, 10, 14 weeks under Universal Immunization Program [UIP]. For institutional deliveries, birth dose to be administered within 24 hours of birth. For project cities, initial mandate was to administer vaccine free of cost to children born in slums upto age-one however the scope was extended further to include all children born outside the slum area as well to ensure principle of equity, improve immunization coverage and also the epidemiological impact. The additional inputs provided through public health system for introduction of Hepatitis B vaccine included AD syringe, with renewed emphasis on training of health personnel, maintenance of cold chain, safe injection practices and safe disposal of AD [auto-disable] syringes. These opportunities were considered to improve system of universal immunization as a whole and not exclusively related with introduction of Hepatitis B vaccine only.

### SETTING

Delhi is one of the oldest cities of India that has slowly expanded over years to acquire its present status of big metropolis albeit with third largest slum population in the country. With an area of 1483 sq. km, the density of population in Delhi was 9294 persons per sq. km. (93% urban population) and was highest in the country. As per census report 2001, the total population of Delhi was 13 million with projected rise to 15.8 million in 2005 and 18.5 million by 2010.<sup>6</sup> The present study was undertaken in slums since these sites are considered high risks due to various medical & socio-logical reasons including lower level of delivery/ utilization of health care services and non-availability of related statistics etc.

### METHODOLOGY

Using 30-cluster sampling technique<sup>7</sup> based on probability proportional to size, hepatitis b immunization coverage was assessed amongst children [30x7=210] in the age group of 12-23 months residing in slums of a randomly selected municipal zone of Delhi, India in Oct' 2005. Reference period considered in the present study was birth during the period from 1<sup>st</sup> Oct 2003 to 30<sup>th</sup> Sep 2004. Out of 12 municipal (administrative) zones of Delhi, one was selected randomly and list of all the slums along with their population was procured from the municipal zonal office and Delhi administration (mobile scheme). The approx. population residing in these slums was 4,29,130.

In addition, all the government primary level health care facilities [n=32] functional in this selected municipal zone was also contacted with the permission of competent authorities to collect monthly performance

report [MPR] of immunization. Since the government work schedule as per financial year rather than calendar year, the complete MPR corresponded to time frame Apr 2004 to Mar 2005 and information recorded was catering population, total number of infants to be immunized and number actually immunized with hepatitis b vaccine. This activity was done during the period Nov-Dec' 2005 for assessing the reported hepatitis b-III dose coverage among infants and to corroborate the finding emerging from community survey.

Before initiating the study, clearance was taken from ethical committee of the institute and verbal consent from mother. Data was collected by a single investigator and respondents were thanked for their participation and sensitized about the importance of childhood immunization. The relevant immunization information was recorded from immunization card and/or recall of mothers. Other details included socio-demographic variable, place of birth, assistance provided during home delivery, birth-order, vaccination sources, mother's awareness regarding Hepatitis B vaccine and reasons for incomplete immunization on a pre-designed tested structured proforma. For the purpose of this study, a child receiving atleast 3 doses of Hepatitis B was considered fully immunized and partially immunized if received 1 or 2 doses. Data was entered in MS excel master sheet and analysis by means of univariate and multivariate analysis was carried out using software statistical package (SPSS, ver. 11.5).

### RESULTS

Out of all the eligible respondent ant contacted none refused to participate in the study. It was observed that out of 210 children, 120 (57.15%) were male and 90 (42.85%) female; 177 (84.28%) were Hindus and 33 (15.72%) Muslims; 84 (40.0%) birth took place in health institutions and rest 126 (60.0%) occurred at home. There were 64 (30.48%), 64 (30.48%) and 82 (39.04%) children with birth-order one, two, three & above respectively. The proportion of literate mother [who could read and/or write] was 35% only.

Out of 210 eligible children, it was noticed that 100 (47.62%) had received all three doses of Hepatitis B vaccine whereas 19 (9.04%) and 17 (8.09%) received two & one dose respectively. There were 74 (35.23%) children who had received none. Overall, 136 children received at least one dose of Hepatitis B vaccine. The source of Hepatitis B Immunization was government dispensary for maximum 93 (68.38%) children followed by outreach sessions 31 (23%), hospital/nursing home 10 (7.35%) and private practitioner's clinic 2 (1.45 %).

A child receiving three doses of Hepatitis B vaccine was further correlated with selective variables [Table

1] and it was found out that birth order [ $p=0.001$ ], place of birth [ $p=0.001$ ], education status of mother [ $p=0.002$ ] and awareness of mother with regard to Hepatitis B vaccine [ $p=0.001$ ] was significantly related to child receiving all three recommended doses of Hepatitis B vaccine. The odd's of a child receiving three-doses was found to be significant for birth order-one [OR 2.13, 95% CI: 0.93 to 4.88], birth order-two [OR 2.1, 95% CI: 0.92 to 4.96], birth in health institution [OR 2.13, 95% CI: 1.06 to 4.28] and awareness of mother for Hepatitis B vaccine [OR 3.40, 95% CI: 1.64 to 7.03].

With respect to other vaccines, the children receiving one, two and three doses of DPT/OPV were 15 [7.14%], 16 [7.61%], & 127 [60.47%]. There were 159 (75.71%) and 113 (53.80%) children who received BCG & measles vaccine respectively.

## DISCUSSION

The study highlights that only 47.61% children aged 12-23 months residing in slums had received the recommended three doses of Hepatitis B immunization. The reasons for incomplete vaccination were found to be varied/multiple and to draw some meaningful conclusion these were grouped into three domains i.e. lack of motivation, lack of information and obstacle as 47 (42.72%), 37 (33.63%) and 26 (23.63%) respectively. On data triangulation with health facility reported hepatitis B-III dose coverage, it was found out that only 44.65% infant had completed the three dose schedule which further corroborated well with the findings emerging from community survey. Though the study was conducted in 2005 but no significant achievement has been noticed in these years as annual report of ministry of health and family welfare, government of India also documents 50.3% hepatitis-B III coverage among children in the project sites.<sup>8</sup>

On review of Indian literature it was found that in a study undertaken by Sokhey J et al in East Delhi found out that coverage with Hepatitis B vaccine was only 14% in 1999 whereas it was 9.0% in 1996.<sup>9</sup> A study in Chandigarh reported 24.4% children receiving one dose of Hepatitis B vaccine.<sup>10</sup> A study amongst upper and middle class community of Chennai reported 42.8% of children receiving three doses with private practitioner as the sole source.<sup>11</sup> A study in Goa reported Hepatitis B coverage as 19.0%.<sup>12</sup>

In the present study the investigators had found much higher proportion of children in comparison to other Indian studies who received atleast one (64.76%) dose while 47.62% children received three doses of Hepatitis B vaccine. This could be due to free and adequate availability of Hepatitis B vaccine at health care facilities over the years in comparison to earlier

studies. In the present study higher proportion of children with DPT-III coverage i.e. 60.18% was found in comparison to Hepatitis B-III (47.62%). When Hepatitis B immunization and DPT are administered together, it was surprising to observe the gap between immunization coverage. Some of the factors like erratic supply of vaccine since it was recently introduced in the program, non-availability of other logistics [AD syringe] and/or misconception of the health workers could be responsible for this gap.

In context of place of birth, higher proportions of children born in health institution were fully immunized for Hepatitis B in comparison to those born at home which indicates that at health institution, mother must have been sensitized regarding the importance of immunization for the healthy development of the child or they were aware/self-motivated or socio-economically better off than those undergoing home deliveries.

Hepatitis B coverage was further explored with assistance provided during home delivery [ $n=126$ ]. Health personal, traditional birth attendant [trained] and elderly women were responsible for 9 [7.0%], 79 [62.69%] and 38 [30.15%] deliveries. The coverage of Hepatitis B-III dose was directly proportional & statistically significant ( $p<0.05$ ) to the skills and awareness of the personnel who conducted home deliveries i.e. health personnel [44.44%], trained traditional birth attendant [36.72%], and elderly women [28.94%] respectively. The personnel who assisted mothers during home delivery would have motivated them for child immunization and also reflects that level of knowledge, training and communication skill of the personnel conducting deliveries does affect the immunization status.

The contrast of advancement of communication technology, opportunities for growth & development, favorable regulatory mechanism, high level governance at one end to large-scale migration (estimated to be 0.5 million/year)<sup>13</sup> into the city from several parts of the country, shortfall in basic amenities, multiplicity of health agencies and uneven distribution of health facilities, are some of the reasons for shortfall in the provisions of reproductive and child health services in the community. Under such circumstances sustaining an optimum level of hepatitis B immunization may appear a challenging task. To conclude, the study reflects low level of Hepatitis b immunization coverage and requires adequate remedial measure in-conjunction with sustain & aggressive Information Education Communication (IEC) activities in achieving optimum level of vaccination coverage in future.

**Conflict of interest:** Nil, **Source of funding:** Nil

## REFERENCES

1. Introduction of Hepatitis B vaccine into childhood immunization services. Geneva: World Health Organization; 2001
2. Introduction of Hepatitis B Vaccine in the Universal Immunization Programme: Operations Guide for Programme Manager. New Delhi: Ministry of Health & Family Welfare, Government of India; 2002
3. Sarin SK and Singhal AK, editors. Hepatitis B in India: problems and prevention. New Delhi: CBS publishers; 1996
4. Goldstein ST, Zhou F, Hadler SC, Bell BP, Mast EE, Margolis HS. A mathematical model to estimate global hepatitis B disease burden and vaccination impact. *Int J Epidemiol.* 2005 Dec;34 (6): 1329-39
5. *Epidemiological Record.* Geneva WHO, No. 40, 7<sup>th</sup> Oct 2005 80:351
6. Guidelines for development of city level urban slum health projects. New Delhi: Area Project Division, Ministry of health and family welfare, government of India; Feb 2004
7. Immunization coverage cluster survey reference manual. WHO/IVB/04.23. Geneva: WHO; 2004
8. Annual Report: 2009-10. Ministry of Health and Family Welfare, Government of India, Nirman Bhawan, New Delhi; 2010.
9. Sokhey J, Jain DC, Harit AK, Dhariwal AC. Moderate immunization coverage levels in East Delhi: implication for disease control programme and introduction of new vaccines. *J Trop Pediatr.* 2001 Aug; 47 (4): 199-203
10. V Bhatia, HM Swami. Assessment of Hepatitis B vaccine coverage by using the national immunization day in Chandigarh. *Indian Journal of Medical Sciences.* Aug 2000, 54; 8: 347-49
11. Pai M, Sundaram P, Radha Krishnan KK, Thomas K, Muliylil J. Hepatitis B immunization coverage and awareness in middle and upper class population in Chennai city. *Indian J Pediatr* 1998; 35: 922-23
12. Ashwin Dalal, MP Silveira. Immunization status of children in Goa. *Indian Pediatrics* Apr 17, 2005; 42: 401-02
13. Reproductive and Child Health Programme-II, Delhi. Revised Programme implementation plan 2005-10 submitted to Government of India, Nirman Bhawan, New Delhi. Department of Health and Family Welfare, Govt. of NCT of Delhi; 2005

Table 1 Hepatitis B immunization coverage by selective variables

SN	Variable	N	Hepatitis-B : 3-doses				Odds ratio (95% CI)	
			Received		Not received		Unadjusted	Adjusted
			N	%	N	%		
	<b>Overall</b>	210	100		110		-	
1	<b>Religion</b>							
	Hindu	175	87	87.0	88	80.0	1.67(0.79-3.53)	-
	Muslim	35	13	13.0	22	20.0	1.0	-
			$\chi^2=1.84, d.f=1, p=0.174$					
2	<b>Sex</b>							
	Male	120	55	55.0	65	59.09	0.84(0.48-1.46)	-
	Female	90	45	45.0	45	40.91	1.0	-
			$\chi^2=0.35, d.f=1, p=0.550$					
3	<b>Birth order</b>							
	1	64	38	38.0	26	23.64	3.20 (1.62-6.33)	2.13 (0.93-4.88)
	2	63	36	36.0	27	24.55	2.92 (1.47-5.77)	2.1 (0.92-4.96)
	3	83	26	26.0	57	51.82	1.0	1.0
			$\chi^2=14.67, d.f=2, p=0.001$					
4	<b>Place of birth of eligible child</b>							
	Health institution	84	56	56.0	28	25.45	3.72 (2.08-6.67)	2.13 (1.06-4.28)
	Home	126	44	44.0	82	74.55	1.0	1.0
			$\chi^2=20.36, d.f=1, p=0.001$					
5	<b>Education status of mother</b>							
	Literate	74	46	46.0	28	25.45	2.49 (1.39-4.46)	-
	Illiterate	136	54	54.0	82	74.55	1.0	-
			$\chi^2=9.68, d.f=1, p=0.002$					
6	<b>Awareness of mother regarding Hepatitis B vaccine</b>							
	Yes	70	53	53.0	17	15.45	6.16 (3.22-11.8)	3.40 (1.64-7.03)
	No	140	47	47.0	93	84.55	1.0	
			$\chi^2=33.22, d.f=1, p=0.001$					

# Anatomical Site Distribution of Cutaneous Cystic lesions- A Six years Study in Karnataka

Sandhyalakshmi B.N<sup>1</sup>, Shashikala P<sup>2</sup>, Manjula A<sup>1</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Prof and Head, Department of Pathology, SSIMS&RC, Davanagere. Karnataka-577005.

## ABSTRACT

A descriptive study of six years conducted in our institute from 2005 to 2010. Total of 230 cases were considered, out of which 133 cases were clinically diagnosed as sebaceous cysts and 97 cases were dermoid cysts. Majority of the lesions (98 cases) occurred in sun exposed areas like upper limbs, eye, ear and face. Majority of the lesions (222 cases) were benign.

## INTRODUCTION

Cutaneous cystic lesions are most common clinical presentations<sup>1</sup>. Most of the lesions are clinically diagnosed as dermoid cysts or sebaceous cysts. These lesions can occur anywhere in the body and can be seen in extremes of ages. Majority of the lesions are brought to clinical notice for cosmetic purpose. These are more common in head and neck, scalp extremities<sup>2,3,4</sup> and can occur in non hairy areas like palms and soles<sup>5</sup>. Both benign and malignant lesions can present as cystic lesions<sup>6,7</sup>. The benign lesions include epidermoid cysts, trichilemmal cysts, and dermoid cysts<sup>8,9,10</sup>. The malignant lesions are squamous cell carcinoma, sebaceous carcinoma, and cutaneous metastatic lesions<sup>11</sup>.

## MATERIAL AND METHODS

This is a six years descriptive study from the inception (June 2005) of new medical college S.S.Institute of medical Sciences and Research centre, Davanagere, Karnataka till date. All the cystic swellings of skin specimen diagnosed clinically as either dermoid cysts or sebaceous cysts excised and submitted for Histopathological examination were included in the study. All the relevant clinical details of patients such as age, sex, address, presenting complaints, site of lesions and clinical diagnosis were procured from the medical records department of the institute. All the specimen sent were examined macroscopically and microscopically for definitive diagnosis of the cystic lesion.

## RESULTS

Total of 230 cystic lesions of skin were received during this period which were included for the study, out of which 133 cases (57.8%) were clinically diag-

nosed as sebaceous cysts and 97 cases (42.2%) were dermoid cysts (Table 1).

Table 1 Clinical diagnosis of cysts

Clinical diagnosis	No. of cases	%
Dermoid cysts	97	42.2
Sebaceous cysts	133	57.8
Total	230	100

The age of these patients ranged from 20 days to 75 years with the maximum patients between 31-40 years (28.7%) (Figure1). Male patients were more 143 (62.2%) compared to females 87, (37.8%) with male to female ratio of 1.6:1(Table2).

Table 2 Sex distribution of cases.

Sex	No. of cases	%
Male	143	62.2
Female	87	37.8
Total	230	100

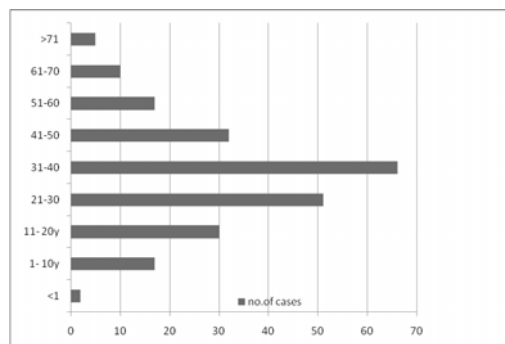


Figure1. Age distribution of cases.

All the patients complained of swelling which was present over a varying period of time. In 98 patients (42.6%) the swelling was in the exposed parts of the body, like upper limbs, eye, ear, face and neck which made them approach the surgeons for cosmetic purpose.

**Table 3 Site distribution of cysts**

Site	No. of cases	%
Abdominal wall	5	2.2
Upper limb	21	9.1
Lower limb	34	14.7
Eye	28	12.2
Ear	8	3.5
Back	35	15.2
Face	28	12.8
Neck	13	5.6
Scalp	22	9.5
Chest	30	13
Sacral region	3	1.3
Prepuce	3	1.3
Total	230	100

These cystic lesions were present in many locations of the body with no particular site involved predominantly. However back (15.2%), lower limbs(14.7%), chestwall (13%) and face (12.8%) were frequently involved. Sacral region (1.3%) and prepuce (1.3%) were least involved sites (Table.3).

The microscopic examination showed benign lesions in 222 (96.5%) cases and malignancy was found in 8 (3.5%) cases (Table 4).

**Table 4 Microscopic diagnosis.**

Type of cysts	No. of cases	%
Benign	222	96.5
Malignant	8	3.5
Total	230	100

**DISCUSSION**

The cutaneous cystic lesions are the most common presenting symptoms. Most the lesions occur in the sun exposed areas<sup>1</sup>. Majority of the cases were clinically

diagnosed as sebaceous cysts which similar to the study by Yu RC et al<sup>5</sup>. Male patients were more compared to females with male to female ratio of 1.6:1 which was in contrast with the study by Nazan Sivrioglu<sup>1</sup>. Majority of the patients belonged to the age range of 31 to 40 years <sup>1,5,6</sup>. Sunexposed areas upper limbs, face,eye and ear were the predominant sites of involvement <sup>1,4,11</sup>. Benign lesions formed the majority of the cases but malignant lesions occurred in extremes of ages <sup>1,5,12</sup>.

**CONCLUSION**

Cutaneous cystic lesions were common clinical presentations. Majority of the lesions were diagnosed clinically as sebaceous cysts. The lesions come to medical attention for cosmetic purpose and occur mainly in the sun exposed areas. A thorough microscopic examination is needed as malignant lesions can present as cystic lesions at extremes of age.

**REFERENCES**

- Nazan Sivrioglu and Nil Culhaci. Cutaneous horns: are these lesions as innocent as they seem to be? World Journal of Surgical Oncology 2004, 2:18.
- Bondeson J: Everard Home, John Hunter, and cutaneous horns: a historical review. Am J Dermatopathol 2001, 23:362-369.
- Schosser RH, Hodge SJ, Gaba CR, Owen LG: Cutaneous horns: a histopathologic study. South Med J 1979, 72:1129-1131.
- Taiseer Hussain Al-Khateeb; Nidal M Al-Masri; Firas Al-Zoubi. Cutaneous cysts of the head and neck. Journal of oral and maxillofacial surgery.2009 67(1). [Pub med Abstract]
- Yu RC, Pryce DW, Macfarlane AW, Stewart TW: A histopathological study of 643 cutaneous horns.Br J Dermatol 1991, 124:449-452. .
- Handa U, Chhabra S, Mohan H. Epidermal inclusion cyst: cytomorphological features and differential diagnosis. Diagn Cytopathol. 2008 Dec, 36(12):861-3.
- Brownstein MH, Helwig EB. Subcutaneous dermoid cysts. Arch. Dermatol.1973, 107:237.
- Rahbari H. Epidermoid cysts with seborrheic veruca like cyst walls. Arch.Dermatol.1982, 118:326-328.
- McGavran MH, Binnington B. Keratinous cysts of the skin. Arch.Dermatol. 1966, 94:499-508.
- Pinkus H. "Sebaceous cysts" are trichilemmal cysts. Arch.Dermatol.1969, 99:544-553.
- V. Chandrasekaran, S. Parkash, C. V. Raghuveer. Epidermal cysts - a clinicopathological and biochemical study. Postgrad Med J 1980, 56:823-827.
- Jaworsky C. Cystic tumors of the neck. J Dermatol Surgoncol. 1989, 15:21-26.



# A Study to Determine the Effects of Air Pollution on Conjunctival Tissue using Scraping and Impression Cytology

Agarwal Sarita<sup>1</sup>, Verma Manisha<sup>2</sup>, Ranjan Somesh<sup>2</sup>, Kumar Manoj<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of Ophthalmology, Santosh Medical College and Hospital, Ghaziabad <sup>2</sup>Post Graduate Resident, Department of Ophthalmology, Santosh Medical College and Hospital, Ghaziabad

## ABSTRACT

**Objective:** To study the effect of outdoor air pollution on conjunctival and sub-conjunctival tissues by cytological methods like Scraping Cytology and Conjunctival Impression Cytology.

**Methods and Material:** One hundred patients (200 eyes in total) were included in the study. The study was conducted on two groups, consisting of 50 subjects (100eyes each) The study group (group 1) comprised people who commuted daily via highly polluted areas for at least two years.

Control group (group 2) comprised people who were not commuting long distances on a daily basis.

Effects of Air pollution were determined using Scraping Cytology and Conjunctival Cytology.

**Results:** No subject showed advanced keratinization, the highest grade of metaplasia found was 3. The distribution of metaplastic changes in group I was significantly higher than in group II.

**Conclusions:** Longer duration of exposure also causes metaplastic changes in the conjunctival epithelium, which are seen easily on conjunctival impression cytology (CIC) preparations. Also inflammatory changes in scraping appear earlier than metaplastic changes, though changes in CIC are more specific.

**Key-words:** Air pollution, conjunctival scraping, Impression Cytology

## INTRODUCTION

Air Pollution encompasses a diverse array of anthropogenic chemical emissions including gaseous combustion products, volatile chemicals, aerosols and their atmospheric products. The evaluation of adverse health effects resulting from exposure to ambient air pollution is currently a major concern especially in the wake of phenomenal increase of level of pollutants over the past few years. The awareness of environmental pollution hazards has been existent for years but not much has been documented especially on ophthalmic effects.

Indeed, individual living in areas with high concentrations of pollutants frequently report ocular symptoms (Versura et al. 1999)<sup>1</sup> and previous studies have detected tear film abnormalities and sub clinical changes of the ocular surface in individual who lived

in cities with high level of air pollution (Saxena et al. 2003)<sup>2</sup>. In such a scenario, changes in ocular mucosa may indicate potential damage to the eyes.

The combination of simple measurements of exposure and impression cytology was shown to be an effective and non-invasive approach to characterize human response to ambient levels of air pollution (Priscila Novaes et al)<sup>3</sup>.

## HISTOLOGICAL EVIDENCE OF DAMAGE

Indices of surface damage in dry eye:

- Fall in the area of corneal epithelial cells
- Rise in the area of conjunctival epithelial cells
- Fall in the nuclear: cytoplasmic ratio
- Presence of snake chromatin

- Fall in the goblet cell density
- Increased squamous metaplasia

The various indices of surface damage can be reliably assessed with Conjunctival Impression Cytology (CIC). The size of epithelial cells (Blades K. Doughty et al)<sup>4</sup>, changes in the nuclear: cytoplasmic ratio, variations in goblet cell density and squamous metaplasia are all well demonstrated on suitably stained CIC specimens on adequately prepared filter papers (Vadrevu V.L. et al)<sup>5</sup>.

Since its introduction, CIC has gradually become the method of choice and is recommended by ophthalmologists and pathologists alike the world over for assessment of ocular surface damage<sup>6</sup>.

It was observed that presence of snake-like chromatin was significantly correlated to increased cell size (and decreased nuclear: cytoplasmic ratio) as well as reduced goblet cell density<sup>7</sup>.

The presence of squamous metaplasia and reduced goblet cell density have long been known to correlate well with clinical manifestation of dry eye state, but relatively less is known about the pathological mechanisms behind these cytological changes.

- Loss of vascularisation
- Intense inflammation

The exact inter relationship and the time frame between these two processes still remains unknown, but it leads us to another parameter, viz. the presence of sub-clinical inflammation as a predictor of early ocular surface damage. This can be studied in the fluid samples obtained by scraping the conjunctival fornix, a technique named as "SCRAPING CYTOLOGY"<sup>8</sup>. Our aim is to study the effect of outdoor air pollution on conjunctival and sub-conjunctival tissues by cytological methods.

## MATERIALS AND METHODS

One hundred patients (200 eyes in total) were included in the study. The study was conducted on two groups, consisting of 50 subjects (100 eyes) each.

### Inclusion criteria

The patients, who have the following subjective symptoms:-

1. Burning
2. Irritation
3. Heaviness of lid
4. Watering
5. F.B. sensation

6. Redness
7. Photophobia

### Exclusion criteria

- 1.) Recent/ongoing ocular disorder
- 2.) Disorders of globe lid congruity
- 3.) Disorders of blinking
- 4.) Presence of auto-immune diseases or allergic conditions
- 5.) Intake of systemic drugs known to cause dry eye e.g. antipsychotics, antidepressants.
- 6.) Regular use of topical medications > 2 weeks
- 7.) Visual display terminal users
- 8.) Contact lens users

All subjects were informed about the nature and method of study and informed consent was obtained. Subjects were divided into two groups. The study group (group 1) comprised people who commuted daily via highly polluted areas for at least two years and were not using any eye protection (i.e. sunglasses etc.). The subjects in this group hailed from different walks of life (constables, students etc.) with the common factor being commuting through the roads of Ghaziabad and thus being exposed to deleterious effects of air pollution.

Control group (group 2) comprised people who were not commuting long distances on a daily basis. The housewives routinely staying in door at their houses were also included in the control group.

## HISTORY

An informed consent was obtained from each of the subjects.

A detailed history was elicited from each subject with special reference to the area of residence, work, occupation, commuting, smoking and contact lens wear.

The subjects were also asked for ocular symptoms. If positive, a note was made whether it was present at all the times, off and on or only occasionally. A seasonal variation in these symptoms was specifically asked for and noted if present.

The subjects were also asked for any pre-existing systemic illness and the use of any systemic or ocular medication.

**A detailed ocular examination was then conducted in the following order:**

1. Visual Acuity (Snellen's)
  - Uncorrected
  - Best corrected

**2. Slit lamp evaluation of anterior segment, looking specifically for the following features:**

- a) Lid abnormalities e.g. entropion, ectropion,
- b) Conjunctival abnormalities e.g. congestion, discharge

Cornea was screened for foreign body, epithelial defect and transparency.

**1. SCRAPING CYTOLOGY<sup>8</sup>**

Using one drop of 0.5% proparacaine as a topical anaesthetic, the subject was made to sit upright and look upwards. A kimura's spatula was used for collecting the conjunctival scraping from the inferior fornix. Care was taken not to pick mucous strands from the fornix, if present. The scraped material was transferred on to a fresh, grease-free slide. The right side of the slide was marked with a diamond pencil; it was air-dried and dipped in methyl alcohol for 30 minutes for fixation. After drying the slide again, it was stained using Giemsa technique.

The stained slides were screened under the microscope for the presence of inflammatory cells. The cells, when present, were scored as under<sup>9</sup>:

TABLE-1: SCORING OF INFLAMMATORY CELLS

CELLS (per slide)	PNM's	Eosinophils	Basophils	Lympho-cytes	Monocytes	Score
None	0	0	0	0	0	0
Occasional	1-5	1-3	1-3	1-3	1-3	1
Moderate	6-10	4-10	4-10	4-10	4-10	2
Important	11-50	11-30	11-30	11-30	11-30	3
Massive	>50	>30	>30	>30	>30	4

A cumulative score was then graded as under:

0-6 Normal

7-10 Moderate inflammation

>10 Intense inflammation

**2. CONJUNCTIVAL IMPRESSION CYTOLOGY (CIC)<sup>10</sup>**

CIC samples were obtained using cellulose acetate strips measuring 15mm x 5mm with a pore size of 0.2 µm. Each quadrangular strip was cut asymmetrically in such a way that one horizontal edge was longer than the other while one of the vertical edges was actually oblique. This was done in order to identify which side of the strip had cellular impressions even after it had been dipped in various stains.

One drop of 0.5% proparacaine was instilled and after one minute, all excess fluid was wiped from the eye. Using a pair of fine forceps, cellulose acetate strips

were applied to various quadrants of bulbar conjunctiva, in such a way that their long edges faced the inferior fornix and the apices pointed towards the medial canthi. Gentle pressure was applied over the strip with the blunt end of forceps for about 5 seconds.

The strips were then gently peeled off lifting the edge with fine forceps. These strips were transferred into contact lens cases containing 95% ethyl alcohol and left and right sides marked along with the index number of the subject. Care was taken not to allow the strips to dry at any time.

For staining of these strips, reagents were arranged in contact lens cases. This was done so as to avoid wastage of volatile reagents from large containers and it also ensured no loss of small strips. The staining protocol used was modified Papanicolaou (PAP) stain.

Stained strips were arranged on a fresh, grease-free slide in the manner described previously to ensure that the side with the cells faced up. A generous amount of mountant was placed over these strips followed by a cover slip, avoiding any air bubbles under it.

Once dry, the slides were screened under the microscope for the presence of metaplastic changes. The CIC specimens were graded in the following manner:

**Stage 0: Normal conjunctival epithelium:** Moderate number of goblet cells scattered among uniform non-goblet epithelial cells, which have blue-green cytoplasm and N: C ratio of 1:1. Goblet cells appear as clear cells with nucleus pushed to one side in modified PAP stained slides.

**Stage 1: Early loss of goblet cells without keratinization:** Decreased density of goblet cells, with mild enlargement of non-goblet epithelial cells which have blue-green cytoplasm and N: C ratio of 1:2 to 1:3.

**Stage 2: Total loss of goblet cells without keratinization:** No goblet cells are observed. All epithelial cells are moderately enlarged and flattened (squamous) with cytoplasm of blue-green to mild pinkish color and N: C ratio of 1:4.

**Stage 3: Early and mild keratinization:** All epithelial cells are markedly squamous with pink cytoplasm; N: C ratio is 1:6 due to flattening of cytoplasm and mild pyknotic change of the nucleus.

**Stage 4: Moderate keratinization:** Along with squamous epithelial cells as described in stage 3, more cells contain orangophilic cytoplasm, keratohyalin granules and pyknotic nuclei. N: C ratio is 1:8.

**Stage 5: Advanced keratinization:** More keratinized cells with orangophilic cytoplasm in which nuclei are

markedly pyknotic, lytic or enucleated and sometimes aggregated into keratinized debris.

Any stage above 0 was considered abnormal

### OBSERVATIONS AND RESULTS

TABLE-2: DISTRIBUTION OF SCRAPING SCORES

Scraping Scores	Group I	Group II
0	27	42
1	10	5
2	7	2
3	5	1
4	1	0

The difference in conjunctival scraping scores in two groups were Statistically significant ( $p < 0.05$ ). Among the slides showing Inflammatory cells, the most prevalent were the neutrophils ( $PMN_s$ )

Followed by lymphocytes. No eosinophils, basophils or monocytes were observed. A monocellular infiltrates was more common than mixed population of cell

TABLE-3: GRADES OF METAPLASIA ON CIC (Conjunctival Impression Cytology)

CIC Grade	Group I	Group II
0	38	47
1	8	2
2	3	1
3	1	0

No subject showed advanced keratinization, the highest grade of metaplasia found was 3, displaying total loss of goblet cells with early keratinization in the form of flattening of epithelial cells, a pinkish cytoplasm and increased N:C ratio to 1:6. The distribution of metaplastic changes in group I were significantly higher than in group II ( $P < 0.05$ ).

### DISCUSSION

#### 1. SCRAPING CYTOLOGY

In group I, 27 subjects had score 0 of inflammation, 10 subjects had score 1, 7 subjects had scores 2, 5 subjects had score 3, 1 subject had score 4 of inflammation. In group II, 42 subjects had inflammatory score of 0, 5 had score 1, 2 had score 2, 1 had score 3 of inflammatory changes. The differences between the two

groups were significant ( $P < 0.05$ ).

We found the higher scores of sub-clinical inflammation to be related to increasing age of the subject. This finding was similar to earlier report (Versura P.et.al)<sup>1</sup>

We also found significantly higher scores of inflammation with increasing durations of exposure. Such inflammation has been variously reported to be related to levels of pollutants and independent of other factors. It can thus be said the increasing exposure to pollutants, whether in small increments or as a single large exposure does lead to ocular inflammation.

#### 2. CONJUNCTIVAL IMPRESSION CYTOLOGY

Most studies on CIC<sup>7,10</sup> have recommended the use of 0.045µm pore size cellulose acetate strips. We, however, worked with pore size 0.20µm and got reasonably good cell yield.

Next step in the uphill task was staining of these strips. They were too small to be dipped in jars of stains used routinely in our labs. The micro titre plates (similar to the ones used in ELISA) were too shallow to be used with volatile reagents. The special Teflon containers as described by some authors<sup>10</sup> were too expensive. That was when the idea of using empty contact lens cases for storage and staining of the cellulose acetate strips hit us and we had great success working with them.

Previous studies<sup>7,10</sup> have utilized modified Papanicolaou stain (PAP) with Periodic acid-Schiff's base (PAS) incorporated in it. At the outset, we used PAP both with and without PAS and compared the results. Once we were assured good visualization of goblet cells even without PAS, we decided to use only PAP for all subjects in our study.

In terms of results (Table-3), the two groups had significant differences ( $P < 0.05$ ). In group 1, 38 subjects had normal cytology (grade 0), 8 had grade 1 changes, 3 subjects had grade 2 and 1 subject had grade 3 metaplasia on CIC. In group II, 47 subjects had normal cytology (grade 0), 2 had grade 1 changes, 1 had grade 2 changes of squamous metaplasia. Thus, group I subjects demonstrated significantly higher grades of squamous metaplasia as compared to group II ( $P < 0.05$ ).

No consistent relationship was found between CIC and other parameters studied, viz. duration of exposure, symptomatology or scraping cytology, possibly because of only a small number of subjects with higher grades of metaplasia.

The finding of correlation of scrape cytology with age as well as duration of exposure and the lack of

similar correlation of CIC with these variables could possibly be due to earlier manifestation of inflammatory changes as compared to metaplastic changes.

Hence the following conclusions were noted:

1. Longer duration of exposure leads to greater intensity of subclinical ocular inflammation as evidenced on scrape smears.
2. Longer duration of exposure also causes metaplastic changes in the conjunctival epithelium, which are seen easily on conjunctival impression cytology (CIC) preparations.
3. Inflammatory changes in scraping appear earlier than metaplastic changes, though changes in CIC are more specific.
4. Pollution exposed eyes accumulate carbon pigment within epithelial cells, which may be involved in the pathogenesis of ocular effects of pollutants.
5. Conjunctival cytology, scraping and CIC, are convenient, inexpensive, yet underutilized techniques for the study of ocular surface disease.

#### ACKNOWLEDGEMENT

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**Conflict of interest and Source of support:** None

#### REFERENCES

1. Versura P, Profazio V, Cellini M, Torreggiani A, Caramazza R. Eye discomfort and air pollution. *Ophthalmologica* 1999;213:-9.
2. Saxena R, Srivastava S, Trivedi D, Anand E, Joshi S, Gupta SK. Impact of environmental on the eye. *Acta Ophthalmol Scand* 2003; 81:491-4.
3. Priscila Novaes, Paula Hilario do Nascimento Saldiva, Newton Kara- Jose, Mariangela Macchione, Monique Matsuda, Lourdes Racca, and Alejandro Berra. *Environmental Health Perspectives* Volume 115, Number 12, December 2007.
4. Blades K., Doughty M.J., Patel S: Pilot study on the use of impression cytology specimens for quantitative assessment of the surface of bulbar conjunctival cells. *Optom Vis Sci* 1998 Aug; 75(8):591-599.
5. Vadrevu V.L., Fullard R.J: Enhancement of the conjunctival impression cytology technique and examples of applications in clinico- biochemical study of dry eye. *The CLAO J* 1994 Jan; 20(1): 59-63.
6. Divani S.N., Margari c., Zikos A., Papavassiliou G.B.:. Diagnostic impression cytology: a simple technique for the diagnosis of external eye diseases. *Cytopathology* 1997 Dec; 8(6): 373-380.
7. Bjerrum K.B: Snake like chromatin in conjunctival cells of normal elderly persons and of patients with primary Sjogren's syndrome and other connective tissue disorders. *Acta Ophthalmol Scand* 1995;73:33-36.
8. Murube J, Wilson S, Ramose- Esteban J, New horizons in the relief and control of dry eye. *Highlights Ophthalmol* 2001;29:55-64.
9. Scheffer C.G. Tseng: Staging of conjunctival squamous metaplasia by impression cytology. *Ophthalmology* 1985 Jun; 92(6):728-733.
10. Scheffer C.G., Tseng, Lawrence W.H., Maumenee A.E., Kenyon K.R., Sun T.T., Green W.H: Possible mechanism for the loss of goblet cells in mucin deficient disorders. *Ophthalmology* 1984;91:545-552.

## Non Pigmented Mass on The Lid Margin – A Case Study

Sathyannarayana<sup>1</sup>, Radhika<sup>2</sup>, Saila Rekha<sup>3</sup>, Murali Mohan<sup>4</sup>

<sup>1</sup>Assistant professor of Ophthalmology, RIMS Medical College, Kadapa, A.P, India., <sup>2</sup>Assistant professor of Anatomy, RIMS Medical College, Kadapa, A.P, India., <sup>3</sup>Assistant professor of Pathology, RIMS Medical College, Kadapa, A.P, India., <sup>4</sup>Professor and HOD of Pathology, RIMS Medical College, Kadapa. A.P, India.

### ABSTRACT

Non pigmented sessile mass arising at lid margins may be an intradermal nevus. In the present case a female patient aged 70 years presented with a mass at the margin of left upper eye lid. Mass was excised and lid reconstructed by Tenzel's semicircular flap under local anesthesia. Excised mass submitted for histopathological examination and reported as intradermal nevus.

**Key words:** Non pigmented mass, Intradermal nevus.

### INTRODUCTION

Nevus is a congenital lesion also called nevocellular nevus, melanotic nevus or mole. Benign proliferations of melanocytic cells forms nevus. Clinically most nevi are small usually less than 6mm. Nevus often arises at the lid margins. Congenital nevus of the eye lids may be present as kissing nevus in which melanocytes are present symmetrically on upper and lower eye lids, most probably it may present prior to eye lid separation at the time of gestation. They are divided into three categories junctional, compound and intradermal. Intradermal nevus is most common nevus seen on eye. Nevus often arises at the lid margins. They may be flat, elevated dome shaped or pedunculated. Junctional nevi are often flat and intradermal nevi are pedunculated. Because of the risk of malignant transformation in 4.6%, these lesions should be excised.

### CASE REPORT

Balamma female 60 years presented to outpatient department with a mass on the left upper eye lid for the past 2 yrs which is gradually increasing in size (Fig: 1). On examination a brown colored sessile mass of 10 x 8 mm is seen on left upper eye lid margin, at the junction of medial 1/3 rd and lateral 2/3rs, firm in consistency, irregular surface, non-tender, skin not pinchable, no regional lymphadenopathy and appears to be adherent to tarsal plate. Right eye is pseudophakia and left eye has mature cataract. Visual acuity in right eye is 6/9 and in left eye H.M present.

Fig.1



*Preoperative*

Clinical diagnosis of adenoma of glands of Moll of left upper eye lid was made. Routine investigations like HB, TC, DC, ESR, blood sugar, blood urea, serum creatinine normal. Chest X ray PA view normal. Mass was excised and lid reconstructed by TENZEL's semicircular flap under local anesthesia (Fig: 2,3&4).

Fig.2:



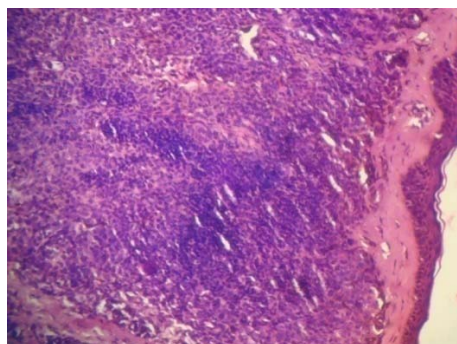
*Tenzels semicircular flap within the orbit*

Fig.4:



*Post-operative period - 2<sup>nd</sup> week*

Fig.5:

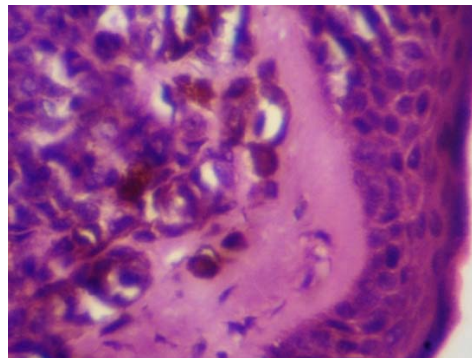


*Nevocellular nevus (H & E, x100).*

Fig.3:

Excised mass sent for histopathological examination. Histopathology report revealed as intradermal nevus (Fig: 5&6).

Fig.6:



*Nevoid cells with melanine pigment (H & E, X800).*

## DISCUSSION

Melanocytic nevi :

A.congenital

B. Acquired: 1.Junctional nevi

2. Compound nevi

3. Intradermal nevi

A benign cluster of melanocytic nevus cells arise as a result of proliferation of melanocytes at the dermal – epidermal junction. These may all remain in contact with the basal layer of epidermis, giving rise to the junctional nevus. Some of nevus cells may become detached from the basal layer, giving rise to the compound nevus. End stage of this process is when there are no nevus cells attached to the epidermis and all are lying free in the dermis. This pattern is the intradermal nevus (1).

Intradermal nevi are unusual in the 1<sup>st</sup> decade of life. Clinically intradermal nevi present either as raised dome shaped non pigmented nodules with overlying telangiectatic vessels, without growth of one or two coarse terminal hairs or sessile /pedunculated, soft skin tag like lesion with no excess pigment/ at the most light brown surface.

## Complications

1. Inflammation due to rupture of hair follicle  
- due to recurrent inflammation
2. Calcification
3. Ossification
4. Fibrosis
5. Fatty infiltration -Incidence increases with age

6. Neuroid changes
7. Metaplasia

**Histopathology:** Upper dermis- Nests and cords of nevus cells are seen in upper dermis. Multi nucleated nevus cells may be seen in which small nuclei lie either in rosette like arrangement or close together in the center of the cells. Nevus cell nests located in the upper dermis often contain moderate amount of melanin (type A cells).

**Mid and lower dermis-** Type B and type C nevus cells in the mid and lower dermis rarely contain melanin.

Occasionally intradermal nevi contain large fat cells within the aggregates of nevus cells. This is a regressive phenomenon in which fat cells replace the involuting nevus cells or it may be a true adipose metaplasia with in the stroma of nevus(3).

Sometimes rare mitoses are found in the dermis. This phenomenon has been described in children and in pregnancy (4, 5). Possibility of nevoid melanoma should be considered in such cases(2,6).

Pigmented lesions of eye lids may be pigmented nevocellular nevus, malignant melanoma or basal cell carcinoma. In our case the mass is non pigmented so rule out nevus, xanthlasma, skin tags, inclusion cysts, styes, marginal chalazion, papillomas or non pig-

mented eye lid skin cancers. No itching, no bleeding, no recent enlargement of size and no destroying or redirecting eye lashes so possibly benign mass. Histopathology report differentiates and confirm the diagnosis (7).

#### REFERENCES

1. R.M. Mackie. Disorders of Cutaneous melanocyte. Rook's Text book of Dermatology. 2nd Edition, Volume 2, page 386-387.
2. David. E Elder, Rosalie Elenitsas, George F M Murphy, Xiaowei Xu. Benign pigmented lesions and malignant melanoma. Lever's Histopathology of skin 10<sup>th</sup> Edition, page 710-714.
3. Stegmaier OC. Natural regression of melanocytic nevus. Invest. Dermatol. 1959; 32: 419.
4. Eng AN. Solitary small active junctional nevi in juvenile patients. Arch. Dermatol. 1983;119: 35-38.
5. Foucar E, Bentley PJ, Laube DW, et al. A Histopathologic evaluation of nevocellular nevi in pregnancy. Arch Dermatol. 1985; 121:350-354.
6. Zembowicz A, Mc Cusker M, Chiarelli C et al. Morphological analysis of nevoid melanoma: a study of 20 cases with a review of literature. AmJ. Dermatopathol. 2001; 23: 167-175.
7. David R. Jordan. A growth on the eye lid: When to be suspicious for skin cancer. Insight. Volume 10, Issue 2.



# Breast Feeding Practices in Post IMNCI Era in Rural Community of Haryana

Shahida Parveen<sup>1</sup>, I.B. Sareen<sup>2</sup>, B. R Dahiya<sup>1</sup>

<sup>1</sup>Assistant Professor, <sup>2</sup>Professor & Head, Department of Community Medicine, SGT Medical College, Hospital & Research Institute, Budhera, Gurgaon

## ABSTRACT

**Back ground:** Breastfeeding has been accepted as the most vital intervention for ensuring optimal growth and development of children and for reducing infant mortality. Commensurate with this concept, breast feeding has been included in the training program of **Integrated Management of Neonatal & Childhood Illness** (mentioned as IMNCI in subsequent text of this paper) for doctors, Anganwadi workers (AWW), ASHA and Women Self Help groups all over the country. In the state of Haryana, IMNCI training for above mentioned groups was completed by middle of January 2012 & the present study was conducted after this training was imparted.

**Objective:** The study was conducted with the objective to find the impact of IMNCI training on the pattern of breastfeeding practices in the rural areas of Haryana.

**Methods:** The study was carried out in the field practice area of SGT Medical College Gurgaon, that is, village Kaliyawas from 1st Feb to 30<sup>th</sup> April 2012. Study Group comprised of lactating mothers with at least one child of age under 3 years, attending the immunization session organized centrally in the selected village.

**Results:** Only 26.2% of the study group initiated breastfeeding within 1 hour of child birth & 73.8% had initiated breast feeding later than 1 hour. Commonest reason for late initiation was stated as 'family custom' based on advice of elderly women in the household & traditional belief. Colostrum feeding was practiced by 70.5% of the mothers. As regards exclusive breast feeding, majority of mothers (62.3%) reported not practising exclusive breast feeding. **Conclusion:** Community based programmes launched by Health Services, both at state level as also at the national level for promotion of breast feeding and for imparting correct breast feeding practices are yet to create their desired impact.

**Key words:** IMNCI, AWW, ASHA, Colostrum feeding, Exclusive breast feeding

## INTRODUCTION

Breastfeeding has been accepted as the most vital intervention ensuring optimal growth and development of children and for reducing infant mortality<sup>1</sup>. In India, though breast feeding is universal<sup>2-4</sup> but traditionally, initiation of breast feeding is considerably delayed in our country. Also, in most cases valuable colostrum is discarded before putting the child to the breast<sup>4, 5</sup>. Based on most recent scientific evidence, WHO recommends that breast feeding should be commenced at the earliest after child birth, neonate should receive benefits of colostrum feeding and new born must receive exclusive breast feeding for first 4

– 6 months. Thereafter there should be addition of semisolid & solid foods as a complement to breast milk till the child is able to eat normal food<sup>6</sup>. It has been conclusively deduced that beneficial effects of breastfeeding depend directly on the time period of breastfeeding initiation as also on the total duration of breast feeding<sup>7</sup>.

Although breast feeding is universal in India, but exclusive breast feeding & appropriate weaning practices still remain far from satisfactory. Various socio-cultural factors influence this aspect and these factors vary from region to region<sup>8</sup>.

Earlier studies have brought out that in India, about

43% of under-five children have their body weights lower than the optimum weight expected for respective age-groups. 'Underweight for age' has been observed to contribute to around one third of child mortality. The problem of 'underweight for age' starts right from low birth weight and is exacerbated with late initiation of breastfeeding, low prevalence of exclusive breastfeeding and inadequate complementary feeding both quantitatively and qualitatively.

Poor quality complementary foods, inadequate quantity of complementary foods and insufficient breastfeeding are detrimental feeding practices.

It is also well established that children need complementary food along with breast milk from the age of six months onwards.

### MATERIAL & METHODS

The study was conducted from 1<sup>st</sup> Feb 2012 to 30<sup>th</sup> April 2012, in the Rural Field practice area (Village Kaliyawas) of the Department of Community Medicine of SGT Medical College, Hospital & Research Institute, Budhera, District Gurgaon in Haryana. In this village immunization sessions are conducted centrally, once a week (third Wednesday of every month) in one of the Anganwadi Centres. Total population of this village is 2079 residing in 349 households & three Anganwadis are operating in the village. The study population comprised mothers having at least one child below three years of age. Mothers, who were interviewed once, were not interviewed in the next session. There were a total of 67 eligible mothers as per the criteria for inclusion in the study and of them, 61 (91.04%) participated in the study.

The data was collected on a semi-structured format in the form of questionnaire with open ended & close ended questions. The questionnaire included questions related to information on biosocial profile of children, breast feeding practices, complimentary feeding and maternal education.

The informed consent was obtained from all the mothers included in the study. Data collected was tabulated, collated and analyzed statistically.

Findings:

**Table - 1 Distribution of Children as per Age, Sex, Birth Order & Type of Delivery**

Characteristic	No.	%
<b>Age of children</b>		
Up to 1 year	13	21.3
1 – 2 year	17	27.9
2 – 3 year	31	50.8
<b>Sex</b>		
Male	39	63.9
Female	22	36.1
<b>Birth order</b>		
1– 2	45	73.8
> 2	16	26.2
<b>Type of delivery</b>		
Home	40	65.6
Hospital	21	34.4
<b>Total</b>	<b>61</b>	<b>100</b>

Out of total 61 children nearly half of them i.e. 31 were in age group of two to three years, 17 were in the age group of 1 – 2 years & 13 were less than 1 year of age. Out of 61 children, 39 (63.9%) were males & 22 (36.1%) were females. Nearly one fourth that is 16 children were in the birth order of above '2' and 45 (73.8%) were in the birth order '1' or '2' in the family. The study findings brought out that majority (65.6%) of the deliveries were domiciliary & only 34.4% were institutional, that is, in public sector or private hospitals.

**Table – 2 Distribution of Children as per Educational Status of Mothers**

Maternal Education	No.	Percentage
Illiterate	17	27.9
Primary School	18	29.5
Upto High School	10	16.4
Intermediate and above	16	26.2
<b>Total</b>	<b>61</b>	<b>100</b>

Majority (57.4%) of mothers were either illiterate (27.9%) or were educated upto primary class (29.5%) and 42.6% were educated upto High School and above, that is, 16.4% upto High School and 26.2% of the mothers were educated up to intermediate or higher level.

**Table 3 Maternal Literacy and Time of Initiating Breast Feeding**

Initiation of Breast Feeding	Illiterate	Primary School	High School	Intermediate & above	Total
<1 hr	2 (11.8)	3 (16.7)	5 (50)	6 (37.5)	16 (26.2)
1-24 hr	5 (29.4)	7 (38.9)	2 (20)	8 (50.0)	22 (36.1)
> 24 hr	10 (58.8)	8 (44.4)	3 (30)	2 (12.5)	23 (37.7)
<b>Total</b>	<b>17</b>	<b>18</b>	<b>10</b>	<b>16</b>	<b>61</b>

$\chi^2=11.819$  At  $df=6$   $p>0.05$  Not Significant

Almost one fourth (26.2%) of mothers initiated breastfeeding within 1 hour of child birth & remaining (73.8%) initiated breast feeding after a lapse of 1 hour. Half of the mothers who were educated up to intermediate level & above, initiated breast feeding within 1 – 24 hours of birth. Most of the illiterate females started breast feeding after 24 hours of birth.

**Table-4 Distribution as per Reasons for late initiation**

Reason	No.	%
Family Customs	28	62.3
No milk secretion	116	24.
Mother's illness	6	13.1
<b>Total</b>	<b>45</b>	<b>100</b>

Most common factor for late initiation that is among 62.3% mothers was family custom & only 24.6% reported that initially there was 'no milk secretion'. In a small group that is 13.1% late initiation was reported to be due to 'mother's illnesses'.

**Table – 5 Distribution as per Mode of Breast Feeding**

Mode of Breast Feeding	Illiterate	Primary School	High School	Intermediate & above	Total
On demand	3(17.6)	3 (16.7)	6 (60)	11(68.8)	23 (37.7)
When get time	8 (47.1)	1 (5.5)	2 (20)	2 (12.5)	13 (21.3)
At regular interval	6 (35.3)	14 (77.8)	2 (20)	3 (18.7)	25 (41.0)
<b>Total</b>	<b>17 (100)</b>	<b>18 (100)</b>	<b>10 (100)</b>	<b>16 (100)</b>	<b>61 (100)</b>

$\chi^2=26.395$  At  $df=6$   $p<0.001$  Highly Significant

41.0 percent of the study group breast-fed their children at regular intervals & 37.7% on demand, Only 21.3% mothers stated they breast-fed their children whenever they get time from own work.

**Table – 6 Age of Child at which Complementary Feeding Commenced according to the maternal literacy**

Age of Child	Illiterate	Primary School	High School	Intermediate & above	Total
At 6 months	5 (29.4)	7 (38.9)	6 (60)	12 (75.0)	30 (49.2%)
< or > 6 months	12 (70.6)	11 (61.1)	4 (40)	4 (25.0)	31 (50.8%)
<b>Total</b>	<b>17 (100)</b>	<b>18 (100)</b>	<b>10 (100)</b>	<b>16 (100)</b>	<b>61 (100)</b>

$\chi^2=8.157$   $df=3$   $p<0.05$  Statistically Significant

About half of the mothers (49.2%) started complimentary feeding at 6 months of age, whereas remaining 50.8% started complimentary feeding either much before or much after 6 months of age.

**Table – 7 Distribution as per Practice of Giving Colostrum to the New Born & Maternal Literacy**

Colostrum	Illiterate	Primary School	High School	Intermediate & above	Total
Given	7 (41.2)	14 (77.8)	7 (70)	15 (93.8)	43 (70.5)
Not given	10 (58.8)	4 (22.2)	3 (30)	1 (6.2)	18 (29.5)
<b>Total</b>	<b>17 (100)</b>	<b>18 (100)</b>	<b>10 (100)</b>	<b>16 (100)</b>	<b>61 (100)</b>

$\chi^2=11.645$   $df=3$   $p<0.05$  Statistically Significant

Colostrum feeding was practiced by majority (70.5%) of the women in this rural community and Statistically the difference was significant.

**Table – 8 Distribution as per Type of Breast feeding Practised by Mothers**

Type of breast feeding	Illiterate	Primary School	High School	Intermediate & above	Total
Exclusive	3 (17.6)	4 (22.2)	4 (40)	12 (75.0)	23 (37.7)
Not exclusive	14 (82.4)	14 (77.8)	6 (60)	4 (25.0)	38 (62.3)
<b>Total</b>	<b>17 (100)</b>	<b>18 (100)</b>	<b>10 (100)</b>	<b>16 (100)</b>	<b>61 (100)</b>

$\chi^2=14.246$  At  $df=3$   $p<0.05$  Significant

Majority of mothers i.e. 62.3% did not practice exclusive breast feeding & only 37.7% practised exclusive breast feeding. Most of the literate females practised exclusive breast feeding.

**Table 9 Distribution as per Source of Information regarding breast feeding**

Source of information	No.	%
Family members	35	57.4
Paramedical staff	17	27.9
Peer group	91	4.7
<b>Total</b>	<b>61</b>	<b>100</b>

Majority (57.4%) of mothers received awareness about breast feeding from their family members. For the remaining, in case of 27.9% the source of information about breast feeding was paramedical staff and 14.7% received this information from their peer group.

## DISCUSSION

Proper infant feeding, starting from the time of birth, is important for the physical and mental development of children and for reducing infant mortality rate. WHO & Government of India recommends that initiation of breastfeeding should be done immediately

after childbirth.

While breastfeeding is nearly universal in India, only a few children are put to the breast immediately after birth. According to National Family Health Survey (NFHS – III) only 21.5% of females started breastfeeding within one hour in rural areas<sup>9</sup> & 51.9% within one day in. In our study initiation of breastfeeding within one hour (26.2%) was comparable to national average of 21.5%. However in our study initiation of breastfeeding later than one hour but within one day was 32.8% which is lower than the national average at 51.9%. In our study as literacy status increased, proportion of mothers observed initiating breast feeding within 1 hour increased. This is comparable to national figure. In our study, 70.5% of females gave colostrum to their children. Kulkarni<sup>10</sup> also observed similar trend that rate of colostrum feeding was more than 50%. As literacy status increased percentage of females giving colostrum to their children correspondingly increased. (Statistically the difference was significant).

37.7 % of females practised exclusive breast feeding & 62.3% non exclusive & according to the literacy status this difference was statistically significant. 41.0 percent breast-fed their children at regular interval & 37.7% on demand, however almost one fifth of females (21.3%) breast-fed their children whenever they get time. As literacy status increased percentage of females feeding children on demand (whenever baby is hungry) increased & this difference was found to be statistically significant.

In our study, 49.2% of mothers started complimentary feeding at 6 months of age which is quite lower as observed by Kulkarni (82.5%). The difference may be because that study was conducted in urban area & the present study is in a rural setting & awareness is more among urban people. The difference was found to be statistically significant.

In our study, more than half of the females (57.4%) got information regarding breastfeeding from their family members & the remaining from paramedical staff & peer groups. Majority (60.7%) of mothers were giving prelacteal feed to their children. Similar finding was observed from another study done by Saurav et al<sup>11</sup> wherein it was observed that 54.54% mothers gave prelacteal feed.

## CONCLUSIONS

Though lot of emphasis is being laid on motivating the mothers about initiation of breast feeding immediately after child birth through community based national programs including 'Integrated Management

of Neonatal and Childhood Illnesses Program' still the desired impact is yet to be achieved. This community based study has brought out that in spite of the fact that the awareness and training about correct methodology of breast feeding practices was imparted through the IMNCI by medical and para-medical staff, most of the mothers still follow the practice of starting breast feeding after 1 hour of birth & even later. Most common factor for late initiation of breast feeding continues to be family customs. This highlights the need that all the family members, particularly the elderly females should be included in Awareness and Training Programs about the timely initiation of breast feeding, exclusive breast feeding and importance of feeding colostrum to the newborn

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## REFERENCES

1. Gupta A, Arora V. The State of World's Breastfeeding -Tracking Implementation of the Global Strategy for Infant and Young Child Feeding. International Baby Food Action Network (IBFAN), Asia Pacific. South Asia report. Feb 2007
2. WHO; 1998 In National Family Health Survey Subject Reports Number 16. Mumbai, India and Honolulu, Hawaii, USA: International Institute for Population Sciences and East-West Centre, Population Health Studies; 2000:1-23.
3. Khan ME: Breast-feeding and weaning practices in India. *Asia-Pacific Population Journal* 1990;5(1):71-88. [PubMed Abstract](#)
4. Tiwari R, Mahajan PC, Lahariya C: The determinants of exclusive breast feeding in urban slums: a community based study. *Journal of Tropical Pediatrics* 2008; 1-6. [PubMed Abstract](#) | [Publisher Full Text](#)
5. Prasad B, Costello AMdL: Impact and sustainability of a "baby friendly" health education intervention at a district hospital in Bihar, India. *British Medical Journal* 1995,310:621-623. [PubMed Abstract](#) | [Publisher Full Text](#) | [PubMed Central Full Text](#)
6. World Health Organization. Evidence for the ten steps to successful breastfeeding. Geneva:
7. Victora CG, Smith PG, Vaughan JP, Nobre LC,

- Lombardi C, Teixeira AM, *et al* . Evidence for protection against infant deaths from infectious diseases in Brazil *Lancet* 1987;2: 319-22.
8. Ministry of Health and Family Welfare: National Family Health Survey 3, India, 2007. [<http://mohfw.nic.in/nfhs3/CD.htm>].
  9. NFHS III (2005 - 2006). Fact sheet for key indicators. Child feeding practices & nutritional status of children.
  10. Kulkarni R N, Anjenaya S, GujarR, Breast feeding practices in a urban community of Kalamboli, Navi Mumbai. *IndJ of Community Medicine* 2004;Vol 29(4);179-80.
  11. S. Chatterjee, S. Saha: A Study On Knowledge And Practice Of Mothers Regarding Infant Feeding And Nutritional Status Of Under-Five Children Attending Immunization Clinic Of A Medical College. *The Internet Journal of Nutrition and Wellness* 2008;Vol. 5(1).

# A Study of Medial Thigh Pain In Fracture Neck of Femur With Bipolar Hemiarthroplasty

Neelkant.S<sup>1</sup>, Sameena<sup>2</sup>, Karigoudar R.N<sup>3</sup>, Sreekantha<sup>4</sup>

<sup>1</sup>Assistant Professor, Department of Orthopedics, Navodaya Medical College, Raichur, <sup>2</sup>Assistant Professor, Department of Ophthalmology, Navodaya Medical College, Raichur., <sup>3</sup>Professor & Head, Department of Orthopedics, Navodaya Medical College, Raichur., <sup>4</sup>Associate Professor, Department of Biochemistry, Navodaya Medical College, Raichur.

## ABSTRACT

Even though after Bipolar hemiarthroplasty for fracture neck of femur in elderly patients, medial thigh pain is persisting in many patients and this is more troublesome to patients. In this study 23 cases of Bipolar hemiarthroplasty were followed up, we found that 13% patients had no pain and 86.9% of patients had medial thigh pain. Medial thigh pain is then radiologically and clinically assessed and we found that varus alignment of stem in 15%, loosening in 10%, acetabular erosion with arthritis changes in 15%, adductor muscle spasm in 10%, shortening in 15%. Some of these factors are avoidable by keeping these factors in mind while doing surgery.

**Key words:** Hemiarthroplasty, fracture neck of femur, medial thigh pain.

## INTRODUCTION

With life expectancy increasing with each decade, our society is becoming more and more geriatric society, with significant numbers of patients suffering from osteoporosis and fracture neck of femur. Despite advances in the management of femoral neck fractures it is still referred to as the 'unsolved fracture' in certain situations<sup>1</sup>. Kocher suggested two mechanisms of injury, the first is a fall producing a direct blow over the greater trochanter and the second is lateral rotation of the extremity. A third suggested mechanism is cyclical loading which produces macrofractures<sup>2</sup>.

Primary prosthetic replacement provides for immediate mobilization with weight bearing, this permits elderly patients to return to activity and avoid the complications of immobilization, these remain the primary indications for prosthetic hemiarthroplasty<sup>3</sup>.

Whether cement less hip arthroplasty in the very elderly is successful or not, given the possible complications noted with improper technique (example: fracture, loosening, stress shielding, subsidence etc) uniformly good results have been reported with cementless hemiarthroplasty in elderly patients. Medial thigh pain usually occurs during the course of hemiarthroplasty<sup>4</sup>.

The unipolar prosthesis was generally satisfactory

but with time some caused pain, which was attributed to wear of the acetabular cartilage, some became loose and sometimes progressive protrusion of acetabulum developed<sup>5</sup>.

## METHODOLOGY

This prospective study of assessment of medial thigh pain in bipolar hemiarthroplasty for fracture neck of femur in elderly patients has been done in Navodaya medical college hospital and research centre Raichur, between October 2008 to 2011. We have taken patients with acute femoral neck fracture with less than 3 weeks duration in patients aged above 60 years. Patients were taken as inpatients and data was collected through detailed history, systemic and local examination. Patients were operated with Moore's approach and fractured neck is replaced by Talwarkar's bipolar prosthesis. Patients were mobilized on third postoperative day by using walker. Follow up examination was done at 6 weeks, 3<sup>rd</sup>, 6<sup>th</sup>, 9<sup>th</sup>, 12<sup>th</sup>, 18<sup>th</sup> months. Radiographs were taken during follow up for evidence of any complications. Outcome of the surgery was assessed using Harris hip score. Medial thigh pain was assessed by following factors: Acetabular fit of bipolar prosthesis, femoral stem alignment, canal fit, calcar resorption with sinking of prosthesis, loosening, acetabular erosion with osteoarthritis changes, acetabular protrusion,

heterotropic ossification, adductor muscle spasm, shortening.

## RESULTS

In present study, 25 cases of intracapsular fracture neck of femur were treated with bipolar hemiarthroplasty, two patients lost for follow up. Hence we included 23 cases in this study. There were 16 female and 7 male patients with mean age of 65.91 years. Left side hip was affected in 12(52.2%) patients. The injury was caused by trivial trauma in 14(60.9%) patients. Preoperative x-ray showed normal acetabulum in all patients.

### Clinical evaluation by HARRIS HIP Score;-

- 1 PAIN .no pain - 3 patients (13%)  
 .mild pain - 13 patients (56.5%)  
 .moderate pain -7 patients (30.40%)
- 2 LIMP 3 patients(13%) shortening of 1cm
- 3 SUPPORT;- 14patients (60.9%)could walk without support
- 4 DISTANCE WALKED; majority of patients (12,52.2%) could walk for a distance of 1000 metres comfortably

Total 20 patients that is about 86.9% of patients had some type of medial thigh pain during follow up. This pain was then assessed by radiological parameters and clinical examination.

### Assessment of Medial thigh Pain;-

- 1 Equatorial fit (too large bipolar head) -1 patient (5%)
- 2 polar fit (too small bipolar head) -1 patient (5%)
- 3 varus alignment of femoral stem -3 patients (15%)
- 4 loose fit in femoral canal -2 patients (10%)
- 5 calcar resorption with sinking of prosthesis -2 patients (10%)
- 6 loosening - 2 patients (10%)
- 7 acetabular erosion with Osteoarthritis changes -3 patients (15%)
- 8 heterotropic ossification -1 patient (5%)
- 9 Adductor muscle spasm -2 patients (10%)
- 10 shortening - 3 patients (15%)
- 11 acetabular protrusion -nil



X-ray showing loosening and acetabular changes

## DISCUSSION

Bipolar prosthesis was first introduced in 1974 by James E Batman and Giliberty<sup>6,7</sup>. Most of the patients in present series were between 6<sup>th</sup> and 7<sup>th</sup> decade, this is because osteoporosis is more common in this age. Females in postmenopausal age group are more prone for this fracture. In present study we found that 86.9% of patients had medial thigh pain. Labelle et al(1990) in their series had 79.2% of medial thigh pain as compared to our study<sup>8</sup>. If too large head of bipolar is selected then equatorial contact occurs resulting in tight joint with decreased motion and hip pain. If head is too small polar contact occurs with increased stress over reduced area that leads to erosion and superomedial prosthetic migration and pain. If neck is left excessively long, reduction may be difficult and pressure on acetabulum increases<sup>9</sup>. Cameron et al used Batman bipolar prosthesis in 161 hips and found decreased protrusion and they stated that if significant pelvic protrusion is noted infection must be suspected<sup>10</sup>. Loosening can be defined as an area of radiolucency of more than 2mm around femoral stem, the presence of loosening is significantly related to a poor result<sup>11,12</sup>.

In our study 86.9% of patients had medial thigh pain and it is mainly because of Acetabular erosion by prosthesis(15%), loosening of stem(10%), Varus alignment of prosthesis(15%), calcar resorption and sinking(10%) and adductor muscle spasm(10%). Moshein in their study they found femoral stem varus alignment as most common complication that is about 27.5%<sup>13</sup>. Gallinaro in their study they found femoral stem loosening in 56.5% of patients and heterotropic ossification in 82.6%<sup>14</sup>. Langan reported lengthening in 15% of patients and shortening in 40% of patients<sup>15</sup>.

### CONCLUSION

Bipolar hemiarthroplasty is having good results in fracture neck of femur in elderly patients, it is cost effective and there is minimal exposure. Most of the fair results are because of associated medical disorders. During follow up most of the patients complained of medial thigh pain because of acetabular erosion, loosening, adductor muscle spasm etc. Some of these factors are avoidable by keeping these factors during surgery. Asking the patient to use stick while walking will also prevent acetabular changes, loosening and increases the life of prosthesis.

### REFERENCES

1. Canale ST. Campbell's operative orthopaedics, 10<sup>th</sup> ed. 3. 2908-21.
2. Kocher T, Beitrage Zurkentruess Einiger Praktisch wichtiger Fracturformen, Basel and Leipzig. Carl sallman ;1896.
3. Bucholz RW, Heckman JD. Rockwood and Greens fracture in adults 3<sup>rd</sup> ed 1996; 2; 1495-1518.
4. Systematic review of cemented and uncemented hemiarthroplasty outcomes for femoral neck fractures. Clin. orthop. Relat. Res; 2009. Feb; 467(2); 582-4.
5. Bochner RM, Pellicci PM, Lyden JP, Bipolar hemiarthroplasty for fracture of the femoral neck. Joint Surg 1988 Aug; 70A; 1001-10.
6. Philips TW, Bateman bipolar femoral head replacement a fluoroscopic study of movements over a four year period. J. Bone joint surg 1987; 69B; 76.
7. Giliberty RP- Hemiarthroplasty of the hip using a Low-Friction Bipolar endoprosthesis clin orthop 1983; 175; 72-86.
8. LaBelle. LW, Colwill JC, Swanson AB, Bateman bipolar hip arthroplasty for femoral neck fractures Clin. ortho. 1990 Feb; 251; 20.
9. Clifford. R. Wheelless MD 3<sup>rd</sup>, textbook of orthopaedics 2008; 21-pp58.
10. Cameron HU, Szivek HP, Turner R. Femoral Head migration after single Assembly Total Hip Arthroplasty clin Orthop 1982; 164; 230.
11. Basu AK, Talwalkar's endoprosthesis replacement of the hip in the management of subcapital fractures of neck of femur. IJU, 1986 July; 20 (2) 123.
12. McConville OR, Bowman AJ, Kilfoyle RM, McConville JF, Mayo RA. Clin orthop 1990 Feb; 251; 6.
13. Moshein J, Anthony H, Eloconin KB, Abamsww, Isaacson J, Transcervical fractures of the hip treated with Bateman bipolar prosthesis. Clinical Orthopaedics and related research 1919; 25.
14. Gallinaro P, Tabasso J, Negretto R, Prever BDEM, Experience with bipolar prostheses in femoral neck fractures in the elderly and debilitated. Clin Orthop; 1990 Feb; 251; 26.
15. Langan P, the Giliberty bipolar prostheses, A Clinical and radiographic review. Clin Orthop 1979 Jun; 141; 169.



# Study of Rectus Sternalis Muscle in Karnataka Region

Siri AM<sup>1</sup>, Ravikumar.V<sup>2</sup>, Rajasekhar.HV<sup>3</sup>, Vijayakumar B. Jatti<sup>4</sup>

<sup>1</sup>Assistant Professor, Dept. Of Anatomy, J.J.M. Medical College, Davangere – 577 004., <sup>2</sup>Assistant Professor, Department of Anatomy, J.J.M. Medical College, Davangere., <sup>3</sup>Dr. H.V.Rajasekhar, Professor, Department of Anatomy, J.J.M. Medical College, Davangere., <sup>4</sup>Dr. Vijayakumar B. Jatti, Assistant Professor, Department of Forensic Medicine, SSIMS & RC, Davangere.,

## ABSTRACT

Rectus sternalis muscle is an inconstant muscle. It is present as musculo-aponeurotic fibre on the surface of pectoralis major muscle along side the lateral border of sternum. Its a derivative of superficial layers of rectus abdominis muscle. Its incidence is 1 in 20 dissected cadavers. In our case the muscle was present between rectus abdominis and sternal head of sternocleidomastoid muscle.

The purpose of reporting this case is important for the surgeons to be aware of this rare entity and identify the muscle early on in surgery, so that the dissection plane is appropriate. The rectus sternalis muscle can be used for augmentation mammoplasty procedures also.

**Keywords :** Rectus sternalis; Augmentation mammoplasty.

## INTRODUCTION

Rectus sternalis muscle is a derivative of superficial fibres of rectus abdominis muscle. It is present as musculo-aponeurotic fibres on the surface of pectoralis major muscle<sup>1</sup>. The muscle extends from rectus abdominis in the abdomen to the sternal head of sternocleidomastoid muscle. Its incidence in Indian subjects is 4–8% finding the muscle in cadaveric dissection and during autopsy is more frequent<sup>2</sup>.

**Evolution of the muscle:** Rectus sternalis was first reported in Anatomies Elunchus Accuratisinus in 1604<sup>3</sup>. In Golden moles [chrysochloridae] a species of mammals the rectus sternalis passes forwards to the 1<sup>st</sup> rib superficial to the pectoralis major. It also lies in close approximation to its fellow of opposite side by a ligamentous raphe<sup>4</sup>.

According to G.E.Dobson rectus sternalis is not homologous to panniculosus carnosus lining the integument but with sterno-cuticularis which is present in many species of mammals<sup>4</sup>. A variable attachment of the muscle in man also agrees well with the above hypothesis for the rudimentary muscle having ceased to have any function<sup>4</sup>.

**Embryological basis:** This muscle is derived from the upper limb myotomes but morphologically it belongs to the outer layer of the 3 primitive layers of the body wall. This is represented in the abdomen by

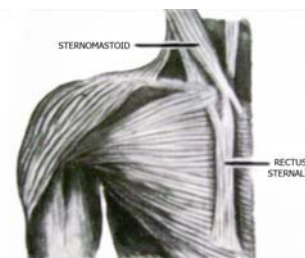
the external oblique muscle. This muscle is supplied segmentally by the corresponding intercostals nerves<sup>1</sup>.

## MATERIAL AND METHODS

The study was conducted in department of anatomy in J.J.M. Medical College Davanagere. The study was carried over on 50 formalin dried cadavers. The present finding was found during routine dissection on a cadaver aged around 60 years. The findings were noted. Individual observations were made and photographed.

## OBSERVATION

In one of the male cadaver aged around 60 years we found a subcutaneous muscle. The musculo aponeurotic band was running parallel to sternum along the lateral border. The extent of the muscle was between rectus sheath and sternal head of sternocleido mastoid muscle.(Fig:-2)



**Fig-1** Line Diagram showing the rectus sternalis muscle location.

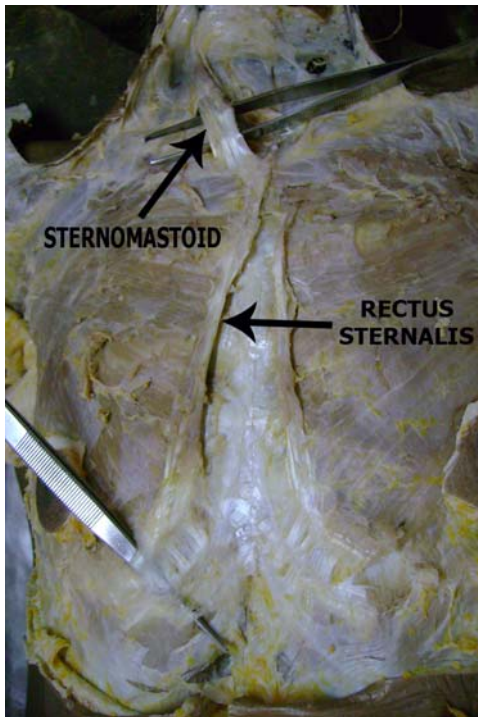
## SUMMARY

In our study out of the 50 cadavers which were dissected we found that the rectus sternalis muscle was found in one of the cadaver on the right lateral border of the sternum. The muscle is usually missed during the dissection because it will be confused for the fibres of pectoralis major muscle over which it will be present.

Rectus sternalis is a rare muscle in the subcutaneous plane. It should not be mistaken for pectoralis major muscle or for a mass on mammography. It is important to be aware of this rare entity and identify the muscle early in surgery so that the dissection plane is appropriate<sup>2</sup>.

Rectus sternalis is an anomalous muscle which may interfere with the submuscular pocket dissection in submammary approach for M.R.M. The muscle can be used in augmentation mammoplasty procedure where the muscle is used to cover the prosthesis on the most medial part<sup>5</sup>.

In addition the muscle should not be mistaken for recurrence on follow up mammographies done on patients who have undergone M.R.M<sup>2</sup>. It is important to know the plane and location of muscle, because the depth at which the internal mammary nodes are irradiated may also vary in the presence of this muscle<sup>2</sup>.



**Fig no-2** Photograph showing the rectus sternalis muscle shown with arrow. The upper fibres joining the sternomastoid muscle in the neck shown in an arrow

## DISCUSSION

Rectus sternoalis is found more frequently during cadaveric dissection and autopsies. There are few reports of rectus sternalis muscle being identified during surgeries<sup>2</sup>. The incidence of rectus sternalis muscle is varied in different populations. It is found in 2 to 8% of the subjects in Indian population. A 6% incidence is reported in African American population<sup>2</sup>.

A study conducted by Harish and Gopinath in patients who underwent modified radical mastectomy [MRM] between 1990-2000 the incidence was 8 in 1152 patients operated. The thickness of the muscle was variable in all patients. The muscle was spared in all the patients who had undergone M.R.M<sup>2</sup>.

## REFERENCES

- 1) Last RJ. Anatomy regional and applied, 7<sup>th</sup> edn., ELBS Churchill Livingstone; 1988; Pp: 54.
- 2) Harish K, Gopinath K.S. Sternalis muscle – importance in surgery of breast; J Surg Radiolo Anat 2003;25:311-314
- 3) Annals of Plastic surgery- Full text.com Vol 56(3)March 2006.
- 4) Dobson GE. Note on rectus abdominus et sternalis muscle; J Anat Physiology, 1882 Oct 17 (Pt 1) 84-85.
- 5) Khan.U.D. Use of Rectus Sternalis in Augmentation Mammoplasty: Case Report and Literature search. Aesth. Plast. Surg. Vol(32) no 1: 21-24

# A Pilot One Year Study of Lipid Lowering Effect of the Guggul Preparation in Hyperlipidemia

Sunita Singh<sup>1</sup>, Yogesh Kumar Rai<sup>2</sup>, Anil Kumar Kem<sup>3</sup>, Harsh Misra<sup>4</sup>

<sup>1,4</sup>Assistant Professor, Department of Pharmacology, <sup>2</sup>Assistant Professor, Department of Biochemistry, <sup>3</sup>Assistant Professor, Department of Medicine, Saraswathi Institute of Medical Sciences Hapur, Ghaziabad, U.P., India.

## ABSTRACT

**CONTEXT:** Herbal extracts from *Commiphora mukul* (guggul) have been widely used in Asia as cholesterol-lowering agents, and their popularity is increasing in the United States. Recently, guggulsterones, the purported bioactive compounds of guggul, have been shown to be potent antagonists of 2 nuclear hormone receptors involved in cholesterol metabolism, establishing a plausible mechanism of action for the hypolipidemic effects of these extracts.

**OBJECTIVE:** The present study is being undertaken with the aim of detecting the lipid lowering effect of the Guggul preparation in cases of hyperlipidemia.

**MATERIAL AND METHOD:** 40 patients of hyperlipidaemia both male & female were taken for this study and percentage changes in levels of lipid profile are directly measured after at 10 weeks and 12 weeks of therapy.

**RESULTS:** Guggul has beneficial effect on lipid profile. It causes statistically significant lowering of serum triglyceride and serum cholesterol and LDL, VLDL levels at the 10<sup>th</sup> week and these levels were maintained even at the 12<sup>th</sup> week of therapy.

**CONCLUSIONS:** It can be concluded that this compound can definitely be of help in lowering serum triglyceride and serum cholesterol levels in cases of I.H.D. and Diabetes mellitus. It may be recommended for primary and secondary prevention of CAD.

**Key words :** CVD, Guggulipid, Hypolipidemia, Hyperlipidemia, Lipid profile.

## INTRODUCTION

Cardiovascular disease encompasses a no of different diseases including coronary artery diseases, stroke and peripheral diseases. However, the underlying pathology for all of these disorders is atherosclerosis. The great medical challenge of all is cardiovascular diseases due to severe coronary atherosclerosis, by reason of its wide prevalence, and posing common and instant threat of life. Epidemiological and clinical studies suggest triangular relationship between diet, serum cholesterol and atherosclerosis<sup>1</sup>. Hypercholesterolemia was indicated as the chief etiopathogenic factor<sup>2</sup>. Etiology of coronary heart diseases is multifactorial. Risk factors like hypertension, diabetes mellitus, obesity, and hyperlipidemia are in limelight these days. Hyperlipidemia is also known as hyperlipoproteinaemia or high cholesterol, is a disorder characterized by abnormally

high concentration of lipids in the blood that is correlated with the development of atherosclerosis, the underlying cause of coronary artery diseases (CHD)<sup>3,4</sup>. The relationship of plasma apolipoprotein to myocardial infarction and its predictive value over and above the lipoprotein cholesterol has drawn wide attention. High cholesterol, which affects tens of millions of adults, including many who are at borderline-high levels, is a top risk factor for heart diseases<sup>5</sup>. Reducing intake of saturated fat continues to be the single most important step in lowering cholesterol. More than any other food component, saturated fat, found mainly in meat and dairy products, stimulates the liver to produce artery-clogging LDLs<sup>6,7</sup>. The rationale for the use of hypolipidemic drugs is strongest in patients with hyperlipidemia who concurrently have evidence of coronary or peripheral vascular disease, in whom the use of drugs is to retard further progression of athero-

sclerosis and induce some regression. Whereas in high risk patients without evidence of atherosclerosis, the goals of therapy are to prevent the premature development of C.A.D. or, in patients with severe hypertriglyceridemia prevent the adverse sequelae of hepatomegaly and potentially pancreatitis<sup>8</sup>. Several mechanisms have been proposed for the effects of guggul. Guggul may decrease hepatic steroid production, ultimately increasing the catabolism of plasma LDL cholesterol.<sup>9</sup> Alternatively, the proposed active components of guggul, guggulsterones E and Z, may increase hepatic binding sites for LDL cholesterol, thus increasing LDL clearance<sup>10</sup>. Still another possibility is prevention of cholesterol synthesis in the liver by ketonic steroids.<sup>11</sup> Guggulsterones E and Z act as antagonists at the farnesoid X receptor, allowing more cholesterol catabolism and excretion from the body.<sup>12</sup> This receptor mediates the conversion of cholesterol to bile acids; by antagonizing this receptor, 7 $\alpha$ -hydroxylase is released, stimulating cholesterol catabolism.<sup>13</sup> The present study is being undertaken with the aim of detecting the lipid lowering effect of the guggulu preparation in cases of hyperlipidemia.

## MATERIAL AND METHOD

40 patients of hyperlipidaemia both male & female from the OPD of Medicine Departments of Saraswathi Institute of Medical Sciences, Hapur, Ghaziabad, U.P. India from March 2009 to February 2010 were selected for present study. Patients suffering with liver disease, thyroid disease, taking beta blockers or diuretics within 8 weeks of enrolment were excluded. Patients with total fasting cholesterol >200 mg/dl & fasting TG <200mg/dl were included. All patient of hyperlipidemia including IHD & Diabetes were given the guggulu preparation for 12 weeks.

After an overnight fast of 14-16 hrs, 5ml blood samples of patients were collected twice after 10 weeks and after 12 weeks of treatment in vacuum tubes and allowed to clot at room temperature for 60-120 minutes followed by centrifugation at 3000g for 10 minutes at 14 °C. Serum was stored at -20°C for estimation of lipid profile.

### Estimation of triglyceride

Estimation of triglyceride was performed by method described by Kaplan<sup>14</sup> by using commercially available kit from Sigma Aldrich. In brief, 10 microlitre of serum was mixed with 1000 microlitres of reaction solution. The absorbance of sample was measured against the reaction solution at 540 nm, due to the formation of Quinoneimine dye, which is directly proportional to the total triglyceride concentration in the sample.

### Estimation of total cholesterol

Estimation of total cholesterol was performed by Pelkonen et al<sup>15</sup>. CHOD-PAP method by using commercially available kit from Sigma-Aldrich. In brief, 0.02 of serum was mixed with 2 ml of reaction solution (Enzyme solution with color reagent). The absorbance of sample was measured at 540nm against the reagent blank value.

### Estimation of serum HDLc

Estimation of serum HDLc was performed as described by Nikkila et al<sup>16</sup>. CHOD-PAP method by using commercially available kit from Sigma Aldrich. In brief, 0.2ml of serum was mixed with 0.5 ml of precipitating reagent solution and centrifuged at 4000rpm for 10 minutes. 0.1ml of clear supernatant was mixed with 1ml of reaction solution. The intensity of color produced was directly proportional to the concentration of HDL cholesterol in the sample. The absorbance of samples was measured at 540nm against the reagent blank value.

### Estimation of serum LDLc & VLDLc

Estimation of LDLc & VLDLc were calculated by Friedwald equation suggested method of Sattyanarayanan<sup>17</sup>.

$$\text{LDLc} = \text{Total cholesterol} - (\text{HDLc} + \text{VLDLc})$$

$\text{VLDLc} = \text{Total cholesterol} - (\text{HDLc} + \text{LDLc})$ . The estimated values of LDLc & VLDLc were expressed in mg/dl.

## OBSERVATION

Table no- 1 shows the distribution of patients according to the age group. It is evident from table maximum patients 24 (60 %) were in the age group of 41-50 years, while the least 02(5%) were in age group of 31-40 years

TABLE- 1 Distribution of cases according to age

Age Group (Yrs.)	No. of Patients	Percentage
31-40	2	5%
41-50	24	60%
51-60	6	15%
61-70	8	20%
Total	40	100%

Table no- 2 shows the distributions of cases according to sex. It is evident from table predominantly the patient of hyperlipidemia were males (60%) against females (40%).

**TABLE – 2 Distribution of cases according to sex**

Sex	No. of Patient	Percentage
Male/Female	24/16	60%/40%
Total	40	100%

Table no-3 shows level of serum total cholesterol, LDLc, VLDLc and triglyceride at 10 weeks of therapy were significantly decreased as compare to without guggulipid therapy  $p < 0.001$ , while HDLc was slightly increased this group  $p < 0.01$ .

**Table – 3 Effect of drug therapy on lipid profile at 10 weeks**

Serum Concentration mg/dl	Before Treatment Mean±S.D.	After 10 weeks of Treatment Mean±S.D.	P-Value
Total Cholesterol	258.13±32.93	162.84±31.02	<0.001
Triglyceride	198.96±28.82	106.08±29.12	<0.001
LDL	200.33±21.24	118.61±18.61	<0.001
HDL	18.01±5.93	23.01±6.58	<0.01
VLDL	39.79±5.76	21.22±5.83	<0.001

Table no-4 shows level of serum total cholesterol, LDLc, VLDLc and triglyceride at 10 weeks of therapy were significantly decreased as compare to without guggulipid therapy  $p < 0.001$ , while HDLc was slightly increased this group  $p < 0.01$ .

**Table 4 Effect of drug therapy on lipid profile at 12 weeks**

Serum Concentration mg/dl	Before Treatment Mean±S.D.	After 12 weeks of Treatment Mean±S.D.	P-Value
Total Cholesterol	258.13±32.93	158.20±28.89	<0.001
Triglyceride	198.96±28.82	102.19±27.24	<0.001
LDL	200.33±21.24	113.60±17.99	<0.001
HDL	18.01±5.93	24.16±6.32	<0.01
VLDL	39.79±5.76	20.45±4.58	<0.001

Table no-5 shows relationship between lipid profile & the duration of Guggulipid therapy. It is evident from table there were no significant changes in lipid profile level between 10 weeks and 12 weeks of Guggulipid therapy.

**Table-5 Relationship between lipid profile and the duration of Guggulipid therapy**

Duration of therapy	Total Cholesterol	Triglyceride	LDL	HDL	VLDL
A-10weeks	162.89±31.02	106.08±29.12	118.60±18.61	23.01±6.58	21.22±5.83
B-12weeks	158.20±28.89	102.19±27.24	213.60±17.99	24.16±6.32	20.45±4.58
Comparison Between A&B	N.S	N.S	N.S	N.S	N.S

## RESULT

In this study, the effect of Guggulipid was seen on lipid profile serum total cholesterol, serum triglyceride, HDLc & LDLc. Guggulipid exerts hypolipidemic action by inhibiting the biosynthesis of Cholesterol and reducing the rate of Cholesterol turnover. It also stimulates the LDL receptor binding activity and thus increasing the catabolism of LDL-CH. Most of the cases of hyperlipidemia (60%) were in the age group of 41-50 years. Only 2% of cases were below the age of 40 years. So, it would be more cost effective if only the patients above the age of 40 years are screened for hyperlipidemia.

According to sex distribution, most cases (60%) were males against females (40%). The male preponderance in coronary artery diseases is well recognized. Estrogen is responsible for the protective effect from coronary artery disease in premenopausal females. Moreover the use of hormonal replacement therapy has extended the benefit of estrogen to even post-menopausal females.

The mean cholesterol before starting therapy was 258.13 mg/dl and after 10 weeks of therapy it was 162.89mg/dl, the difference was statistically significant ( $p < 0.001$ ). Similarly, the difference between initial mean cholesterol (258.13 mg/dl) and after 12 weeks of therapy was also statistically significant ( $p < 0.001$ ). But the difference in effect of drug between 10 weeks and 12 weeks was not statistically significant ( $p > 0.001$ ). Thus the drug should be given for 10 weeks for lowering of S. cholesterol concentration, there is no benefit of continuing it for 12 weeks.

The mean serum triglyceride concentration before start of drug therapy was 198.96 mg/dl while after 10 weeks of therapy, it was 106.08 mg/dl. The difference was statistically significant ( $p < 0.001$ ). Similarly, the difference between mean serum triglyceride concentration at start of therapy (198.96mg/dl) and after 12 weeks of drug (102.19 mg/dl) was also statistically significant ( $p > 0.001$ ). But there is no statistical significance ( $> 0.001$ ) between drug therapy for 10 weeks and 12 weeks. So drug should be given for 10 weeks for triglyceride lowering effect no benefit of continuing it for 12 weeks.

The drug had no statistically significant effect on serum HDL concentration ( $p > 0.01$ ) either at 10 weeks or at 12 weeks. So, the drug has no beneficial effect on HDL concentration, either at 10 weeks or 12 weeks.

The mean of VLDL concentration before start of drug therapy was 39.7mg/dl, while after 10 weeks of therapy, it was 21.22mg/dl showing a significant effect on VLDL-C concentration and after 12 weeks of therapy

it was (20.45mg/dl). The difference between 10 and 12 weeks of therapy was not statistically significant ( $p > 0.001$ ). So the drug should be given for 10 weeks.

The drug had statistically significant effect on LDL-C concentration ( $p < 0.001$ ) after 10 weeks of therapy and after 12 weeks of therapy. But the difference between 10 weeks and 12 weeks was not significant ( $> 0.001$ ). So the drug will have to be given for 10 weeks for its lipid lowering effect on LDL concentration. The drug lowers serum total cholesterol, serum triglyceride and VLDL to statistically significant levels in 10 weeks only.

## DISCUSSION

The present study was carried out from March 2009 to March 2010 on 40 patients (both male and female) of hyperlipidaemia attending in OPD and ward of medicine department at SIMS. The relationship between dyslipidaemia and CHDs is known for several decades, but the impact of control of dyslipidaemia on the natural history of CAD has only been recently demonstrated<sup>18</sup>. Dyslipidaemia is a prime issue throughout the natural history of CAD. The relationship between dyslipidemia and coronary heart disease is known for several decades, but the impact of control of dyslipidemia on the natural history of CAD has only been recently demonstrated<sup>19</sup>. Primary prevention for CAD with the control of dyslipidemia, cigarette smoking, hypertension, diet control and weight reduction has great advantage, but it is unfortunate that in our country primary prevention is not widely practiced, and prevention only begins after an acute coronary event<sup>20</sup>. The lipid disorder seen in Indians includes increased triglyceride, decreased HDL, and increased lipoprotein (a)<sup>21</sup>. An increased prevalence of coronary artery disease is seen in young Indians probably due to genetic susceptibility which is possibly mediated through elevated level of lipoprotein (a)<sup>22</sup>.

Michael et al<sup>23</sup>. (1985) found that in men, the score of severity of atherosclerosis was strongly related to low density lipoprotein cholesterol and apolipoprotein B concentration in plasma intermediate density lipoprotein (IDL), LDLc and apolipoprotein B concentration whereas in women it was related to triglyceride concentration in plasma intermediate density lipoprotein (IDL), LDLc and apolipoprotein B concentration in LDL. No relationship was found between score of severity of atherosclerosis and high density lipoprotein cholesterol or plasma apolipoprotein A-1 concentration<sup>24</sup>. Guggulu contains resin, volatile oils, and gum. The extract isolates ketonic steroid compounds known as guggulsterones. These compounds have been shown to provide the cholesterol- and triglyceride-lowering actions noted for guggul.<sup>25</sup> Guggul significantly low-

ers serum triglycerides and cholesterol as well as LDL and VLDL cholesterol (the "bad" cholesterol).<sup>26</sup> At the same time, it raises levels of HDL cholesterol (the "good" cholesterol). As antioxidants, guggulsterones keep LDL cholesterol from oxidizing, an action which protects against atherosclerosis.<sup>27</sup> Guggul has also been shown to reduce the stickiness of platelets—another effect that lowers the risk of coronary artery disease.<sup>28</sup> One double-blind trial found guggul extract similar to the drug clofibrate for lowering cholesterol levels.<sup>29</sup> Other clinical trials in India (using 1,500 mg of extract per day) have confirmed guggul extracts improve lipid levels in humans.<sup>30</sup> A combination of guggul, phosphate salts, hydroxycitrate, and tyrosine coupled with exercise has been shown in a double-blind trial to improve mood with a slight tendency to improve weight loss in overweight adults.<sup>31</sup> One small clinical trial found that guggul (*Commiphora mukul*) compared favorably to tetracycline in the treatment of cystic acne.<sup>32</sup>

It can be concluded that guggulu has beneficial effect on lipid profile. It causes statistically significant lowering of serum triglyceride and serum total cholesterol and LDL, VLDL levels at the 10<sup>th</sup> week and these levels were maintained even at the 12<sup>th</sup> week of therapy. Thus, this compound can definitely be of help in lowering serum triglyceride and serum total cholesterol levels in cases of I.H.D. and diabetes mellitus. It may be recommended for primary and secondary prevention of CAD.

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**Conflict of interest - None**

## REFERANCES

1. Steiner, A, Kendale, F.E. and Bevans, M: Production of Atherosclerosis in Dogs by cholesterol and Thiouracil Feeding. *Am. Heart J.* 1949; 38: 34.
2. Keys, A: Cholesterol and Gaint Molecules ans Atherosclerosis *J.A.M.A.* 1957; 147:1557.
3. Rifai N, Warnick GR, Dominiczak MH, eds. Handbook of lipoprotein testing. Washington, DC: Association for Clinical Chemistry Press, 1997.
4. Burtis CA, Ashwood ER, eds. Teitz fundamentals of clinical chemistry. 4th ed. Philadelphia: WB Saunders, 1996.

5. Matos SL, Paula H, Pedrosa ML, Santos RC, Oliveira EL, Chianca Jr DA, Silva ME (2005). Dietary models for inducing hypercholesterolemia in rats. *Brazilian Archives Biol. Technol.*, 48(2):203-209.
6. Ahrens, E.H., Jr, Connor, W.E., Bierman, E.L., Glueck, C.J., Hirsch, J., McGill, H.C., Spritz, N., Jr., Tobian, L., and Van Itallie, T.B., The evidence relating six dietary factors to the nations health , A. J. Clin. Nutr. 32:261-2748, 1979.
7. Reiser, R., Probstfield, J.L., Silvers, A., Scott, L.W., Shorney, M.L., Wood, R.D., O'Brien, B.C., Gotto, A.M., and Insull, W., Jr., Plasma lipid and lipoprotein response of humans to beef fat, coconut, & safflower oil , *AJCN*, 42:190, 1987.
8. Rifai N, Warnick GR, Dominiczak MH, eds. Handbook of lipoprotein testing. Washington, DC: Association for Clinical Chemistry Press, 1997.
9. Caron MF, White CM. Evaluation of the antihyperlipidemic properties of dietary supplements. *Pharmacotherapy*. 2001; 21:481-7.
10. Urizar NL, Moore DD. Gugulipid: a natural cholesterol-lowering agent. *Ann Rev Nutr*. 2003; 23:303-13.
11. McDermott JH. Complementary lipid-lowering therapies. *Am J Health-Syst Pharm*. 1999; 56:1668-71.
12. Szapary PO, Wolfe ML, Bloedon LT et al. Gugulipid for the treatment of hypercholesterolemia. *JAMA*. 2003; 290:765-72.
13. Singh RB, Niaz MA, Ghosh S. Hypolipidemic and antioxidant effects of *Commiphora mukul* as an adjunct to dietary therapy in patients with hypercholesterolemia. *Cardiovasc Drugs Ther*. 1994; 8:659-64.
14. Kaplan, M.M. Clinical and laboratory assessment of thyroid abnormalities. *Med. Clin. North. Amer.* 1985; 5:69-71.
15. Palkonen, R., Foegholm, R., Nikkila, E.A. Increase in serum cholesterol during Phenytoin treatment. *Br. Med. J.* 1975; 4:85-87.
16. Nikkila, E.A., Kaste, M., Ehnholm, C., Viikari, J. Increase in serum high-density lipoprotein in Phenytoin users. *Br. Med. J.* 1978; 2: 99-103.
17. Sattyanarayanan, U. Textbook of Biochemistry. Press book and allied private limited 1st edition March 1999 revised edition. 2001; 238-241.
18. Keys A, Anderson JT, Grande F. Serum cholesterol response to changes in the diet. IV. Particular fatty acids in the diet. *Metabolism* 1965; 14:776-87.
19. Hegsted DM, McGandy RB, Myers ML, Stare FJ. Quantitative effect of dietary fat on serum cholesterol in man. *Am J Clin Nutr* 1965; 17:281-95.
20. Yu-Poth S, Zhao G, Etherton T, Naglak M, Jonnalagadda S, Kris-Etherton P. Effects of National Cholesterol Education Program's Step I and Step II dietary intervention programs on cardiovascular disease risk factors: a meta-analysis. *Am J Clin Nutr* 1999; 69:632-46.
21. Welch GN, Loscalzo J. Homocysteine and atherothrombosis. *N Engl J Med* 1998; 338:1042-50.
22. Ueland PM, Refsum H. Plasma homocysteine, a risk factor for vascular disease: plasma levels in health, disease, and drug therapy. *J Lab Clin Med* 1989; 114:473-501.
23. Michael JM, Virtamo J, Fogelholm R, Albanes D, Heinonen OP. Different risk factors for different stroke subtypes: association of blood pressure, cholesterol, and antioxidants. *Stroke* 1999; 30:253-40.
24. Brown D, Austin S. Hyperlipidemia and Prevention of Coronary Artery Disease. Seattle, WA: NPRC, 1997, 4-6.
25. Satyavati GV. Gum guggul (*Commiphora mukul*)—The success of an ancient insight leading to a modern discovery. *Indian J Med* 1988; 87:327-35.
26. Nityanand S, Kapoor NK. Hypocholesterolemic effect of *Commiphora mukul* resin (Guggal). *Indian J Exp Biol* 1971; 9:367-77.
27. Singh K, Chander R, Kapoor NK. Guggulsterone, a potent hypolipidaemic, prevents oxidation of low density lipoprotein. *Phytother Res* 1997; 11:291-4.
28. Mester L, Mester M, Nityanand S. Inhibition of platelet aggregation by guggulu steroids. *Planta Med* 1979; 37:367-9.
29. Malhotra SC, Ahuja MMS, Sundarum KR. Long-term clinical studies on the hypolipidemic effect of *Commiphora mukul* (guggul) and clofibrate. *Ind J Med Res* 1977; 65:390-5.
30. Nityanand S, Srivastava JS, Asthana OP. Clinical trials with gugulipid—a new hypolipidemic agent. *J Assoc Phys India* 1989; 37:323-8.
31. Antonio J, Colker CM, Torina GC, et al. Effects of a standardized guggulsterone phosphate supplement on body composition in overweight adults: A pilot study. *Curr Ther Res* 1999; 60:220-7.
32. Thappa DM, Dogra J. Nodulocystic acne: oral gugulipid versus tetracycline. *J Dermatol* 1994; 21:729-31.

# Scaling up Emergency Medical Services under the Universal Health Insurance Scheme in Thailand

Suriyawongpaisal Paibul<sup>1</sup>, Woratanarat Thira<sup>2</sup>, Tansirisithikul Rassamee<sup>1</sup>, Srithumrongsawat Samrit<sup>3</sup>

<sup>1</sup>Department of Community Medicine, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand. <sup>2</sup>Department of Preventive and Social Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand. <sup>3</sup>Health Insurance System Research Office, Nonthaburi, Thailand.

## ABSTRACT

Obstacles to developing effective Emergency Medical Services (EMS) include a lack of structural models, inappropriate training foci, concerns about cost, and sustainability in the face of a high demand for services. This reported case study from Thailand demonstrated how these obstacles had been addressed through incremental changes via a few initiatives on trauma care. Universal health insurance system and health systems and health financing reforms had taken place during the last 2 decades, and created a window of opportunity for sustainable EMS development in Thailand.

**Keywords:** *Emergency medical service, EMS, Medical transport service, MTS*

## INTRODUCTION

Similar to other middle-income countries, epidemiological transitions have transformed major health challenges of Thailand from communicable diseases to chronic diseases and injuries. For all ages, ischemic heart disease, cerebrovascular disease and road traffic injury were listed at 2<sup>nd</sup>, 3<sup>rd</sup> and 5<sup>th</sup> rank respectively in 2002<sup>1</sup>, accounting for 18% of total deaths.

Despite preventive services and definitive care, these health burdens continue to post a demand for emergency medical services (EMS). Prompt response against emergency medical conditions did make difference in terms of life-saving and preservation of functionality<sup>2</sup>. However, EMS provision for time-sensitive life-threatening conditions is not a priority for many health systems in developing countries<sup>2</sup>. This is also the case for Thailand with an unofficial figure of 13 million visits to public hospital emergency department, annually.

Along with the transition, Thailand had undergone major health system reforms during the last 2 decades including the establishment of institutional mechanisms to influence health policy, health finance and management, as well as health system research, health promotion initiatives, and health services delivery<sup>3</sup>.

We attempted to describe and analyze the ways these major reforms had contributed to the advancement of EMS.

## MATERIAL AND METHODS

We searched academic and policy literatures (English and Thai) in which the principal focus was EMS. Electronic databases (Medline, HealthSTAR, Embase, CINAHL, Current Contents, PsychINFO, AIDSLINE, CancerLit, Cochrane Library, Dissertation abstracts, Papers1st (conferences and paper abstracts), Web of Science, WorldCat) as well as web library catalogues, peer reviewed internet sites, internet search engines, and several in-house databases were utilized from 1990 to February 2011. The reviewers used a data extraction form to summarize relevant documents from every health discipline, and all reviewers read key documents.

Ninety-one documents were presented to EMS workshop participants held in Nakhon Pratom province, Thailand, in December 2009. We obtained structured feedback to a discussion paper and expert presentations. Participants validated the common themes and proposed features of EMS that did not emerge from the literature but were relevant to policy—for example, budget planning process, public hearing activities.

## FINDINGS

### Thai health care system

Health service delivery system in Thailand has been provided by public sector with 80% share of total



hospital beds during 1998-2005<sup>4</sup> and 73% share of total health expenditure in 2007<sup>5</sup>. Being the biggest player in national health system, Ministry of Public Health (MOPH) owned 66% of total hospital beds, half of total number of doctors and 60% of total number of nurses<sup>1</sup>.

In 2007, under the MOPH there were 733 district hospitals providing primary medical care and inpatient care with 10-150 beds; 70 provincial hospitals providing secondary medical care with 200-500 beds, and 25 regional hospitals for tertiary medical care with 500 or more beds<sup>6</sup>. Each of these categories shared proportion of total hospital beds at 24, 17, and 13% respectively. Private hospitals had a share of 22% of total hospital beds. Fourteen university hospitals provided tertiary medical care and health personnel training mainly for doctors and nurses. At sub-district level, primary health care was provided by 9,758 health stations staffed with nurses or other paramedics without inpatient services. MOPH hospitals shouldered the biggest share of inpatient services of 71% and ambulatory and emergency (A&E) services of 63% in 2005. Hospital admission, in general, varied from 7.1% of A&E cases in MOPH hospitals to 4.0% in military operated hospitals.

### **Historical Background of EMS**

Notwithstanding increasing trend of injury-related mortality during the last two decades<sup>7</sup>, Thai national health policy had disproportionately low concern for EMS.

There are 3 core components of EMS, i.e., on scene care, care during transportation, and care on arrival at health facility. The scope of EMS development in Thailand has confined to the latter two components. Medical transport services (MTS) were available for injury victims in some urban settings<sup>8</sup>. The services were provided by volunteers with limited training and using poorly equipped pick-up trucks. Coverage of MTS was believed to be limited. Centralized command and control centers responsible for dispatching ambulances as in the West did not exist. It was not uncommon to find patients transported to hospitals being turned away.

Even though most public and private hospitals provided emergency services around the clock, personnel and equipments varied greatly between official hours and non-official hours<sup>8</sup>. For large public hospitals and private hospitals, attending doctors tended to be more available in official hours. In district hospitals and hospitals at higher levels, emergency services were provided either by doctors in their first 3-year compulsory period or nurses. Nevertheless, overcrowding was always observed more in large public hospitals.

Initiatives in pre-hospital care with medical transport services (MTS):

During 1994-2006, a few initiatives in public sector were started to provide more professional pre-hospital care on trauma cases. The development in Khon Kaen province, in northeastern part of Thailand with 1.8 million inhabitants, was considered an outstanding case in Thailand and may be for other developing countries<sup>9</sup>.

With incremental and continuing development, a comprehensive trauma care system was established through personnel training and management; information system (trauma registry); integrated service delivery models for definitive care, hospital emergency department (ED), referral and pre-hospital care; continuous quality improvement (trauma audit, referral audit, pre-hospital care audit); ambulance dispatching systems and back office support (coordinating function, action and budget plan, staff remuneration, fund raising and policy advocacy). The system development and technical know-how were well documented and distributed regularly to relevant agencies as knowledge dissemination<sup>16</sup>.

The services were stratified into 4 levels: advanced life support (ALS), intermediate life support (ILS), basic life support (BLS), and first responder service (FR). Recently, pre-hospital care in the capital district of Khon Kaen province was fragmentally provided by 4 agencies: Khon Kaen hospital, fire brigade, police, and volunteer organizations with hostile competition among the volunteers for compensation of trauma care. Trainings of pre-hospital care were not available prior to the initiatives.

By empowering and participatory approaches, zoning of pre-hospital care providers was achieved through regular technical meetings to share experience, concerns, and knowledge among the providers; and personal contacts to solve emerging issues for each provider. With a leading role in provincial policy forum on road safety, the head of trauma care team of Khon Kaen hospital gained respect from other providers and paved the way to success.

Decreasing trends of inappropriate practices of basic procedures such as airway care and fracture immobilization suggested a continuous quality improvement of pre-hospital care

This improvement resulted from formal training of emergency medical technicians (EMT) and volunteers upon recruitment and on-the-job training using a simple checklist to assess practices against standard guidelines and provide immediate feedback to EMT and volunteers transferring trauma cases to the hos-

pital ED.

In parallel, the MOPH set up the Office for Emergency Medical Service System (OEMSS) in 1995 taking charged with dual roles: national EMS policy formulation/implementation, and local service provision in Bangkok. Under the first role, development of human resources for EMS was facilitated by centralized mechanisms for registration and financing in production and training.

There were 4 main categories of personnel included in the development: physicians (fully trained and partially trained in emergency medicine), nurses (4-month training and 1-week training), emergency medical technicians (2-year training and 110-hour training), and first responders (16-hour training). In 2003, OEMSS established "1669" as the national call number for EMS.

### **Initiatives of inclusive trauma care system**

With trauma registry in 1991, the trauma center of Khon Kaen hospital was guided by the evidence from trauma registry and trauma audit to achieve a decline in case-fatality rate of hospitalized trauma patients from 6.1%(Pre-registry) to 4.4%<sup>9</sup>.

This success was enabled through leadership (program development and team building), provision of non-financial incentives (opportunity to participate in technical forums aboard, recognition as an expert) and small performance-based financial incentives.

Financial and non-financial incentives were provided with the project supported by the WHO and Japan International Cooperation Agency (JICA)<sup>10</sup>. Overseas fundings were flexible in provision of the incentives. With appreciation of the team performance, JICA invested in new building and medical equipment for trauma care in 1993.

In addition to curative care, the trauma care included preventive services comprising health education, technical assistance to community programs, provincial and national policy advocacy. There was 41% reduction of head injuries after law enforcement and public education campaign promoting helmet use<sup>11</sup>. Making use of this successful case, the team succeeded in advocating for nationwide enforcement of helmet law through the Health Minister.

More importantly, trauma prevention activities led to the linkage between public and private agencies within and outside health sector, and helped solve major pre-hospital care problems such as hostile competition for compensation of transferring trauma patients among different providers.

## **Implications on scaling up EMS system**

### **Hospital-based trauma care**

After the 1997 economic crisis, an idea of establishing excellent centers for specific services was proposed in the MoPH. Through a series of dialogue and negotiation, there were 3 areas (trauma, cardiac, cancer) for capital and human resources investments.

During 2003-2007, trauma care excellent centers were established in 28 tertiary care hospitals: 19 were MOPH regional hospitals including Khon Kaen hospital. American College of Surgeons' models<sup>12</sup> were applied to set up 3 levels of trauma centers. The investment included medical equipment (427 million Baht/14.2 million US\$), health personnel training (115 million Baht/3.8 million US\$) and on-top payment (320 million Baht/10.6 million US\$) to doctors in charge of ED<sup>13</sup>. Lessons learnt from Khon Kaen initiatives were used as a key input for determining the investment choices.

It was expected that upgrading these tertiary care hospitals to excellent centers would improve quality of trauma care through referral networks of community hospitals, provincial hospitals and a tertiary hospital. Generally, provincial and district hospitals shared 80% of service load for in-patient trauma cases. During this period, there were approximately 500,000 in-patient trauma cases annually (ICD-10 codes: V01-Y98 and S00-T98)<sup>14</sup>.

Two sources of data with individual records were available for assessing patient outcomes. The first was trauma registry maintained by MOPH provincial and regional hospitals since 1995<sup>15</sup> (the number varied from 28-35 sites year by year). However, only data from 2002-2006 were available for the assessment, approximately 110,000 records/year. Another source was diagnosis-related-group (DRG) dataset for reimbursement of in-patient care for both private and public hospitals nationwide, available from 2004-2008, around 155,000 registered trauma cases annually. A report from trauma registry revealed a decline of case-fatality rate of in-patient trauma cases from 7% to 5% among excellent centers during 2002-2006. Meanwhile, the fluctuation of the figures between 4% and 5% was reported from provincial hospitals<sup>5</sup>. Another report using the DRG dataset documented a decline of age-sex adjusted case fatality rate from 3.4% to 1.7% during 2004-2008<sup>16</sup>.

### **Pre-hospital care**

In Thailand, most areas shared the common shortfalls in pre-hospital care system, i.e., fragmentation and less systematic approach in service delivery system.

Since accidents and emergency conditions were included in the benefit packages declared by the National Health Security Office, they began financing EMS from 2002<sup>16</sup>. Due to demand-supply mismatch, in 2004, NHSO launched a pilot project in 7 provinces to assess feasibility of applying the Khon Kaen initiatives in different provinces. Technical documents from Khon Kaen hospital were used as a key input for designing and implementing the project such as Guideline for Management of Traumatic Patient, Organizing Pre-hospital Care, and Practical Issues for Emergency Medical Technicians, etc.<sup>17</sup>

After finishing the project, NHSO decided to scale up pre-hospital care for the whole country by allocating 6 Baht (0.2 US\$) from per-capita budget in 2006 to cover operating cost, administrative cost, medical equipment and quality improvement activities such as personnel training, information system<sup>18</sup>.

Taking participatory decision-making at local level into account, local government at provincial and sub-district levels were involved in the scaling up process. Matching resources from NHSO and the local governments was considered an important approach. Local government contributed in logistic support (ambulances, telecommunication equipment) and recruitment of first responders. Medical equipment, first responder training, and operating cost of pre-hospital care were financed by NHSO. Up to 2009, 94,634 of the personnel were trained: 75% were first responders (Table 1)<sup>13</sup>.

**Table 1 Categories of EMS-trained personnel**

Categories	Number	Percent <sup>a</sup>
Physicians with full training	194	0.3
Physicians with partial training	1,102	1.6
Paramedic/Nurse	16,890	23.9
EMT with 2-year training	976	1.4
EMT with 110-hour training	4,910	5.2
First responders	70,562	74.6
Total	94,634	100.0
*rounded number		

Increasing trend in case load was observed<sup>19</sup>, however, this did not reflect in the proportion of in-patient trauma cases transported by MTS to hospital EDs of the excellent centers and other MOPH hospitals during 2002-2006. The inconsistency suggested inadequate triage and dispatching of MTS. Evidence from NHSO database for reimbursement of MTS also supported this notion, i.e., only 38% of all patients transported by MTS were admitted<sup>4</sup>.

Besides the efficiency issue, MTS coverage varied substantially across regions from 3,179 in the North-east region to 575 episodes/100,000 population, annually, in the South<sup>4</sup>(Table 2). This raised a concern about

equitable access and capacity of specific locality in MTS provision.

**Table 2 Number of patients transferred per 100,000 population by NHSO administrative regions**

NHSO administrative regions	year 2007	year 2008	
		OEMSS	Provider report
NE 1	2080	3111	3179
NE 2	2480	2443	2425
NE 3	1207	2340	1517
NE 4	1199	1112	1463
C1	961	978	994
C2	942	996	935
C3	641	783	776
N1	801	874	759
N2	673	894	722
C4	569	664	676
S1	571	645	650
S2	543	583	575
Bangkok	320	373	554

**Note:** NE = Northeast; C = Central; N = North; S = South

Recently, a survey of 12 hospital EDs of regional and provincial hospitals<sup>20</sup> revealed that 64% of 5,957 patients visited hospital EDs with non-traumatic conditions, whereas only 34% requiring trauma care. Interestingly, the chance of access to MTS differed between two groups: 13-15% in patients requiring surgeries were transferred by MTS, with only 4-10% for non-traumatic patients (table 3). This indicated a bias in organizing MTS towards traumatic cases. Given the availability of relevant knowledge, public outcry and noticeable presentation of trauma cases; such bias is understandable. How to balance the arrangement of EMS between trauma and non-trauma cases is still challenging.

**Table 3 Proportion of MTS-transported patients by departments**

Department	Total patients	number of patients transported by MTS	%
General Surgery	488	39	8
Trauma	1,388	204	14.7
Orthopedic	405	54	13.4
Medicine	2,585	220	8.5
Ob-Gyn	179	18	10.2
Pediatric	751	33	4.4
EEENT/Psychiatry	161	6	3.6
Total	5,957	574	9.64

### **Sustainable development mechanism for EMS:**

For sustainable EMS development, the authorities believed that a national institute must be established to facilitate and play roles in formulating the rules and regulations; technical know-how; financing mechanisms; information systems, service delivery models; governance; health personnel.

The September 2006 coup gave rise to a military-formed government with a former permanent secretary of MOPH appointed as the Health Minister. During his previous term as the permanent secretary, he established the OEMSS tasked with the aforementioned dual roles. Hence, his ministerial post was perceived as an opportunity to turn the belief into reality. A task force was formed to draft a bill leading to the establishment of the National Institute of Emergency Medical Services (NIEMS) in 2008.

NIEMS was designed to function as following: 1) issue operational standards and regulations; 2) provide policy recommendations to the Cabinet; 3) provide recommendations on operational solutions to the Cabinet; 4) issue regulations for approval of institutes and curriculum for health personnel training; 5) establish telecommunication and information systems; 6) coordinate EMS operation across agencies; and 7) monitor and evaluate the operation<sup>21</sup>.

Even though the bill was supported by the Health Minister, it had to compete with 40 other bills to get enacted within 17 months<sup>22</sup>. In order to mobilize public support of the bill, a series of public hearings and media advocacy had been organized. The legislative and advocacy processes were financially supported by the NHSO and Thai Health Foundation. HSRI and the OEMSS played a pivotal role in facilitating collaborations among key stakeholders involving in the processes.

It is notable that convergence of these enabling and reinforcing factors was not a coincidence but rather a result of long term achievement in health systems reform putting in place these institutional mechanisms and the proponents over the last 2 decades.

### **CONCLUSION**

From Razzak et al, the obstacles to developing effective EMS include a lack of structural models, inappropriate training foci, concerns about cost, and sustainability in the face of a high demand for services<sup>2</sup>. Thailand case study demonstrates how these obstacles had been addressed through a few initiatives with major emphasis on trauma care.

Method to overcome the obstacles constitutes ca-

capacity strengthening at three levels: individuals (health personnel training); institutions (OEMSS, local authorities, hospital networks); and macro or system factors (financing pre-hospital care, hospital ED, training for health personnel; establishing NIEMS; registration of the health personnel). The strengthening was possible by making use of knowledge generated at health care facilities.

Instead of heavily reliance on overseas funding support as occurred in low income countries, the financing reforms in Thai health systems enabled the EMS scaling up processes in terms of financial support for capital investment, operating budget, and development of supportive systems including health system research.

### **Conflict of interest**

No conflict of interest.

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### **REFERENCES**

- 1 Mortality Country Fact Sheet 2006. Available from : [http://www.who.int/whosis/mort/profiles/mort\\_searo\\_tha\\_thailand.pdf](http://www.who.int/whosis/mort/profiles/mort_searo_tha_thailand.pdf)
- 2 Junaid A. Razzak & Arthur L. Kellermann. Emergency medical care in developing countries: is it worthwhile? *Bulletin of the World Health Organization* 2002;80:900-905.
- 3 Bureau of Health Policy and Plan. Thailand Health Profile 2001-2004. Page 435-4 42. Available from: [http://www.moph.go.th/ops/health\\_48/index\\_eng.htm](http://www.moph.go.th/ops/health_48/index_eng.htm)
- 4 Bureau of Health Policy and Plan. Thailand Health Profile 2005-2006. Page 287.[In Thai]. Available from: [http://www.moph.go.th/ops/thp/index.php?option=com\\_content&task=view&id=6&Itemid=2](http://www.moph.go.th/ops/thp/index.php?option=com_content&task=view&id=6&Itemid=2)
- 5 The NHA 2006-2007 WORKING GROUP. Thai National Health Accounts: sustainable updates of 2006 and 2007 and diversification. Submitted to WHO-Thailand. 9 October 2009 Available from: <http://whothailand.healthrepository.org/browse?type=dateissued>
- 6 Bureau of Health Policy and Plan. Health care resources. (In Thai). Available from: <http://bps.ops.moph.go.th/index.php?mod=bps&doc=5>
- 7 Bureau of Health Policy and Plan. Thailand Health Profile 2005-2006. Page 168. Available from: [http://www.moph.go.th/ops/thp/index.php?option=com\\_content&task=view&id=6&Itemid=2](http://www.moph.go.th/ops/thp/index.php?option=com_content&task=view&id=6&Itemid=2)

- 8 Church AL, Plitponkarnpim A: Emergency medicine in Thailand. *Ann Emerg Med* July 1998;32:93-979 Chadbunchachai W, Suppachutikul A, Santikarn C. Development of service system for injury patients by utilizing data from the trauma registry. Khon Kaen, Office of Research and Text-book Project, Khon Kaen Hospital, 2002.
- 10 Japan International Cooperation Agency. <http://www.jica.go.jp>
- 11 Masao Ichikawa, Witaya Chadbunchachai, Eiji Marui. Effect of the helmet act for motorcyclists in Thailand. *Accid Anal Prev.* 2003 Mar ;35 (2):183-912 Greenwald HP, O' Keefe S, DiCamillo M. The importance of public sector health care in an underserved population. *Journal of Health and Human Services Administration.* 2004;27(1):142 – 157.
- 13 Chittinan P. A report on evaluation of excellent centers for trauma care under universal coverage health insurance. Submitted to the National Health Security Office. February 29,2008.
- 14 Bureau of Health Policy and Strategy. Health statistics. <http://bps.ops.moph.go.th/index.php?mod=bps & doc=5>
- 15 Santikan, C. 2000. Background on the Establishment of the Provincial Injury Surveillance. In *Injury Surveillance Report Thailand 1995–1998* (in Thai). Bangkok: Noncommunicable Disease Epidemiology Section, Epidemiology Division, Ministry of Public Health.
- 16 Suriyawongpaisal P. A report on preparedness of human resources for health in emergency medical services. Health System Research Institute. January 2010.
- 17 A list of technical papers, Khon Kaen Hospital. Available from : <http://khokaen.moph.go.th/trauma/book.htm>
- 18 Payment for performance: guideline. Available from: [http://budget51.nhso.go.th/File\\_Download.aspx](http://budget51.nhso.go.th/File_Download.aspx)
- 19 Knowsiri C. Management of medical transport services under universal coverage of health insurance. A presentation at Health Insurance System Research Office. Nonthaburi. 2008.
- 20 Suriyawongpaisal P, Srithumrongsawat S, Chadbunchachai W et al. A cross sectional survey of emergency departments in 12 regional and provincial hospitals. Submitted to the Health System Research Institute. February,2010.
- 21 Emergency Medicine Act B.E.2551 [www.ratchakitcha.soc.go.th/DATA/PDF/2551/A/044/1.PDF](http://www.ratchakitcha.soc.go.th/DATA/PDF/2551/A/044/1.PDF) [in Thai]
- 22 <http://www.oknation.net/blog/artpom/2007/11/27/entry-1> Access: Jan 3,2011.

# A Study on Evaluating the Quality of Health Education Given to Pregnant Women in a Tertiary care Hospital in Bangalore

T S Mahadeva Murthy<sup>1</sup>, Vaishali Gaikwad<sup>2</sup>, Suwarna Madhukumar<sup>3</sup>

<sup>1</sup> Associate Professor, Department of Community Medicine, MVJ Medical college Bangalore India, <sup>2</sup>Associate Professor, Department of Community Medicine, MVJ Medical college Bangalore India, <sup>3</sup>Associate Professor, Department of Community Medicine, MVJ Medical college Bangalore India.

## ABSTRACT

**Background:** Effective interpersonal communication (IPC) between health care provider and client is one of the most important elements for improving client satisfaction, compliance and health outcomes. The rational approach to health promotion is still an integral part of primary healthcare strategies.

**Objectives:** 1) To evaluate the health education given by doctors to the maternal group. 2) To recommend the measures for improving the quality of health education given to the patients.

**Methods:** The study was conducted in out-patient departments of MVJ Medical College and Research hospital in Bangalore. A total of 100 primigravidae women were selected randomly for the study. The participants were interviewed using a pretested questionnaire. The aspects covered were antenatal visits, diet, immunization, prophylactic treatment, mental preparation for pregnancy, physiology of labour, exclusive breast feeding, weaning and child care.

**Results:** Total 100 primigravidae were included in the study. Only 38 % of the pregnant women were informed adequately about the ANC visits. There were 48% of the women who were informed about the diet to be taken in pregnancy. However, 88% of the women were informed correctly about the iron and folic acid tablets and almost all the women were informed about the Tetanus toxoid. There were only 26% of the pregnant women who were instructed about the warning signs in pregnancy, 39% of the pregnant women were explained about the exclusive breast feeding and only 26% of the women who received family planning advice. None of the women were explained about the physiology of labour or antenatal exercises.

**Interpretation and conclusions:** Along with the clinical care quality, the quality of the health education given to the pregnant women should be improved.

**Keywords:** primigravidae, diet, family planning, health education.

## INTRODUCTION

Effective interpersonal communication (IPC) between health care provider and client is one of the most important elements for improving client satisfaction, compliance and health outcomes. Patients who understand the nature of their illness and its treatment show greater satisfaction with the care received and are more likely to comply with treatment regimes. Despite widespread acknowledgement of the importance of interpersonal communication, the subject is not always

emphasized in medical training.

Over the past 30 years substantial investments have been made to enhance access to basic health services in developing countries. However, there have been relatively few studies that investigate the quality of the services delivered, and fewer still that study the quality of interpersonal communication.<sup>1</sup>

Even when providers know what messages to communicate, they do not have the interpersonal skills to communicate them most effectively. They often do

not know how to communicate with their patients. Despite widespread acknowledgement of the critical importance of face-to-face communication between client and provider, there are few rigorous studies of health communication in developing countries.<sup>2</sup>

Evidence of positive health outcomes associated with effective communication from developed countries is strong. Patient satisfaction, recall of information, compliance with therapeutic regimens and appointment keeping, as well as improvements in physiological markers such as blood pressure and blood glucose levels and functional status measures have all been linked to provider-client communication.<sup>3</sup>

Most complaints by patients and the public about doctors deal with problems of communication not with clinical competency.<sup>4</sup>

The commonest complaint is that doctors do not listen to them. Patients want more and better information about their problem and the outcome, more openness about the side effects of treatment, relief of pain and emotional distress, and advice on what they can do for themselves.<sup>5</sup>

The rational approach to health promotion—that information given by health workers during clinic based or community based contacts will bring about a change in health behaviour—is still an integral part of primary healthcare strategies.<sup>6, 7</sup>

In practice, opportunities for one to one health education are given low priority by busy health workers. A survey of perinatal services across India reported that opportunities to give health education messages to mothers in the community were invariably missed.<sup>8</sup>

With increasing use of hospital maternity and immunisation services, especially in urban areas of the developing world, perinatal contact with mothers represents an opportunity for health education about infant care and family planning.<sup>9</sup>

Health education to the pregnant women and mothers is an important aspect. The women should be informed about the antenatal care which includes antenatal visits, immunization, diet, rest, child care, breast feeding, contraception and the physiology of labour.

## OBJECTIVES

- 1) To evaluate the health education given by doctors to the maternal group.
- 2) To recommend the measures for improving the quality of health education given to the patients.

## METHODOLOGY

The study was conducted in out-patient departments of MVJ Medical College and Research hospital in Bangalore. The study group was selected from the Antenatal care clinic. A total of 100 primigravida women were selected randomly for the study. The participants were interviewed using a pretested questionnaire after their consultation. The questionnaire included various questions to evaluate the quality of health education received. The aspects covered were antenatal visits, diet, immunization, prophylactic treatment, mental preparation for pregnancy, physiology of labour, exclusive breast feeding, weaning and child care.

## RESULTS

Total 100 primigravida women were included in the study. Only 38 % of the pregnant women were informed adequately about the ANC visits. The importance of the visits was not explained to the patients. Not a single person was explained the importance of blood and urine examinations carried out.

There were 48% of the women who were informed about the diet to be taken in pregnancy but 52 % women did not receive the diet advice. The diet information is very important in pregnancy because of the prevalent myths in our culture and the food taboos.

Only 13% of the women were informed about the rest to be taken in pregnancy.

However, 88% of the women were informed correctly about the iron and folic acid tablets and almost all the women were informed about the Tetanus toxoid.

There were only 26% of the pregnant women who were instructed about the warning signs in pregnancy. However, among this group, not all the signs were informed to them.

All the women had the apprehension and anxiety about the delivery. None of the women were explained about the physiology of labour.

Only 39% of the pregnant women were explained about the exclusive breast feeding. There were only 26% of the women who received family planning advice.

None of the women were informed about the antenatal exercises.

## DISCUSSION

The primary aim of antenatal care is to achieve at

the end of the pregnancy a healthy mother and a healthy baby. A major component of antenatal care is antenatal or prenatal advice. This time is very important as mother is receptive to the health education concerning herself and her baby at this time than at other times. However, in this study it was found that most of the mothers did not receive the essential advice. This study has again proved the poor patient-doctor communication. If women do not get the information, skills and support they need from health care clinicians, or if they are treated poorly when they get care, they may have difficulty protecting their reproductive health and may avoid seeking care when needed.<sup>10</sup>

Almost two-third of the pregnant women were not informed about antenatal visits. Only one fourth of the women received the information on danger signs in pregnancy and family planning. Almost half of the participants were not informed about the diet. Similarly in a study by Manju rani, Sekhar bonu and Steve Harvey, only 23% of the women in the North and 44% of women in the South India reported receiving information on danger signs during pregnancy and delivery care. Only 56.6% of the women in North India and 79.9% of the women in south India were informed about the diet, 23.6 % in North and 47.6 % in South were informed about the new-born care. Only 14.7 % in North and 43.3% in South India were educated about family planning.<sup>11</sup>

In this study, all the women were informed about antenatal tetanus toxoid. Similarly in the study by Manju rani, Sekhar bonu and Steve Harvey, 89.2% of the pregnant women in North and 95.1% in south India were aware of tetanus toxoid.<sup>11</sup>

In the study group, 89% were informed about the prophylactic iron and folic acid treatment. Similarly, in the study by Manju rani, Sekhar bonu and Steve Harvey, 60.2 % in North and 88.0 % in south were informed about the antenatal iron/folic acid Supplementation.<sup>11</sup>

Not a single woman was prepared mentally for the labour as physiology of labour was not explained to them. This is very important to relieve the anxiety. Among the study group, no one was informed about the antenatal exercise which has multiple benefits in maintaining the reproductive health of the mother.

### RECOMMENDATIONS

Antenatal care among pregnant women is one of the important factors in reducing maternal morbidity and mortality. The health education should be given in the hospitals in a group in a special room just before the antenatal consultation with the help of flip charts

or audio-visual aids. The antenatal exercises should be demonstrated to the women. Mother craft classes giving education about the nutrition, personal hygiene, new-born care, childrearing, family planning, family budgeting should be held before or after consultation. Nursing personnel with the help of medico social workers can be involved in imparting health education to the pregnant women. The health education material should be displayed in the out-patient department in local language.

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### REFERENCES

1. Roemer MI, Montoya-Aguilar C. Quality assessment and assurance in primary health care. Geneva: WHO Offset Publication, 1988.
2. Loevinsohn BP. Health Education Interventions in Developing Countries: A Methodological Review of Published Articles. *International Journal of Epidemiology* 1990 Dec; 19(4):788-794.
3. Hall J, Roter D, and Katz N. Correlates of provider behavior: a meta-analysis. *Medical Care*. 1988; 26:657-675.
4. Richards T. Chasms in communication. *BMJ*. 1990; 301:1407-1408.
5. Siegfried Meryn. Improving doctor-patient communication. *BMJ*. 1998 June 27; 316(7149): 1922-1930.
6. World Health Organisation. The Alma Ata declaration. Geneva: WHO; 1978.
7. World Bank. Investing in health. The world development report. Oxford: Oxford University Press; 1993.
8. Bhargava SK, Singh KK, Saxena BN, editors. A national collaborative study of identification of high risk families, mothers and outcome of their offspring's with particular reference to the problem of maternal nutrition, low birth weight, perinatal and infant morbidity and mortality in rural and urban slum communities. New Delhi: Indian Council of Medical Research; 1990.
9. Alison Bolam, Dharma S Manandhar, Purna Shrestha, Matthew Ellis, Anthony M de L Costello. The effects of postnatal health education for mothers on infant care and family planning practices in Nepal: a randomised controlled trial.



- BMJ. 1998 March 14; 316(7134): 805–811.
10. P.R. Rejoice and A.K. Ravishankar. Differentials in Maternal Health Care Service Utilization: Comparative Study between Tamilnadu and Karnataka .World Appl. Sci. J.2011; 14 (11): 1661-1669.
  11. Manju rani, Sekhar bonu and Steve Harvey. Differentials in the quality of antenatal care in India. International Journal for Quality in Health Care. 2008; 20(1): 62 –71.

# Health Seeking Behavior among Residents of Underprivileged Areas of Gangtok, Sikkim

Vidya Surwade<sup>1</sup>, Shruti Surwade<sup>2</sup>

<sup>1</sup>Assistant Professor, SIMS, Hapur, U.P. India <sup>2</sup>Junior Resident, Lok Nayak Hospital, New Delhi.

## ABSTRACT

According to census report, India's urban population is expected to rise to 182 million by 2026. The unprecedented growth in the population poses challenges for the government in providing basic services in urban areas. Rapid urbanization and tourism has resulted into growth of many congested and slum-like areas in different parts of Gangtok town.

**Objective:** To study health seeking behavior of residents of underprivileged areas of Gangtok.

**Methodology:** The present study was a descriptive study. A total of 136 households were included in the study, which were selected by stratified random sampling. The predesigned, field tested instruments were used for data collection. The information was obtained by conducting household survey, interviewing the eligible woman in the reproductive age group and / or head of the family.

**Results:** The total population from 136 houses was 608. average family size was 4.47. 18 % of the households had monthly income more than Rs. 5000/-For the management of common ailments, 28 per cent households used Government health facilities, where as 35.6% and 35.2 % services used were from chemist and local healers respectively. 81.6% of households used government facility for Obstetric & Gynecological reasons. Only 91.3% of females utilized health services during antenatal period. Maximum number of deliveries took place at government health facility (67.7 %). 50.8% of households informed that delivery was conducted by the government doctor. 84.1% of the households utilized government health facilities for family welfare services.

**Conclusion:** The government health services were maximally used for gynecological problems, health issues during pregnancy, for child birth, family welfare, neonatal and childhood illnesses. For management of common illnesses, private chemists and local healers played a significant role as a source of health advice. The utilization of health facilities in private sector was very low.

**Key words:** *Urbanization, Underprivileged area, health seeking behavior*

## INTRODUCTION

India's urban population has been increasing rapidly in recent decades along with rapid urbanization. It is estimated that 80.8 million persons in urban areas live below the poverty line.<sup>1</sup> The urban poor rarely benefit from the facilities in urban areas and are as deprived as those in the rural areas. According to the census report, the urban population in the country is expected to increase from 28 % (2001) to 33 percent by 2026. According to the population projections report, out of the total population increase of 371 million during 2001-2026 in the country, the share of increase in urban population is expected to be 182 million<sup>2,3</sup>. Recognizing the significance of urban health, the theme

for World Health Day 2010 was "Urbanization and Health".<sup>4</sup>

The unprecedented growth in population poses challenges for the city governments in providing basic services in urban areas. Existing health and basic services like drinking water, housing, electricity, drainage, sewerage etc, are difficult to access for most of urban poor populations living in slum or slum-like conditions. There are a number of factors which determine the access to basic services by urban poor. These range across lack of government priorities in urban health, inadequate public health infrastructure in urban areas, varying socio-economic, environment and infrastructural conditions among vulnerable and non-

vulnerable slums, increase usage of private health services by urban poor, and lack of social security mechanisms. Around 21 % of the total urban populations live in slums (National Commission of Population, 2000), but many of slum populations also comprise of squatter populations, migrant colonies, pavement dwellers, families on construction sites, street. According to UN an Underprivileged area is “run-down areas of the city characterized by sub-standard housing and squalor and lacking in tenure security”<sup>5</sup>.

Rapid urbanization and tourism has resulted into growth of many congested and slum-like areas in different parts of Gangtok town<sup>6</sup>. According to a report of Planning Commission, rapid increase in urban population is putting greater strain on the urban infrastructure which is already overstretched <sup>11</sup> Since the urban areas do not have primary healthcare structure like in rural areas, there is a possibility that many vulnerable groups are left out of primary healthcare and family welfare services.

The present study was undertaken to explore and understand the health seeking behavior of residents of slum like areas of urban areas of Gangtok.

**OBJECTIVE**

To study health seeking behavior of residents of underprivileged areas of Gangtok.

**METHODOLOGY**

The present study was a descriptive study and was conducted in November-December 2009. Identification of 12 slum like areas was done by scanning the entire city of Gangtok. These areas were identified on the basis of being run-down areas of the city characterized by sub-standard housing, congestion which had slum-like pockets of population. With 95 % confidence level and confidence interval of 8, a total of 136 households were included in the study, which were selected by stratified random sampling.

The instruments used for data collection were formulated and finalized after field testing prior to conduction of the study. The information was obtained by conducting household survey, interviewing the eligible woman in the reproductive age group and / or head of the family. The data regarding health seeking behavior was recorded for the sickness which occurred in the previous two weeks. The data was analyzed using statistical methods namely measures of central tendency and frequency distribution.

**RESULTS**

**A) DEMOGRAPHIC PROFILE OF STUDY POPULATION**

The total population of underprivileged areas was 30,450 with 6095 total households, of which 608 population was covered under the survey from 136 households. There were 307 males as against 301 female population.

**Table 1 Demographic Profile**

Total Population Of Underprivileged areas	30,450
Total no of households in Underprivileged areas	6095
Total no of households Surveyed	136
Total Population Surveyed	608
Total No. of males	307
Total no. of females	301
Average persons per family	4.47

**B) SOCIO-ECONOMIC STATUS**

**a. Educational status**

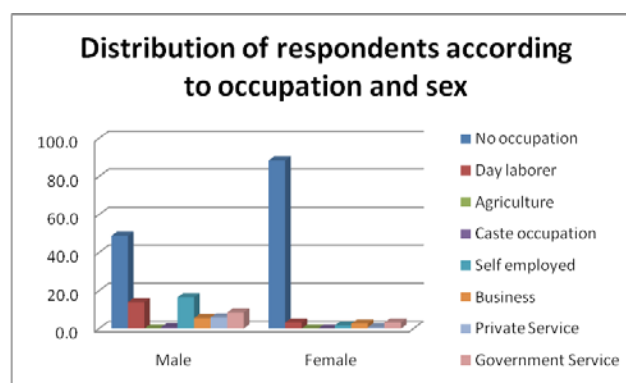
Only 11 % of the population had educational qualification of matriculation and above. Majority of the people (36.35 were illiterate.

**Table 2 Distribution of population according to sex and education**

Education	Male(%)	Female(%)
Illiterate	105(34.20)	128(42.52)
Up to 5th class	92(29.9)	81(26.91)
6th to 10th class	87(28.33)	77(25.58)
>class 10	53(17.26)	15(4.98)
Total	307(100)	301(100)

**b. Occupational Status**

Graph 1

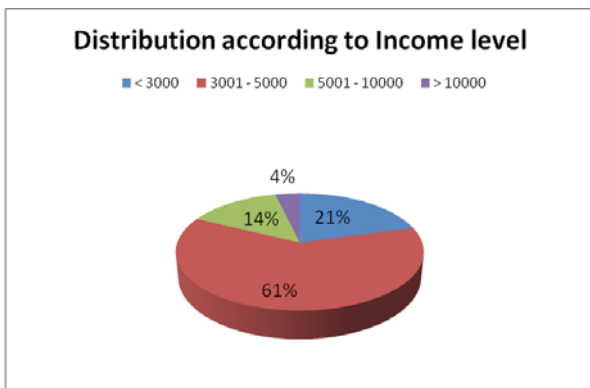


- i. Unemployment is more common among women as compared to men
- ii. The main occupations for both male and females

- are either self employed or day laborer.
- iii. Small proportion of both in male and female doing the business.
- iv. Caste occupation is rare among the urban population.
- v. Very insignificant proportion of urban population studied is engaged in agriculture.

**C. ECONOMIC STATUS**

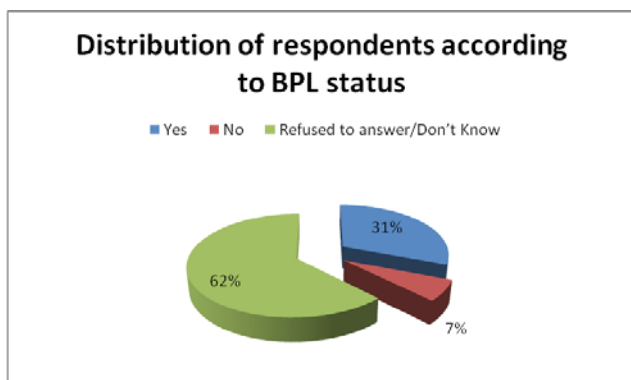
Graph 2



- a. Only 18% of all the households had income of more than Rs.5,000/- per month
- b. Only 4.0 % of households had income of more than Rs.10,000/- per month
- c. 61% of the urban poor population has income Rs. 3000 to Rs. 5000 per month.

**d. BPL Status**

Graph 3



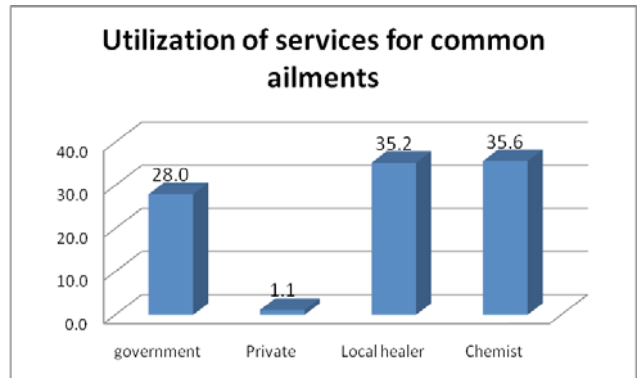
- i. 31% all the urban poor households were under BPL category. Only 7% of household respondents were aware that they are not in BPL category
- i. More that 62% of the respondents didn't know whether they have BPL or not.

**C) HEALTH SEEKING BEHAVIOR**

The health seeking behavior of the population was studied in the context of management of common ailments, issues related to gynecology, obstetrics, family welfare, and childhood illnesses.

**C. 1 For Common Ailments**

Graph 4



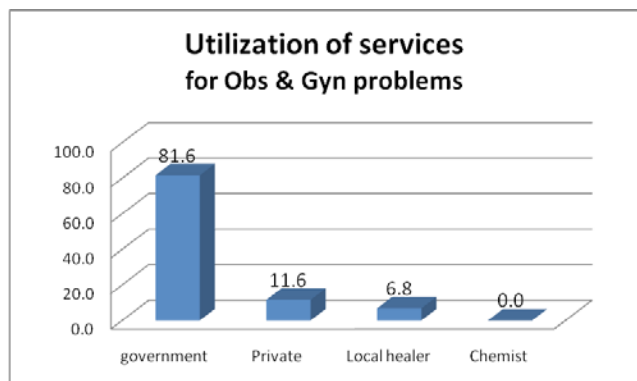
- a. 28.0% of the households used Government health facilities for common ailments. 35.2% of the households used local healing practices whereas private facility were used by 1.1% households and 35.6% households preferred chemist for management of common ailments.
- b. The use of chemist is highest for common ailments amongst the urban poor.

**C. 2 FOR OBSTETRICS, GYNECOLOGICAL, FAMILY WELFARE**

**C.2.1 Obstetric, Gynecological services**

- a. 81.6% of households used government facility for Obstetric & Gynecological reasons while 11.6% and 6.8% used private health facilities and local healer respectively.

Graph 5



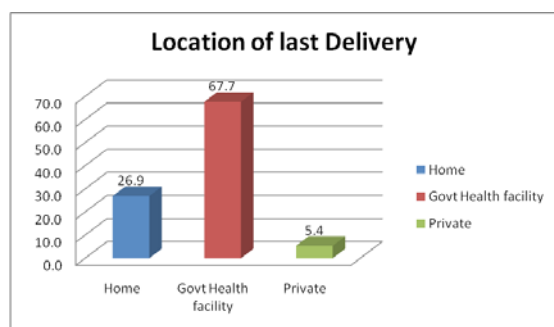
- b. None used chemist's services for management of Obstetric & Gynecological problems.

**C. 2.2 Ante Natal Care**

Only 91.3% of females utilized health services during antenatal period. The percentage break up was 70.3 %, 14.7, 4.2 %, 2.1 % respectively for Government health services, Private Service providers, chemist and local healers.

**C. 2.3 Place of delivery**

**Graph 6**



- a. Maximum number of deliveries took place at government health facility (67.7%) followed by home deliveries (26.9%), and delivery at private hospital/institute (5.4%)
- b. This signifies that the government facilities are the main source of services related to delivery.

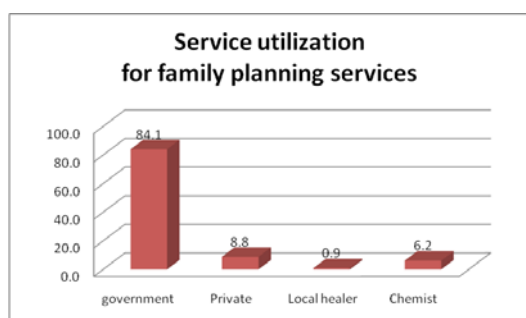
**C. 2.4 Assistance during delivery**

- a. 50.8% of households informed that delivery was conducted by the government doctor
- b. Family members conducted deliveries in about one fourth of the households (26.1%).
- c. 22.3% of deliveries were conducted by ANM/LHV
- d. TBA/Dai conducted deliveries in very small proportion of households (0.8%)

**C.2.5 Family Welfare Services**

- a. 84.1% of the households utilized government health facilities for family welfare services.

**Graph 7**

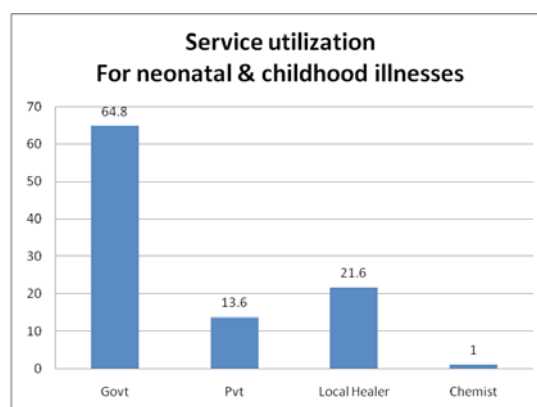


- b. 8.8%, 0.9% and 6.2% of households use services of private practitioners, local healers and chemists respectively.

- c. Chemists provide family planning services to significant proportion (6.2%) of households

**C. 3 Neonatal and Childhood Illnesses**

**Graph 8**



- a. 64.8% households sought government health services for management of Neonatal and childhood illnesses.
- b. 13.6%, 21.6%, 0.5% households used private, other healing practices, chemist respectively for the same purpose.

**DISCUSSION**

In the present study, 50.1 per cent of the population was male as against 49.5 % female population. As far as literacy status was concerned, the illiteracy among males was 105 (34.2 %) as compared to 128 (42.52%) among females. In a study carried out by Goswami Mihir et al<sup>7</sup> regarding socio-demographic and morbidity profile of slum like area in Ahmedabad, the observed difference between literate and illiterate was statistically significant. In another study carried out by Marimuthu P et al at Delhi slums<sup>8</sup>, however found higher literacy rate (73.8 % for males and 49.5 % for females.) A study in year 2006 by Vishwanathan V et al<sup>9</sup> had reported 51.8 % and 26.1 % literacy rate among males and females respectively at slums in Chennai.

According to a study by Abdullahel Hadi et al in Afghanistan<sup>10</sup>, the use of services among working women was higher than among non-working women, especially better educated women living in urban areas. The inequality in the use of antenatal care persists due to lack of access to health services which can be reduced by expanding outreach health facilities in the remote communities.

It was observed that in the present study, the government health services were major source for management of gynecological problems (81.6%), management during pregnancy (70.3%) child birth (67.7 %), for family welfare advice (84.1%), and management of neonatal and childhood illnesses (64.8%), where as a significant proportion of private chemists (35.6%), local healers (35.2%) constituted the source of advice for health for common ailments as compared to private doctor (1.1%). Almost one forth (26.1 %) deliveries were conducted by the family members, which indicates that more efforts are needed for promotion of institutional deliveries.

When the findings of the present study were compared with another study of urban population carried out by Puvar Tapasvi et al at Ahmedabad,<sup>11</sup> it was found that all deliveries were conducted in the hospital and the community depended heavily upon the private practitioner for the management of common ailments was private sector (87%).

In the present study, the utilization of health facilities in private sector was very low. It might be due to low paying capacity.

Due to rapid urbanization and tourism there has been a growth of pockets of population in Gangtok city. In many respects urban slums in Gangtok are different from those in other cities of India. Due to hilly terrain and abundant availability of water and electricity, these pockets of population relatively are better off. The state of Sikkim has adopted many welfare policies and the achievements in health sector are impressive. However the missing links do exist due to rapid urbanization and availability of primary healthcare services, pediatricians for management of neonatal and childhood illnesses, is still an issue.

There are a number of factors which determine access to and utilization of healthcare services / welfare schemes by urban population residing in slum like areas such as official recognition, quality, affordability of services, possession of BPL cards etc. Though the Department of Healthcare, Human Services and Family Welfare of the state provided planned preventive services through mobile clinic reaching out to these slum-like pockets, utilization is still an issue. Overall availability of healthcare services is limited. Apical institution of Gangtok namely STNM Hospital, therefore, becomes the major source of services. The health facilities in private sector are also very few. This may be due to low paying capacity and /or smaller number of the urban population. The inequality in the use of health services can be reduced by expanding outreach health facilities. The National Urban Health Mission<sup>12</sup> will meet health needs of the urban poor, particularly

the slum dwellers by making available to them essential primary health care services. This will be done by investing in high-caliber health professionals, appropriate technology through Public Private Partnership, and health insurance for urban poor. Even if people seek treatment when they are sick, the effectiveness of treatment depends in part on provider quality and individual compliance with the recommended therapies. World Development Report (2004)<sup>13</sup>, in its "Making services work for poor" has offered framework for analysis for learning from success and understanding the sources of failure.

Recognizing the seriousness of the problem, urban health will be taken up as a thrust area for the Eleventh Five Year Plan.

## CONCLUSION

There were slum like congested pockets of population in Gangtok city where urban poor live in sub standard conditions. Unemployment among urban slum like population was common and most of women were unemployed. The access to healthcare services for the urban poor was difficult for various reasons including distance of source of service, difficult terrain. The government health services were maximally used for gynecological problems, health issues during pregnancy, for child birth, family welfare, neonatal and childhood illnesses. For management of common illnesses, private chemists and local healers played a significant role as a source of health advice. The utilization of health facilities in private sector was very low. This may be due to low paying capacity and smaller number of the urban poor.

## REFERENCES

1. A report by Ministry of Health and Family welfare Urban Health division. "Health of Urban Poor in India: Key results from national Family Health Survey 2005-06" <http://www.uhrc.in/downloads/wall-chart.pdf>
2. Census of India 2001- ' Population Projections for India and States 2001-2026' <http://www.censusindia.gov.in/>
3. John D et al (2008). 'National Urban Health Mission: An analysis of strategies and mechanisms for improving services for urban poor'. Background paper for National Workshop on Urban Health and Poverty, 2-3 July 2008, New Delhi; organized by Ministry of Housing and Urban Poverty Alleviation, Government of India <http://www.who.int/world-health-day/en/>
4. <http://en.wikipedia.org/wiki/Slum>
5. State Socio-economic Census (2006), Department of Economics, Statistics, Monitoring and Evalu-

- ation, Government of Sikkim.
7. Goswami Mihir, Kedia Geeta (2010), Socio-demographic and morbidity profile of slum like area in Ahmedabad. *National Journal of Community Medicine*. Vol 1, No 2, pp. 106-110
  8. Marimuhu P, Meitei M H, Sharma B. General morbidity prevalence in Delhi Slums. *Indian Journal of Community Medicine* 2009; 34:338-42
  9. Viswanathan V. Tharkar S. Can the divide be bridged: Overview of life in urban slums in India. *Indian Journal of Community Medicine* 2010;35:198-99
  10. Abdullahel Hadi, M. Naeem Mujaddidi, Taufiqur Rahman and Jalaluddin Ahmed. *Asia-Pacific Population Journal*, April 2007, 31-36.
  11. Puwar Tapasvi I., Kumpavat Bhavna, Trivedi Kartik N. Pattern Of Morbidity And Health Seeking Behavior In A Slum Area Of Ahmedabad City in India *The Internet Journal of Health* ISSN: 1528-8315.  
<http://www.ispub.com/journal/the-internet-journal-of-health/volume-9-number-2/pattern-of-morbidity-and-health-seeking-behavior-in-a-slum-area-of-ahmedabad-city-in-india.html>
  12. MOHFW (2008), Draft Urban Health Mission, Urban Health Division, Government of India
  13. World Bank (2004), World Development Report 2004: Making Services Work for Poor People, The World Bank, Washington, DC

# Health Promotion Across the World: Challenges and Future

**Vinayak Kumar Nahar**

*M.D., Masters in Health Promotion, The University of Mississippi*

## ABSTRACT

Development of health promotion is rapid and tangible in the more economically developed countries (U.S., Canada, U.K., Australia etc), whereas the progress of health promotion towards establishing it in less economically developed countries has been slow. In the future, health promotion will be long term and even though government and international organizations are spending millions of dollars, health promotion continues to be surrounded by many challenges. Health promotion hospital (HPH) needs to link organizational health promoting activities with continuous quality improvement programs. So far we have little knowledge that a HPH is better than a non-HPH. Also, only limited resources have been used to strengthen health promotion, so there is no reason to believe that it has a detrimental effect on hospital activities by reallocating resources from the core functions of the hospital. Future work is required to be carried out in developing indicators and a self-assessment tool for standards in health promotion in order to strengthen the systematic planning, implementation and evaluation of health promotion in hospitals.

**Keywords:** *Health promotion and health promotion hospitals.*

## INTRODUCTION

Health is a basic human necessity. The World Health Organization (WHO), which leads global initiatives to improve health, defines health as a state of physical, mental, and social well-being not merely the absence of disease or infirmity<sup>1</sup>. Also, it is fundamental to successful functioning of individuals and of societies. The main determinants of health are people's behavior choices, such as their values, beliefs, attitudes and motivation about behavior<sup>2</sup>.

So now that health is defined, what exactly is health promotion? Health promotion concerns helping to improve people's health by gaining control over the factors that influence health. Health promotion is also a study of how social policy (government laws and rules) and community structures (such as families, churches, and schools) can be changed or used to support positive health<sup>3</sup>.

For many years, the health care professionals were promoting health and encouraging positive health behaviors through health education. For example, giving people the correct information and educating them how to eat right, get some exercise, see the doctor when feeling ill, and in some instances quit smoking or drink less. Currently, health promotion still relies on providing health education<sup>4</sup>. Additionally, health promotion has advanced well beyond disease, disability or injury prevention to help people change their

lifestyle to move towards a state of optimal health<sup>5</sup>.

The purpose of this manuscript is to focus on challenges faced by health promotion as a discipline. Moreover, this paper portrays the current status of health promotion across the world. Additionally, this paper provides the information about the future needs required to overcome the challenges in practicing health promotion in order to establish health promotion worldwide more effectively.

## Health Promotion in Developed Countries

The WHO, in collaboration with other organizations, has subsequently co-sponsored international conferences on health promotion. In addition, WHO has regional offices such as Pan American Health Organization (PAHO). PAHO, an international and multinational organization, is influential in health promotion around the world. Moreover, PAHO promotes primary health care strategies to people in their communities to extend health services to all and to increase efficiency in the use of scarce resources<sup>6</sup>. PAHO also assists the other countries in fighting epidemic diseases that have re-emerged, such as cholera, dengue and tuberculosis, as well as, help in prevention of new diseases such as AIDS<sup>7</sup>.

The Centers for Disease Control and Prevention (CDC) is one of the U.S. government organizations concerned with health promotion. The mission of CDC



is to prevent diseases, improve health and enhance human potential through evidence based interventions and research in maternal and child health, chronic disease and hereditary disorders. The United States Army Center for Health Promotion and Preventive Medicine is another example of a U.S. government agency which provides worldwide technical support for implementing preventive medicine, public health, and health promotion/wellness services into all aspects of America's Army and the Army Community<sup>8</sup>.

There are some non-governmental organizations in the U.S. associated with health promotion. The Public Health Education and Health Promotion Section is an active component of the American Public Health Association, Wellness Council of America (WELCOVA) and Utilization Review Accreditation Commission (URAC).

In the year 1986, the first international conference on health promotion took place in Ottawa. It was the most important achievement, which resulted in the Ottawa charter for health promotion. Ottawa Charter health promotion includes five dimensions health promotion action as building healthy public policy, creating supportive environments, strengthening community actions aimed at improving health, developing personal skills, reorienting health services (i.e., beyond its responsibility for providing clinical and curative services), and moving into the future<sup>3</sup>.

The Royal Society for the Promotion of United Kingdom merged with the Royal Institute of Public Health (RIPH) in 2008 to form the Royal Society for Public Health<sup>9</sup>. The Australian Health Promotion Association (AHPA) was incorporated in 1988<sup>10</sup>. The Victorian Health Promotion Foundation (VicHealth) from the state of Victoria is the world's first health promotion foundation to be funded by a tax on tobacco<sup>11</sup>.

In the last few years, some European countries (e.g. Switzerland, Austria, and Estonia) have been setting up Health promotion Foundations. These foundations provide funding for organizations and NGOs to develop programs of health promotion that addressed specific issues related to lifestyle and behavioral factors. These programs provide valuable contributions to climate building and dissemination of health promotion thinking<sup>12</sup>.

Despite rapid achievement of health promotion as an approach to health development, developing countries are facing several challenges to establish health promotion as a discipline. First, health promotion as a discipline is relatively new concept. Therefore, its theoretical bases and implementation strategies are not

well understood by most planners and policy makers in the health sector. Such misunderstandings reduce the level of support and funding for the discipline. Secondly, it takes relatively long time to realize the impact of interventions. Hence, it is not easy to convince planners and community leaders to divert resources. Another problem concerns confusing promotion with prevention<sup>13</sup>. Many health promoters in Poland are still focused on risk factors, creating disease prevention rather than promoting health<sup>14</sup>.

However, Development of health promotion is rapid and tangible in the more economically developed countries (U.S., Canada, U.K., Australia etc), but the progress of health promotion towards establishing it in less economically developed countries has been slow.

### **Health promotion in developing countries**

In the developing countries the entry of the health promotion discipline is viewed as a competition for more established discipline because of number of factors. First, health promotion deals with resource allocation, legislation, policy, information and advocacy, all of these are very potent in terms of health development politics. Secondly, health promotion deals with the individuals, groups and communities more directly than most other health discipline. Because of this threat to other established discipline, health promotion practitioners have to struggle with the situation where they receive less support and meager resources for their program from government authorities<sup>15</sup>.

The status of health promotion is very low in most African countries. Only few African countries have developed a health promotion policy. Even in South Africa, which has most advanced health promotion programs, has had its health promotion policy in draft form for over 10 years. Also, infrastructure to support health promotion is weak and there is limited participation of community in the health promotion programs<sup>15</sup>.

Reasons behind poor progress in the growth of health promotion in Africa are: lack of awareness of relationship between health and its social determinants and the evidence of effectiveness of health promotion action, lack of advocacy for health as a strategy for health promotion within the health sector and insufficient indicators to measure the effectiveness of health promotion programs<sup>16</sup>.

In Indonesia, there is no significant difference between health education and health promotion and perceived that what we have been doing is health education, practically we can say that we are doing health promotion as well. Also, there is lack of a

sizeable pool of professional practitioners in the field of health promotion. Ordinary people usually participate only passively in the health promotion process<sup>17</sup>. As we move towards the upcoming years what needs to be accomplished is, an establishment for alliances and networks between developed and developing countries in the health promotion arena. Also, professionalization of health promotion practice is required to a point where its practitioners can interact, compete and collaborate with other professionals on equal footing. Moreover, there is a need for advocacy in support of health promotion at all levels to gain political support, policy change and infrastructure improvement<sup>13</sup>.

### **Health promoting hospitals (HPH)**

Hospitals play an important role in promoting health through the provision of health education, prevention, treatment and rehabilitation services of high quality<sup>18</sup>. However, in the past few years due to increase in the prevalence of lifestyle-related chronic diseases, there is a requirement in the hospitals to introduce more expanded scope and systematic provision of activities such as therapeutic education, effective communication strategies to enable patients to take an active role in chronic disease-management or motivational counseling<sup>19</sup>. Therefore, standards for health promotion in hospitals are necessary to ensure the quality of services provided in this area. Health promoting hospitals are those that are engaged to improve its health gain by systematically, continually and comprehensively applying health promotion core strategies and policies<sup>1</sup>.

HPH does several things at the same time. It uses episodes of acute injury or illness as an opportunity to promote health through providing and organizing rehabilitation. Also, it encourages, liaises with, and empowers clients to make better use of primary health care services. Lastly, and most importantly, it acts as an agent for health development of the whole community, through networking with local health-related services to build alliances for continuous care and health promotion<sup>20</sup>.

### **Health Promoting Hospitals across the world**

The International Network of Health Promoting Hospitals (HPH) was initiated with the aim to reorient health care institutions to integrate health promotion and education, disease prevention and rehabilitation services in curative care. In many member countries the number of hospitals and countries joining The International Network of Health Promoting Hospitals has increased gradually over time<sup>21</sup>.

HPH member hospitals currently exist in Austra-

lia, Austria, Belgium, Brazil, Bulgaria, Canada, Czech Republic, Denmark, England, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Japan, Latvia, Lithuania, Northern Ireland, Norway, Poland, Russian Federation, Scotland, Serbia, Singapore, Slovakia, Spain, Sweden, Switzerland, Taiwan and USA<sup>22</sup>.

Research shows that many hospitals have introduced selected health promotion activities. However, the process of extending and incorporating these activities at a broader level has been slow<sup>23</sup>. One of the main reasons explaining this is few physicians offer health promotion programs to their patients in an ongoing, formalized, and systematic way because of limited time to deliver all recommended preventive services to patients<sup>24</sup>. The WHO refers to the fact that most health professionals in the hospital settings do not readily associate health promotion as a valid part of their role or function. Weil and Harmata suggest that because of hospitals need to focus on fiscal management issues, too many hospitals have set aside their mission to promote and protect the health of surrounding communities. Moreover, the main shortcoming is still there are not enough evidence to support systematic implementation and quality assurance of health promotion activities in hospitals<sup>25</sup>.

If we look at the development of health promotion by decades we see some remarkable events. In 1970, we were successful in tackling preventable diseases and risk behavior. We could call this the first achievement in the field of health promotion. Then in the 1980s we focused on the importance of health promotion intervention approaches (e.g. Ottawa Charter for Health Promotion). In the 1990s, we introduced the importance of health promoting hospitals (e.g. Budapest Declaration on Health Promoting Hospitals, Vienna Recommendations on Health Promoting Hospitals) and also we learned the value of reaching people through the settings and sectors where they live and meet (e.g. schools, healthcare settings and workplaces). Now in the 2000s, across the world there are government health promotion strategies and reviews, statutory authorities and foundations, consumer interest groups, professional associations and journals. In addition to this, there are universities and colleges offering masters and bachelor degrees in health promotion which is a great achievement in itself. Millions of dollars are now increasingly being invested in health promotion programs by governments and international organizations, including the World Bank, as well as through voluntary contributions from people themselves<sup>26</sup>.

In the future, health promotion will be long term and even though government and international organizations are spending millions of dollars, health promotion continues to be surrounded by many chal-

lenges. One of the major future challenges is to create high level of professionalism among health promoters because most of the health promoters throughout the world are from another discipline which somewhat had narrow knowledge and training of health promotion. Also, modern health promoters need to acquire knowledge and training such as organizational skills, networking, advocacy, and activism.

HPH needs to link organizational health promoting activities with continuous quality improvement programs. So far we have little knowledge that a HPH is better than a non-HPH. Also, only limited resources have been used to strengthen health promotion, so there is no reason to believe that it has a detrimental effect on hospital activities by reallocating resources from the core functions of the hospital. Future work is required to be carried out in developing indicators and a self-assessment tool for standards in health promotion in order to strengthen the systematic planning, implementation and evaluation of health promotion in hospitals. Developed and developing countries must cooperate to ensure that the discipline of health promotion is well established in order to promote conditions supportive of health improvement.

Additionally, there is an uncertainty about health promotion among different settings (e.g. government agencies, health care organizations, community health maintenance organizations, businesses) and in the future there are some questions that need to be answered. For example, how do we run health promotion effectively together with the health care industry and the environment movements that are now so dominant in our society? Is health promotion a worth investment? Do managers, commissioners and leaders understand and support health promotion? How could we make health promotion be recognized as a distinct discipline, and where we should spend our efforts?

## REFERENCES

- World Health Organisation (1986b). *First International Conference on Health Promotion*. Ottawa Charter, Canada. WHO, Geneva.
- Breslow L. (1999). From disease prevention to health promotion. *The Journal of the American Medical Association*, 281(11), 1030-3.
- The Ottawa Charter for Health Promotion (1986). First International Conference on Health Promotion, Ottawa. Accessed 2012 May 4.
- Antwi, K. B. (2008). Stakeholders Perception of Current Health Education Situation under Ghana's Health Service. *West African Journal of Applied Ecology*, 13, 83-95.
- Speers, M. (1996) Encouraging trends in health promotion in the United States. *Health Promotion International*, 11, 69-71.
- Kickbusch, I. S. (2001) Health literacy: addressing the health and education divide. *Health Promotion International*, 16, 289-297.
- IUHPE (1995). *Bringing Health to Life. Abstracts of the XV World Conference of the International Union of Health Promotion and Education, Makuhari, Japan*. IUHPE, Paris.
- Centers for Disease Control and Prevention. About CDC's Coordinating Center for Health Promotion. Accessed 2012 May 4.
- Health Promotion Agency for Northern Ireland. What is the HPA? Accessed 2012 May 4
- Australian Health Promotion Association. Providing knowledge, resources and perspective. Accessed 2012 May 4.
- Victorian Health Promotion Foundation. VicHealth history: major events and milestones. Accessed 2012 May 4.
- Ziglio, E., Hagard, S., & Griffiths, J. (2000) Health promotion development in Europe: achievements and challenges. *Health Promotion International*, 15, 143-153.
- Nyamwaya, D. (1996). Impediments to health promotion in developing countries: the way forward. *Health Promotion International*, 11(3), 175-176.
- Tobiasz-Adamczyk, B., Brzyska, M., Woźniak, B., & Kopacz, M.S. (2009). The current state and challenges for the future of health promotion in Polish older people. *International Journal Public Health*, 54, 341- 348.
- Nyamwaya, D. (2003). Health promotion in Africa: Strategies, players, challenges, and prospects. *Health Promotion International*, 18(2), 85-87.
- Sanders, D., Stern, R., Struthers, P., Ngulube, T. J., & Onya, H. (2008) What is needed for health promotion in Africa: band-aid, live aid or real change? *Critical Public Health*, 18(4), 509 - 519.
- Phongphit, S., Galbally, R., Hsu-Hage, B. H. H., Moodie, R., & Borthwick, C. (2000). Health promotion in South-East Asia: Indonesia, DPR Korea, Thailand, the Maldives and Myanmar, *Health Promotion International*, 5 (3), 249-257.
- Mckee, M. & Healy, J. eds (2001) *Hospitals in a changing Europe*. Oxford, Open University Press.
- Johnson, A. & Baum, F. (2001). Health promotion hospitals: a typology of different organizational approaches to health promotion. *Health Promotion International*, 16, 281-287.
- Pelikan, J., Lobnig, H., & Krajic, K. (1997) Health-promoting hospitals. *World Health* 3, 24-25.
- Groene, O. & Jorgensen, S. J (2005). Health promotion in hospitals: a strategy to improve quality in health care. *European Journal of Public Health*, 15, 6-8.

22. 18th International Conference on Health Promoting Hospitals & Health Services (2010). Accessed 2012 May 4.
23. Green, L.W., O'Neill, M., Westphal, M., & Morisky, D. (1996). The challenges of participatory action research for health promotion. *Promotion and Education*, 3, 3–5.
24. Whitehead, D. (2005). Health promoting hospitals: the role and function of nursing. *Journal of clinical nursing*, 14, 20–27.
25. Weil, P., & Harmata, R. (2002). Rekindling the flame: routine practices that promote hospital community leadership. *Journal of Healthcare Management*, 47, 98–109.
26. Catford, J. & Leger, S. L. (1996). Moving into the next decade—and a new dimension? *Health Promotion international*, 11(1).

# Incidence and Microbial Profile of Chronic Suppurative Otitis Media at Gulbarga, Karnataka

VinodKumar C.S<sup>1</sup>., Yuvaraj B.Y<sup>2</sup>., Bushara<sup>3</sup>, Vandana Rathod<sup>4</sup>, Shameem Sulatana<sup>5</sup>, Praveen D.S<sup>6</sup>., Suneeta Kalsurmath<sup>7</sup>

<sup>1</sup>Assistant professor, Department of Microbiology, S.S. Institute of Medical Sciences and Research Centre, Davangere,

<sup>2</sup>Assistant professor, Department of Community Medicine, S.S. Institute of Medical Sciences and Research Centre, Davangere, <sup>3</sup>Research Scholar, Department of Microbiology, Gulbarga University, Gulbarga, <sup>4</sup>Reader, Department of Microbiology, Gulbarga University, Gulbarga <sup>5</sup>Lecturer, Department of Microbiology, K.B.N. Institute of Medical Sciences and Research Centre, Gulbarga, <sup>6</sup>Associate professor, Department of ENT, S.S. Institute of Medical Sciences and Research Centre, Davangere, <sup>7</sup>Assistant professor, Department of Physiology, S.S. Institute of Medical Sciences and Research Centre, Davangere.

**Objective** Chronic suppurative otitis media (CSOM) is a prevailing and notorious infection in developing countries causing serious local damage and threatening complications. Early and effective treatment based on the knowledge of causing micro organisms and their sensitivity results in good clinical recovery and prevents from damage and complications.

The study intended to identify the incidence of bacterial infection in the CSOM and to determine their sensitivity to current antibiotics.

**Methods** After clinical evaluation, middle ear secretion was taken for bacteriological examination from 250 patients meeting the inclusion criteria. All children with cholesteatoma and those with tumors occluding the (ear) canal were excluded. The samples were processed as per the standard microbiological techniques

**Results** A total of 272 bacterial agents were isolated from 250 patients aged between 8 months and 65 years. 220 samples yielded pure growth and 22 were mixed, *Pseudomonas aeruginosa* (39.7%) was the commonest isolate followed by *Klebsiella pneumoniae* and *Staphylococcus aureus*. Among anaerobic bacteria, *Bacteroides* was the predominate bacteria isolated. Most of the isolates were resistant to commonly used antibiotics. ESBL evaluation revealed that 20.4 % of gram negative bacteria were extended beta lactamase producers. 63.4% of *Pseudomonas aeruginosa*, 20.3% of *Klebsiella pneumoniae* were the predominate organisms resistant to 3 GC

**Conclusion** *Pseudomonas aeruginosa* was the most common bacteria isolated from chronic discharging ears followed by *Klebsiella pneumoniae*. Amikacin was found to be the most suitable drug followed by ceftazidime for *Pseudomonas aeruginosa*. The high rate of multiple drug resistance for frequently used antibiotics raises serious concern.

**Keywords:** Chronic suppurative otitis media, Drug resistance

## INTRODUCTION

Chronic Supportive otitis media (CSOM) is a long standing purulent infection of middle ear cleft, presenting as purulent ear discharge which may be associated with variable degree of hearing loss. It occurs as a complication of acute otitis media, a common condition with an alarming propensity to be chronic infection. The complications of CSOM include mastoiditis, meningitis, focal encephalitis, intracranial abscesses and otitis hydrocephalus<sup>1,2</sup>.

The microbiology of CSOM is unique as polymicrobial anaerobic floras were isolated from over half of the cases. The aerobic microorganisms most frequently isolated are *Pseudomonas sps*, *Staphylococcus aureus*, *Klebsiella sps*, *E. coli* and *Proteus sps*<sup>3</sup>.

Chronic otitis media has a multi-factorial etiology with highly variable prevalence through out the world. In Industrialized countries the prevalence of this disease showed a marked decline during the post World War II era and is presently estimated at less than one

percent. Improved housing, hygiene, accessibility to medical care and antimicrobial therapy are probably the factors that contributed to this evolution<sup>4</sup>. Unfortunately, the socio-economic situation of the rural India has not changed much. Gulbarga district of Karnataka state is the most back ward district of this state. The study was under taken to assess the microbial profile of CSOM and to evaluate antimicrobial susceptibility of the organisms isolated from CSOM

## MATERIALS AND METHODS

Hospital based cross sectional study.

### Inclusion criteria

250 patients who attended outpatient clinic of department of ENT at Government Hospital, Gulbarga, M. R. Medical College Hospital, Gulbarga, Basaveshwar Hospital, Gulbarga and K. B. N. Institute of Medical College General Hospital, Gulbarga were included in the study. The patients were from the age 8 months to 65 years of both the genders were included.

### Exclusion criteria

Patients who have used topical or systemic antibiotic for the last 10 days were excluded from the study. All the patients with cholesteatoma and those with tumors occluding the (ear) canal were excluded<sup>4</sup>.

### Sample collection

The external ear canal was cleaned with suction and then swabbed with ethyl alcohol followed by povidone iodine. The aspirations were performed under visual control with an Otomicroscope and secretions were collected in glass bottles<sup>5</sup>

### Processing of samples

The specimen was transported to the laboratory where it was processed routinely for culture of aerobic and anaerobic bacteria. Organisms were identified by standard bio-chemical methods<sup>6,7</sup>.

### Antibiotic susceptibility testing

Sensitivity to relevant antibiotics was determined by Kirby Bauer's disc diffusion method<sup>8,9</sup> using commercially available antibiotic discs ( Hi-media, Mumbai). Gram-negative and gram-positive cocci were tested for the following antibiotics; Ampicillin (10ig), amoxicillin (10ig), gentiamycin (10ig), cefotaxime (30ig), ciprofloxacin (10ig), ceftazidime (30ig), ceftriaxone (30ig), amikacin (10ig), ampicillin (10ig), and ofloxacin (10ig).

*Extended spectrum  $\hat{a}$  lactamase (ES $\hat{a}$ L) by double*

### disk synergetic test

ESbL production was detected by placing a susceptibility disk containing amoxicillin-clavulanate (20/10 ug) as the inhibitor of beta lactamase in the center of the plate and cefotaxime (30ug), ceftazidime (30ug), ceftriaxone (30ug) and aztreonam (30ug) disks at 30 mm (center to center) from the amoxicillin-clavulanate disk. Enhancement of the zone of inhibition of the oxyimino-lactam caused by the synergy with clavulanate in the amoxicillin-clavulanate disk was considered as evidence of ESbL production<sup>10</sup>. *Escherichia coli* ATCC 25922 and *Klebsiella pneumoniae* ATCC 700603 were used as control strains. The results were tabulated as frequencies (NCCLS-1997, 2000, 2004)

## RESULT

During the one year study period, 250 patients with CSOM and related problems at the various Hospitals at Gulbarga were included in the study.

Table 1 shows the age and sex distribution of our cohort. There were 155 male and 95 females, with an age ranging from 08 months to 65 years (mean 10.1 years). Nearly 30% of patients were younger than 10 years. 52% of the study subjects were from lower socio-economic status followed by 31.2% from middle and 16.4% from higher socio-economic status

**Table-1 Demographic characters of the CSOM patients**

Age	Number of patients	%
0-10	75	30.0
11 to 20	85	34.0
21-30	33	13.2
31-40	10	4.0
41-50	15	6.0
>50	32	12.8
Socioeconomic status		
Low	130	52.0
Middle	78	31.2
Higher	41	16.4
Sex		
Male	155	62.0
Female	95	38.0

250 swabs cultured yielded 272 bacterial isolates. Pure growth was obtained in 228 samples and mixed growth in 22 samples. Culture of the swabs revealed *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, and *Staphylococcus aureus* were the most common bacteria isolated (table-2). Taken separately *Pseudomonas aeruginosa* isolated in 33.8%, *Klebsiella pneumoniae* in 23.9%, *Staphylococcus aureus* in 15.4%, *Proteus mirabilis* in 11.8%, *Citrobacter freundii* in 5.9%, *Streptococcus*

pneumonia in 3.3%, and *H. influenza* in 1.8%. Among the anaerobes, the predominant were the species of *Bacteroides* (2.2%) followed by *Peptostreptococci* (1.1%)

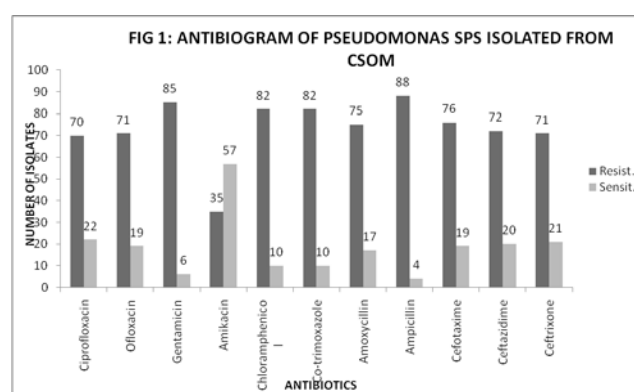
Table 2 Microbial profile of CSOM

Organisms	No.	%
<i>Pseudomonas</i> sps	92	33.8
<i>Klebsiella pneumoniae</i>	65	23.9
<i>Staphylococcus aureus</i>	42	15.4
<i>Proteus mirabilis</i>	32	11.8
<i>Citrobacter freundii</i>	16	5.9
<i>Streptococcus pneumoniae</i>	12	4.4
<i>H.influenzae</i>	11	4.1
CONS	02	0.7
Anaerobic bacteria		
<i>Bacteroides</i>	06	2.2
<i>Peptostreptococci</i>	03	1.1
Total	272	

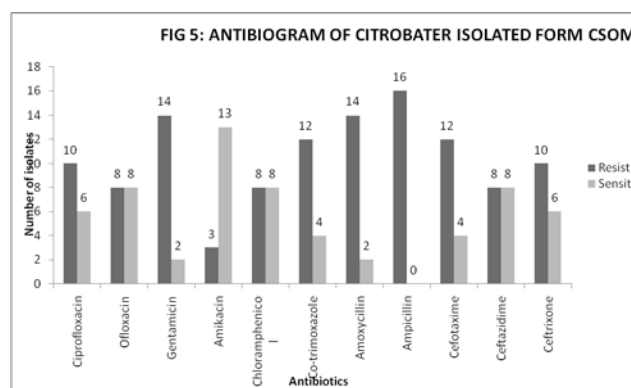
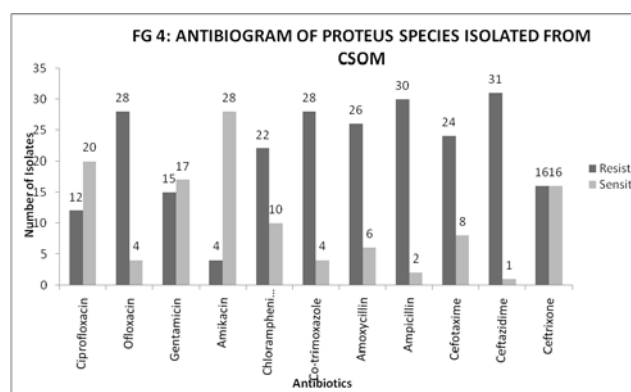
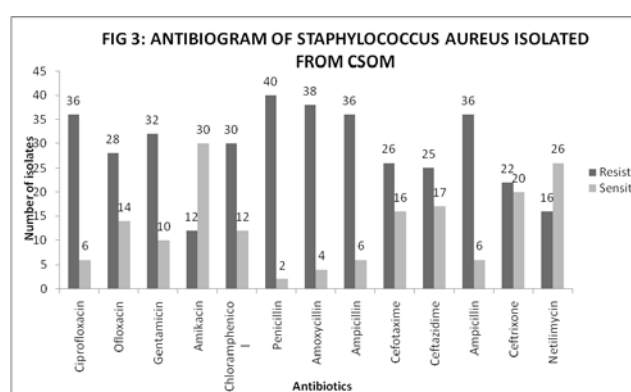
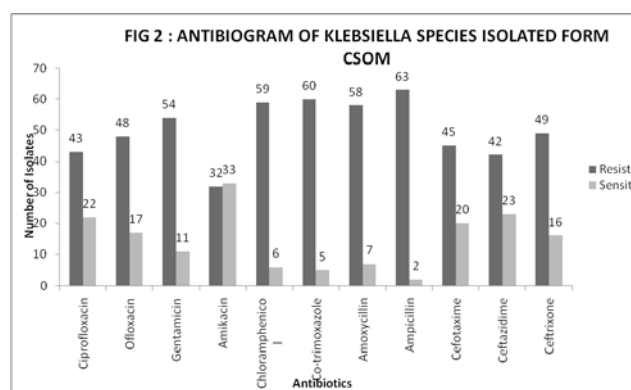
Antibiotic susceptibility pattern of the isolate is shown in table:

### PENICILLINS AND CEPHALOSPORINS

81.3% of gram-negative bacteria were resistance to amoxicillin, 95.6% to ampicillin 69.2% to cefotaxime, 50.0% to ceftazadime and 50.0% to ceftriaxone. Amongst all the gram-negative bacilli, *Klebsiella pneumoniae* had the largest percentage of resistance to amoxicillin (89.2%) [Fig 2] and *Citrobacter freundii* was 100% resistant to ampicillin (Fig 4). *Pseudomonas aeruginosa* was found to have maximum resistance to cefotaxime (82.6%) and for ceftriaxone (77.1%) when compared to other gram-negative bacilli.



Among gram-positive cocci, 85.7% of *Staphylococcus aureus* was resistant to ampicillin, 66.7% to ofloxacin, 61.8% to cefotaxime and 59.5% to ceftazadime and 52.4% to ceftriaxone (Fig 3).



### Aminoglycosides

92% of gram-negative bacilli and 76.2% of gram-positive cocci were resistance to gentamicin and 28.6% of gram-negative bacilli and 29.9% of gram-positive cocci were resistance to amikacin.

### Ciprofloxacin

Over all rate of resistance for ciprofloxacin was 60.5%, with maximum resistance being exhibited by *Pseudomonas aeruginosa* (76%) (Fig 1).

Of gram-positive cocci, all the isolates of *Staphylococcus aureus*, CONS were resistant to more than three antibiotics (Fig 3). Cefotaxime, ceftazadime, ofloxacin, netilmycin and amikacin had higher susceptibility to gram-negative and gram-positive bacteria compared to other drug.

### Extended spectrum $\beta$ lactamase (ES $\beta$ L) mediated resistance

Extended spectrum  $\beta$  lactamase (ES $\beta$ L) mediated resistance was 25.4%. *Pseudomonas aeruginosa* (63.4%) was the predominant ES $\beta$ L producer followed by *Klebsiella pneumoniae* (20.3%) and *Proteus mirabilis* (8.7%) (Table 3).

Table 3 Incidence of ESBL in COM

Organisms	No.	%
<i>Pseudomonas aeruginosa</i>	44	63.4
<i>Klebsiella pneumoniae</i>	14	20.3
<i>Proteus mirabilis</i>	06	8.7
<i>Citrobacter freundii</i>	5	7.2
Total	69	

## DISCUSSION

Chronic suppurative otitis media (CSOM) and its complications are among the most common conditions seen by otologists, pediatricians and general practitioners<sup>2</sup>. It is a persistent disease with great risk of irreversible complications. Early bacteriological diagnosis of all cases will assure accurate and appropriate effective therapy. Selection of antibiotics is influenced by its efficacy, resistance of bacteria, safety, risk of toxicity and cost. Knowledge of the local microorganism's pattern and their antibiotic sensitivity is then essential to formulate a protocol for empirical antibiotic therapy<sup>4</sup>.

The pathophysiology of chronic otitis media is poorly understood, but its natural history, risks factors, microbiology and management are well established. Typically, the disease starts early in life subsequent to an episode of acute otitis medias, and follows a fluctuating time course than synchronizes with the

seasons of the year. As the affected subject matures, the disease sometimes spontaneously remits but leaves permanent damage<sup>7</sup>. In mild cases, a central tympanic membrane perforation and moderate conductive hearing loss are the only sequelae in more severe cases<sup>5</sup>, the ossicular chain and labyrinth can be completely destroyed when chronic otitis media is active, it can cause intracranial complications such as meningitis, venous sinus thrombosis cranial nerve palsies and brain abscesses which are associated with a high morbidity and even mortality<sup>6</sup>.

Previous studies on the microbiology of CSOM have revealed that the most frequently isolated bacteria were *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *coagulase negative Staphylococcus*, *Proteus spp*, *Klebsiella spp* and fungi<sup>7, 12, 13</sup>. *Staphylococcus aureus* is by far the most common, although some studies have shown that *Staphylococcus aureus* was more common especially when cholesteatoma was present<sup>13</sup>. It has also been reported that there were no significant differences in bacteriology between children and adults with CSOM<sup>14</sup>. Our study has revealed that *Pseudomonas aeruginosa* (33.8%) was the most common isolate in CSOM followed by *Klebsiella pneumoniae* (23.9%). There was also significantly high number of anaerobic isolates (11%) in our cases. There were very few isolates of other gram negative rods in the present study. These results commensurate with a study carried out in Rawalpindi<sup>15</sup>. In contrast, studies carried out in Karachi and Quetta revealed that *Staphylococcus aureus* outnumbered *Pseudomonas aeruginosa* as their major bacterial isolate in ear discharges<sup>16,17</sup>. *Pseudomonas aeruginosa* was incidentally also the most common isolate in a similar study carried out in Nepal<sup>18</sup>. Notwithstanding the minor differences in isolation percentages of the two organisms from different areas it is quite evident that *Pseudomonas aeruginosa* and *Staphylococcus aureus* together account for almost 75-85% of the total bacterial isolates in cases of chronic suppurative otitis media<sup>14-17</sup>.

Interestingly review of literature about studies done to find out bacterial flora in cases of CSOM in neighboring state of Pakistan reveals that whereas *Staphylococcus aureus* remained as the premier isolate in two studies, the isolation rate of *Staphylococcus aureus* in one of the study was quite low where as *Klebsiella pneumoniae*, *Proteus mirabilis* and *Escherichia coli* was relatively high<sup>18,19</sup>.

Cephalosporins are the most frequently prescribed class of antibiotics and third-generation display an extended gram negative spectrum. These drugs are also used in treating pseudomonas infections. If *Pseudomonas aeruginosa* have become resistant to one cephalosporin are often resistant to other  $\beta$ -lactam anti-



pseudomonas agents as well as to other antibiotics. In the present study 25.4% of gram negative bacilli were extended spectrum  $\beta$ -lactamase (ES $\beta$ L) producers. 63.4% of *Pseudomonas aeruginosa* were ES $\beta$ L producer followed by *Klebsiella pneumoniae* (20.3%)

The present study highlights the problem of CSOM in and around Gulbarga, District, Karnataka. Unhealthy practices, age of the patients and socio-economic status contributes for high prevalence of CSOM. Measures to provide regular screening programs, at schools, and health educations are essential to reduce the disease burden in the community. Usage of various plant juices and non-prescription drops is wildly prevalent in the present study. We found that despite the presence of accessible health care, patients were reluctant to seek medical attention. Approximately 68% of the patient with discharging ears had never sought a medical opinion. One of the reasons for this is ignorance regarding the implications of the disease. Another 22% were completely unaware that their children were suffering from CSOM.

### CONCLUSION

Antimicrobial resistance is a growing problem worldwide and surveillance of resistance patterns is essential. Treatment efficacy and safety are the main concerns for the chronic of ototopical preparation. Hence It is essential to use antibiotics in proper way to prevent emergence and spread of resistant pathogens.

### REFERENCE

- Mandel EM, Casselbrant ML, Kurs-Lasky M. Acute otorrhea: bacteriology of a common complication of tympanostomy tubes. *Ann. Otol. Rhinol. Laryngol*, 1994;103:713-718
- Dohar JE, Garner ET, Nielsen RW, Biel MA, Seidlin M. Topical of ofloxacin treatment of otorrhea in children with tympanostomy tubes. *Arch otolaryngology Head Neck Surg*. 1999;125:537-45
- Johnson RL: Chronic otitis media in school age Navajo Indians, *Laryngoscope* 1967;77, 1990-95
- WHO (Division of Diarrhea and Acute Management of childhood illnesses WHO/CDR/95.14.A.L.Geneva:WHO.
- Micro N. Controlled multicenter study on CSOM treated with topical application of ciprofloxacin 0.2% solution. *Otolaryngol Head Neck Surg* 2000; 123: 617-23.
- Indudharan R, Haq JA, Aigar S. Antibiotics in CSOM. A bacteriologic study. *Ann Oto Rhino Laryngol* 1999; 108: 440-5.
- Duiguild JP, Collee JG, Fraser AG. Laboratory strategy in the diagnosis of infective syndromes. In Collee JG, Marmion BP, Fraser AG, Simmons A. Mackie and McCartney practical medical microbiology. 14th ed. London: 1996.
- Bauer AW, Kirby WMM, Sherris JC, Truck M. Antibiotic susceptibility testing by a standardized single disc method. *Am J Clin Pathol* 1996;45:493-6
- Performance standards for antimicrobial susceptibility testing; Eighth informational supplement, National committee for clinical laboratory standards (NCCLS) document. 1998; M100-S8.
- Jerestin BH, Vandana Agarwal Pathat M. Extended spectrum  $\beta$ -lactamases mediated resistance to third generation cephalosporins in *Klebsiella pneumoniae* in Nagpur, central India. *Indian Journal Med Res* 1997;105:158-161.
- Loy AHC, Tan AL, Lu PKS. Microbiology of chronic suppurative otitis media in Singapore. *Singapore Med J* 2002; 43(6): 296-99.
- Nekwa O, Shareef ZA, Benayama A. Anaerobes and fungi in chronic suppurative otitis media. *Ann Otorhino Laryngol* 1997; 106: 649-52.
- Attallah MS. Microbiology of chronic suppurative otitis media with cholesteotoma. *Saudi Med J* 2000; 21: 924-7.
- Vartiainen E, Vartiainen J. Effect of aerobic bacteriology on the clinical presentation and treatment results of chronic suppurative media. *J Laryngol Otol* 1996; 110: 315-8.
- Aslam MA, Ahmed Z, Azim R. Microbiology and drug sensitivity patterns of chronic suppurative otitis media. *J Coll Physicians Surg Pak* 2004; 14; 8: 459-61.
- Ahmed B, Hydri S, Afridi AAK, Ejaz A, Farooq S, Zaidi SK. Microbiology of ear discharge in Quetta. *J Coll Physicians Surg Pak* 2005; 15(9): 583-4.
- Taj Y, Essa F, Kazmi SU. Pathological analysis of 596 cases of chronic suppurative otitis media in Karachi. *J Coll Physicians Surg Pak*. 2000; 10: 33-5.
- Ahmed A, Usman J, Hashim R. Isolates from chronic suppurative otitis media and their antimicrobial sensitivity. *Pak Armed Forces Med J* 1999; 49: 82-5.
- Hivemath SL, Kanta RC, Yeshwanthrao M, Vasantha kumar CM. Aerobic bacterial isolates of CSOM and their antibiotic sensitivity pattern. *Ind Pract* 2001; 54(7): 486-89.
- Poorey VK, Lyer A. Study of bacterial flora in CSOM and its clinical significance. *Ind J Otolaryngol and Head & Neck Surg* 2002 ; 54(2): 91-8.

# Evaluation of Maternal and Fetal Outcome in Pregnancy with Congenital Heart Disease

Rekha Bharti<sup>1</sup>, Manjula Sharma<sup>1</sup>, Harsha S Gaikwad<sup>1</sup>, Vrijesh Tripathi<sup>2</sup>, Ayesha Ahmed<sup>1</sup>, Achla Batra<sup>1</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, Vardhman Mahavir Medical College and Safdarjung Hospital, New Delhi, India, <sup>2</sup>Department Mathematics and Statistics, Faculty of Science and Agriculture, The University of The West Indies, Trinidad and Tobago

## ABSTRACT

CHD now constitutes nearly 80% of all cases of heart disease encountered during pregnancy in developed nations. This study was undertaken to assess the obstetric and fetal outcome in pregnant women with CHD. A total of 41 pregnant women with CHD were included in the study irrespective of gestational age and parity. The subjects were followed up for mode of delivery and fetal as well as maternal outcome. Majority of women were between 20 to 25 years of age [61%], were nulliparous (75%), had no history of abortion (80%) and most had no living children. Majority of the pregnancies were unbooked at the antenatal clinic of Safdarjung Hospital [53.7%]. A total of 32 [78%] pregnancies were completed successfully. The postpartum period was uneventful in 25 cases while there were concomitant medical disorder in 9 cases and 7 cases developed complications. The only factor that was significant ( $p$ -value=0.001) was birth weight amongst successful deliveries. In general, pregnancy was sufficiently well tolerated in women with milder forms of CHD.

**Key words:** congenital heart disease, maternal morbidity, fetal outcome

## INTRODUCTION

The reported prevalence of congenital heart disease (CHD) in general population varies between 4 and 10 per 1000 live births<sup>1</sup> whereas the estimated prevalence in adults is 6.02 per 1000.<sup>2</sup> It has also been noted that significantly more females are affected as compared to males, both in adult as well as pediatric CHD populations.<sup>2</sup> The implications of these observations are enormous when considered from an obstetric angle.

CHD now constitutes nearly 80% of all cases of heart disease encountered during pregnancy in developed nations.<sup>3</sup> The affected women have an increased risk of cardiac and obstetric complications. Their offspring have a greater risk of premature delivery, intrauterine growth restriction and recurrence of CHD. Management of these pregnancies requires a multidisciplinary approach. This study was undertaken to assess the obstetric and fetal outcome in pregnant women with CHD.

## MATERIAL AND METHODS

This study was a prospective observational study carried out between July 2006 and December 2007. It

was conducted by the Department of Obstetrics and Gynaecology, V.M.M.C. & Safdarjung Hospital, New Delhi. The study was approved by the ethical committee of the hospital. Subjects were recruited from the patients attending the antenatal O.P.D. and emergency of Safdarjung Hospital.

A total of 41 pregnant women with CHD were included in the study irrespective of gestational age and parity. A detailed cardio respiratory examination was performed. A cardiology consultation was taken at first visit in all cases for confirmation of diagnosis, evaluation of the NYHA status and any special areas of management. The patients were followed up in the antenatal clinic in collaboration with the cardiology clinic. All subjects with NYHA I and II, with no co-morbid medical conditions were followed up once a month till 28 completed weeks of gestation. Thereafter, they were followed up once a fortnight till 36 completed weeks of gestation, following which they were admitted. All subjects with NYHA III and IV or NYHA I and II with co-morbid medical conditions were admitted irrespective of period of gestation.

Routine antenatal investigations were done in all subjects. A total and differential leukocyte count, uri-

nalys and urine culture was done to rule out any evidence of occult infection. An electrocardiogram, echocardiogram and chest X-ray with abdominal shield was also done in all subjects. Antenatal ultrasonogram was done at 18-20 weeks of gestation to rule out any congenital anomaly, a fetal echocardiography was performed at 24 weeks of gestation and Doppler study was performed in all cases of congenital cyanotic heart disease. The subjects were followed up for mode of delivery and fetal as well as maternal outcome.

Both antenatal as well as intra-partum management was based on ACOG guidelines. Labour was managed in a left lateral position, with strict monitoring of vitals, input and output. Adequate labour analgesia was administered in all cases. Antibiotic prophylaxis was given in all cases. The second stage of labour was shortened by the use of forceps or ventouse as found suitable on a case to case basis. Active management of third stage of labour was done. Methyl ergometrine was strictly withheld. Routine neonatal examination and investigation was done in all babies with special emphasis on cardiovascular system to rule out CHD.

Postpartum management included a careful hemodynamic monitoring for 24-72 hours and extended to 10-14 days in subjects of PAH. Antibiotic prophylaxis was continued for one week following delivery. The subjects were kept admitted for at least one week. Thereafter they were discharged unless the postpartum period was complicated. Appropriate contraceptive advice was administered. The subjects were subsequently followed up after one week and then after six weeks postpartum in the postnatal clinic in collaboration with the cardiology clinic.

Statistical analysis was done on SPSS 12. Independent t-test and chi-square were applied on data to see differences. Exact Fisher test was applied when reported cases were few.

### RESULTS

During the study period from July 2006 to December 2007, a total of 10,076 deliveries were conducted at the Department of Obstetrics & Gynecology, V.M.M.C. & Safdarjang Hospital, New Delhi. The total number of cases with heart disease was 130 [Incidence = 1.3%]. The number of women with CHD was 41, making the incidence of CHD as 31.5%. Majority of the pregnancies were unbooked at the antenatal clinic of Safdarjang Hospital [53.7%] [Table 1].

**Table 1. Baseline maternal characteristics in 41 pregnancies**

Variables	Number of observations (%)
<b>Demographical</b>	
<b>Maternal age (yrs)</b>	
(24.34±3.3)	
d"25 26-32	25(61.0%)16(39.0%)
<b>Hospital registration</b>	
Booked	19(46.3%)
Unbooked	22(53.7%)
<b>Gravid</b>	
d"2	29(70.7%)
3-5	12 (29.3%)
<b>Para</b>	
0	31(75.6%)
d"1	10(24.6%)
<b>Abortion history</b>	
No	33(80.5%)
d" 1	08(19.5%)
<b>Living children</b>	
None	23(56.1%)
1	12(29.3%)
2-3	06(14.6%)
<b>Cardiac lesion</b>	
Septal defects	26(63.4%)
PDA	05(12.2%)
TOF	02(04.9%)
Rare syndrome	09(22.0%)
<b>NYHA</b>	
I	26(70.7%)
II	07(17.1%)
III-IV	05(12.2%)
<b>Outcome of delivery</b>	
<b>Unsuccessful outcome</b>	
Preterm vaginal delivery	06(14.6%)
Aborted	03(07.3%)
Maternal death	02(04.9%)
MTP	02(04.9%)
Laparotomy	02(04.9%)
<b>Successful outcome</b>	
FTND	24 (58.5%)
LSCS	02(04.9%)
<b>Infant weight</b>	
<1500 gm	7 (17%)
1500-2500gm	14(34%)
>2500gm	15(36.6%)
<b>Fetal complications</b>	
No. of complications	30(70.7%)
<b>Complication</b>	
Missed abortion	02(4.9%)
IUGR	01(2.4%)
MSB	01(2.4%)
NND	04(4.8%)
<b>Remarks</b>	
Uneventful post partum period	25(61.0%)
Concomitant medical disorder	09(22.0%)
Developed complication	07(17.1%)

Majority of women were between 20 to 25 years of age [61%], were nulliparous (75%), had no history of abortion (80%) and most had no living children. Based on NYHA classification, 26 [70.7%] women were found to be in Class I, 7 [17.1%] in Class II and 5 [12.2%] in Class III and IV. Septal defects was found to be the most common lesion [63.4%], followed by PDA, TOF and rare syndromes.

A total of 32 [78%] pregnancies were completed successfully. 6 were unsuccessful preterm deliveries and 3 pregnancies ended in abortion. 24 [58.5%] women delivered vaginally whereas LSCS was performed in 2 [4.9%] cases. The birth weight of infants was above 2.5 Kg in 15 cases, between 1.5 to 2.5 Kg in 14 cases and 7 infants weighed less than 1.5 Kg.

There were 2 cases of maternal mortality. They had presented with left sided cardiac failure and pulmonary edema. Both pregnancies were unbooked and the patients died within 24 hours of delivery. The postpartum period was uneventful in 25 cases while there were concomitant medical disorder in 9 cases and 7 cases developed complications.

There were 27 live births.

**Table 2: Comparison between successful and unsuccessful outcome**

Variables	Unsuccessful outcome	Successful outcome	p-value
Maternal Age	23.7±2.8	24.7±3.12	0.358
Infant weight	1562.50±956.64	2109.66±937.39	0.001
<b>Hospital registration</b>			
Booked	02(5.4%)	17(45.9%)	
Unbooked	8(21.6%)	10(27.0%)	0.020
<b>Gravid</b>			
d"2	5(13.5%)	10(27.0%)	
3-5	5(13.5%)	17(45.9%)	0.475
<b>Para</b>			
0	6(16.2%)	12(32.4%)	
d"1	4(10.8%)	15(40.5%)	0.650
<b>Cardiac lesion</b>			
Septal defects	6(16.2%)	18(48.6%)	
PDA	2(5.4%)	2(5.4%)	
TOF	1(2.7%)	1(2.7%)	
Rare syndrome	1(2.7%)	6(16.2%)	0.521
<b>NYHA</b>			
I	6(16.2%)	22(59.5%)	
>II	4(10.8%)	5(13.5%)	0.228
<b>Remarks</b>			
Uneventful post partum period	4(10.8%)	20(54.1%)	
Concomitant medical disorder	3(8.1%)	5(13.5%)	
Developed complication	3(8.1%)	2(5.4%)	0.105

Table 2 shows the only factor that was significant (p-value=0.001) was birth weight amongst successful deliveries.

## DISCUSSION

The present study was undertaken to assess maternal and fetal outcomes in pregnancies complicated with congenital heart disease in the context of developing nations. The prevalence of cardiac disease during pregnancy was found to be 1.3% in the present series, similar to data obtained from developed nations.<sup>4</sup> However, the prevalence of congenital heart disease was much lower [23.84% versus 80%].<sup>5</sup> Majority of patients in our series had good functional capacity, with 33 subjects having an effort tolerance of NYHA Class I-II. Most of the pregnancies followed up in the present study were successful, though both obstetric as well as cardiac complications were observed. There were two maternal deaths with one case who had presented with Eisenmenger syndrome. The woman died within 24 hours of delivery, reaffirming the high risk of maternal mortality with the syndrome. Our experience with this case was similar to that observed by other investigators who have reported a high mortality rate, exceeding 25% in these cases.<sup>6,7</sup> The neonatal mortality rate was strikingly higher than observed in previous studies [2%].<sup>2</sup> We observed a neonatal death rate of 6.44% on follow up. This is again at variance with the observed rates of 2.3% by previous investigators.<sup>8</sup> The rate of preterm labor was significantly higher than observed in previous studies [33.33% versus 10%].<sup>2</sup>

The higher incidence of cardiac death may be attributed to advanced disease at the time of presentation and absence of antenatal care since most cases were unbooked (53.7%). However, the number of cases was too inadequate to reach any conclusion. In general, pregnancy was sufficiently well tolerated in women with milder forms of CHD. The incidence of obstetric complications was increased, especially preterm labor and hypertensive disorders of pregnancy. However, the rate of Cesarean section remains similar to that observed in the normal population. The number of cases of congenital cyanotic heart disease was too small to allow any deduction regarding fetal/ neonatal outcome. However, fetal growth restriction, SGA, preterm delivery and risks of prematurity are well recognized complications of pregnancies complicated with maternal congenital cyanotic heart disease.

## CONCLUSION

Cardiac disease in pregnancy is a leading cause of maternal and neonatal morbidity and mortality. However, it is associated with an increased risk of maternal

and neonatal morbidity and mortality. These pregnancies should be managed in tertiary care centres as strict maternal and fetal monitoring is required. A multidisciplinary approach is required for an optimal outcome with involvement of not only the obstetrician but also the cardiologist, paediatrician as well as anaesthetist. Despite a high maternal cardiac complication rate, an overall favorable maternal and neonatal outcome can be obtained with careful surveillance and prompt recognition of symptoms and appropriate management.

#### REFERENCES

1. Hoffman JI, Kaplan S. The incidence of congenital heart disease. *J Am Coll Cardiol.* 2002; 39:1890-1900.
2. Ariane JM, Andrew SM, Raluca I, Elham R, Louise P. Congenital Heart Disease in the General Population: Changing Prevalence and Age Distribution. *Circulation* 2007;115;163-172.
3. Gelson E, Johnson M, Gatzoulis M, Uebing A. Cardiac disease in pregnancy. Part 1: congenital heart disease. *Obstet Gynecol* 2007; 9: 15-20
4. Steer PJ. Pregnancy and contraception. In: Gatzoulis MA, Swan L, Therrien J, Pantely GA, editors. *Adult Congenital Heart Disease: a Practical Guide.* Oxford: BMJ/Blackwell Publishing; 2005; 16-35
5. Gel AF, Hankins GD. Cardiac disease and pregnancy. *Obstet Gynecol Clin North Am* 2001; 28: 465-512. doi: 10.1016/S0889-8545905070214-X
6. Jones AM, Howitt G. Eisenmenger's syndrome in pregnancy. *BMJ* 1965; 2: 1627.
7. Neilson G, Galea EG, Blunt A. Congenital Heart Disease and Pregnancy. *Med J Aust* 1970; 1: 1086.
8. Drenthen W, Pieper PG, Jolien WR, Willem A van L, Adriaan AV, Barbara JMM, Arie PJ van D, Hubert WV, Sing CY, Philip M, Tjark E, Dirk J van V. Outcome of Pregnancy in Women With Congenital Heart Disease: A Literature Review. *J. Am. Coll. Cardiol.* 2007; 49; 2303-2311.

# Are the Marketing Strategies Used By Pharmaceutical Companies Successful Against Prescribing Physician?

<sup>1</sup>Yogendra Keche, <sup>2</sup>Archana Wankhade

<sup>1</sup>Department of Pharmacology, Indira Gandhi Government Medical College, Central Avenue Road, Nagpur-440018,

<sup>2</sup>Department of Microbiology, Smt Kashibai Navale Medical college and Hospital, Narhe, Pune-411041

## ABSTRACT

This study was carried out in Indira Gandhi Government Medical College Nagpur to find out different marketing strategies used by pharmaceutical companies to influence to change the prescription of drug by doctors. Study was carried out with the help of structured questionnaire. The prescribing doctors and medical representatives were study participants. Pharmaceutical companies use extra drug samples (70%), funny tours (63.33%), gifts (70%) and monetary benefits (53.33%) as major marketing strategies. The marketing strategies accepted by doctors from pharmaceutical companies were accepting extra drug samples (86.66%), gifts (86.66%), and monetary benefit (46.66%) Under the influence of these strategies prescribing doctor may prescribe less efficacy drugs or more costly drugs to the patients. Pharmaceutical companies are successful in achieving their marketing goals with the help of use of these marketing strategies.

**Keywords:** Prescription, Marketing strategies, Monetary benefit, Drug samples

## INTRODUCTION

Prescription of drugs by doctor is directly related to increasing the sale of drugs. Doctors are key persons for prescription of the drugs. So, by influencing the doctors; pharmaceutical companies can increase the prescription of their drugs and ultimately increase the sale of these drugs. Heavy advertising of drugs to doctors lead to increase number of prescriptions being written by doctors, whether the new drug is useful for patient or not. Pharmaceutical companies sometimes hide adverse data from the public.<sup>1</sup>

Drug companies promotions subconsciously influence physician's prescription patterns. Parker et al., in 2002, in one study found that, the pharmaceutical industry spent \$15.63 billion on promotions, which include free office supplies, all expenses paid events and awards to sales representatives and physicians.<sup>2</sup> Orłowski et al 1992 in a study of prescription patterns, doctors have no objection on pharmaceutical company's all expenses paid seminars at popular vacation site.<sup>3</sup> Due to all this, there are chances that less effective or equally effective brand with higher cost of same formulation may be prescribed by physician.

After considering, all these aspect of marketing research, pharmaceutical marketing tactics, and pre-

scription of drugs by doctors, this study was planned to find out the marketing strategies used by pharmaceutical companies to influence doctors to prescribe the drug.

### *Aims and Objectives of the study*

1) To study different marketing strategies used by pharmaceutical companies to influence the doctors. 2) To study the effect of these marketing strategies for increasing the prescription of drugs by doctors.

## MATERIAL AND METHODS

This study was carried out in Indira Gandhi Government Medical College, Nagpur. For this study, data was collected with the help of structured questionnaire from the persons involved in promotion of drugs (Medical Representatives) and persons that were actually prescribing the drugs (Resident Doctors of Indira Gandhi Government Medical College, Nagpur ).

The study participants in this study were medical representatives visiting to outpatient department (OPD) of Indira Gandhi Govt. Medical College, Nagpur and the doctors working in outpatient department (OPD) of Indira Gandhi Govt. Medical College, Nagpur. Total 60 participants were included in this

study, 30 participants were medical representatives, and 30 participants were doctors.

The structured questionnaire for medical representatives (questionnaire-1) was containing following questions: 1. Do you provide scientific data about your company drugs to doctors? 2. Do you mention side effect of your company drugs to doctor? 3. Are you offering extra drug samples for prescribing your company drugs? 4. Which factor you think useful for promotion of your company drugs? 5. What material you are using for promotion of your drugs? 6. Are you offer gift to doctors for prescribing your company drugs? 7. Do you offer monetary benefit to doctor for prescribing your company drugs? 8. Do you provide any promotional activity like funny tours, sponsored travel to doctors to prescribe your company drugs?

The structured questionnaire for doctors (questionnaire-1) was containing the following questions: 1. What will you do if medical representative offer extra drug samples for drug prescription? 2. What will you do if medical representative offer gifts for drug prescription? 3. What will you do if medical representative offer monetary benefit for drug prescription? 4. How you decide the prescription drug?

### RESULTS

The results of the study showed that 100 % pharmaceutical companies provide scientific data about drug. 96.66 % pharmaceutical companies mention about the side effects of drug. 70% pharmaceutical companies offer extra drug samples for drug prescription. 70% pharmaceutical companies offer gifts for drug prescription. 53.33 % pharmaceutical companies offer monetary benefit for drug prescription. 63.33 % pharmaceutical companies offer funny tours, sponsored travel to the doctors for drug prescription (Table 1).

**Table 1 No. / (%) of response given by medical representative to structured questionnaire**

Response of the Medical Representatives	YES	NO
Provide scientific data about drug	30(100)	0
Mention side effects of drug	29(96.66)	1(3.33)
Offer extra drug samples for drug prescription	21(70)	9(30)
Offer gifts for drug prescription	21(70)	9(30)
Offer monetary benefit for drug prescription	16(53.33)	14(46.66)
Offer funny tours, sponsored travel to doctors	19(63.33)	11(36.66)

86.66 % doctors will accept extra drug samples drug prescription. 86.66 % doctors will accept gifts for drug prescription. 46.66 % doctors will accept monetary benefit for drug prescription. Constituents of drug (33%), brand of drug (46.66 % ) and cost of drug ( 20 % ) are taken into consideration while decision of the prescription of drug by doctors (Table 2).

**Table 2 No. / (%) of response given by doctors to structured questionnaire**

Response of the doctors	Will accept	Will not accept
Extra drug samples drug prescription	26 (86.66)	4 (13.33)
Gifts for drug prescription	26 (86.66)	4 (13.33)
Monetary benefit for drug prescription	14 (46.66)	16 (53.33)
Decision of the prescription by physician		
a) Constituents of drug	10(33)	-
b) Brand of drug	14(46.66)	-
c) Cost of drug	06(20)	-

### DISCUSSION

Results of these questionnaires (Table 1 & 2) were correlated and discussed in light of observation of previous studies. 70% of pharmaceutical companies offer extra drug samples to doctors for prescription of their company drugs (Table 1) and it was seen that 86.66 % of doctors will prescribe drug if pharmaceutical companies offer extra drug samples (Table 2). Some physicians love drug samples and also have belief that it helps them to take care of patients who are not affording the newer expensive drugs. Other physicians had opinion that they are just helping pharma companies sell more products without any fees. Physician is the middle man who is working for the drug company for free of cost.<sup>4</sup> Therefore, offering extra drug samples to doctor will definitely increase the prescription of drug.

86.66 % doctors would prescribe drug if they had been offered by gifts (Table 2), 70 % of pharma companies has strategy of offering gifts to doctors (Table 1). Randall et al. 2001<sup>5</sup> in their study on residents found that residents were in opinion to accept educational gifts of moderate expense. Therefore offering gifts to doctors by pharma companies is an appropriate marketing strategy.

46.66% doctors would always prescribe drug if pharma companies offer monetary benefit to them (Table 2), 53.33% pharma companies offer monetary benefits occasionally or as a last strategy (Table 1). The pharmaceutical industry spent billion on promotions, which include free office supplies, all-expenses-paid events and awards to the sales representatives and the physicians.<sup>2</sup> This shows that offering monetary benefit will also be a useful marketing strategy of pharmaceutical industry. Somerset et al. 2001, confirmed that offering monetary benefit is a fundamental tactic in meetings between general practitioners and pharmaceutical representatives.<sup>6</sup> Nowadays, some of the pharmaceutical companies started disclosing their expenditure on physician for promotion of prescription of the company drug.

Quality and brand of drug go hand in hand, 93% of medical representatives think quality of drug useful for promotion of prescription of drug and 46.66% of doctors (Table 2) think brand of drug useful for deciding prescription of drug. Providing full scientific data of drug including side effects of drug will add knowledge of doctors and will definitely increase the prescription of drug. Most of pharmaceutical companies provide funny tours and travels to doctors that may also act as good marketing strategy.

### CONCLUSIONS

Use of extra drug samples, gifts, and sometimes offering monetary benefit will definitely influence the prescribing doctor and increase the prescription of drug. Maintaining good quality of drug or brand of drug is helpful for increasing the prescription of drug by doctor. For effective and safe drug, offering extra drug samples and gift will definitely increase the prescription of drug. The study shows that the marketing strategies used by pharmaceutical companies are successful against the prescribing physician. But, there are chances that less or equally effective drug with higher cost might be prescribed by doctor under the pressure of pharmaceutical companies.

### ACKNOWLEDGEMENT

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### REFERENCES

1. Chiu, H. Selling Drugs: Marketing Strategies in the Pharmaceutical Industry and their Effect on Healthcare and Research, *Explorations :An Undergraduate Res J* ;8: 89-94.
2. Parker, R., Stephen, Pettijohn, C. E. Ethical conditions in the use of direct-to-consumer advertising and pharmaceutical promotions: the impact on pharmaceutical sales and physicians. *Journal of Business Ethics* 2003 ; 48 : 279-290.
3. Orłowski, James, P., Wateska, L. The effects of pharmaceutical firm enticements on physician prescribing patterns: there's no such thing as a free lunch. *Chest* 1992 ; 102: 270-274.
4. Mack, J. The Drug Sampling Problem. <http://www.pharma-mkting.com/news/pmn34-article01.html>. accessed on 1/1/2007.
5. Randall, M.L., Rosenbaum, J.R., Rohrbaugh, R.M., Rosenheck, R.A. Attitudes and Behaviors of Psychiatry Residents Toward Pharmaceutical Representatives Before and After an Educational Intervention. *Academic Psychiatry* 2005; 29:33-39.
6. Somerset, M., Weiss, M., Fahey, T., Dramaturgical study of meetings between general practitioners and representatives of pharmaceutical companies. *BMJ* 2001 ; 323(7327): 1481-1484.



# Development Towards Achieving Health Care for All - an Approach to the XIIth Five Year Plan

Mangesh Tyagi<sup>1</sup>, Yogesh Mahor<sup>2</sup>

<sup>1</sup>IFS, Adviser MP SPC, Bhopal, MP, <sup>2</sup>Specialist S.D., PMPSUS-MP SPC, Bhopal, MP

This paper aims to review health outcomes in Madhya Pradesh, paying particular attention to the influence of inequity on community. The paper identifies some core issues to improve accessibility, coverage and service quality in Madhya Pradesh. We draw on the available evidence in published literature, vital statistics and reports published by state, national and international organizations.

The paper is organized as follows. First, we give a brief background of the health sector in MP. Second, we outline the situation of inequity and growing health challenges. Finally, we conclude with suggestions to improve overall health scenario of the state.

**KEY WORDS :** Madhya Pradesh State Planning Commission, National Rural Health Mission, Integrated Child Development Schemes, Revised National Tuberculosis Programme, Revised Vector born disease Control Programme.

## INTRODUCTION

Diversity in Socio-economic conditions is characterizing nature of the State. Widespread geographical area and thin dispread density of population as compared with other states makes the state a difficult terrain, hard to reach and inaccessible. In terms of Human Development Index (HDI) with an index value of 37, the State lags behind the all India average of 45. Taking into account the health indices the situation is not well again. The Infant Mortality Rate is 67 and Maternal Mortality Ratio is 269 which are much higher than the National average. Comparative figures of key health and demographic and macro indicators are as follows:

**Table 1 Macro indicators of health of the state as compared to India figures <sup>1</sup>**

Item	MP	INDIA
Total Population (Census 2011-in millions)	72.59	1210.19
Decadal growth % (Census 2011)	20.3	17.64
Infant Mortality Rate (SRS 2011)	67	50
Mother Mortality Rate (SRS-2007-09)	269	212
Sax Ration (Census 2011)	930	940
Life time risk (SRS-2007-09) %	1.0	0.6
Female literacy rate (Census 2011)%	60.02	65.46

Annual health budget of Madhya Pradesh is around Rs. 2500 Cr. (including plan and non plan) which is Aprox.3.7 % of overall state budget <sup>5</sup>. In spite of the best of efforts on behalf of the government institutions,

the community is not satisfied and the health status, though improved from yesteryears, is far below when compared on the national scale.

## I. INEQUALITY IN HEALTH - A SITUATION ANALYSIS

The fact that disadvantaged people generally die younger and suffer more disease than those with more resources is gaining ground as a major policy concern in the state. Yet we know little about how public opinion of Madhya Pradesh about policy interventions to address these disparities.

The differences among rural-urban or poor and non poor populations in the health outcomes are undeniable in the state. The level of education and gender disparity also plays significant role in explaining healthcare inequality in Madhya Pradesh. Health care equity also includes the access to service. The per capita public expenditure in rural areas amount to less than a third of that is spent per capita in urban areas. IMR in rural areas is also significantly higher than in urban area. ANC services are almost two and half times more in urban areas as compared to rural. In case of gender inequity in MP, women have an inadequate role in main decisions related to maternal and child health care. Mortality rates for girls are higher than boys except during early infancy<sup>4</sup>.

While analyzing the income component, it was observed that poorer sections of the population were

beleaguered with ill-health whether it is their efforts for child survival or anxieties pertaining to child nutrition. Income influence both the access to health care and health status of individual. For example, for one poor rural person that uses public services, there are eight non-poor persons using the publicly funded services (NCAER). Infant Mortality Rate is double and Child Mortality Rate more than five times in poor families compared to non-poor.

Findings of National Family Health Survey have clearly established that the education level of mothers has direct influence on utilization of health services<sup>2</sup>. The regional analysis shows that amongst the six regions of Madhya Pradesh, Vindhyanchal region has the worst and the Malwa region has the best health status<sup>4</sup>.

However, all inequities in the health status cannot be addressed by only the health, Allied sectors (e.g. Rural and Urban Development, Agriculture, Education, Nutrition and Livelihood etc.) also need to have health and equity oriented policy interventions such as to improve the geographic and coverage access to care, new financial resources need to be made available to the health sector<sup>6</sup>.

## II. THE WAY FORWARD - APPROACH TO THE XII<sup>th</sup> FIVE YEAR PLAN

Since MP is often viewed as one of the languish state, it is principally important that critical research be undertaken to better understand the challenges that face these societies and how to overcome with this languish kind of image for the state also how to increase health equity. Now we are entering in XII<sup>th</sup> five year plan (Yr. 2012-17), this is high time to set the approach towards improve Health outcome especially the deprived including extreme poor family, women and children in the state. Some innovative interventions in programmatic and financial aspects have been described to improve equity as well as coverage of population for easy access to effective and good quality health care as given below;

### 1) Step-up in Health Care Service Delivery

Primary health care has to become a part of socio-economic development, and it demands coordinated efforts of all sectors such as agriculture, animal husbandry, food industry, education, housing, public works, communication and others.

The state of Madhya Pradesh is characterized by high mortality and morbidity figures. Moreover the low levels of health expenditure make it impossible to provide quality health care for all. It is also noteworthy that there is a great need for enhancing the health

facility coverage and staffing as per the latest norms.

The coverage and service deployment strategies must focus on local health needs. Utilization of Government facilities must be enhanced. There is a desperate shortage of medical personnel; therefore there is an urgent need of targeted approach to increase no. of educational institutes, Seats in medical colleges, Paramedical colleges and other licensed health professionals of public and private sectors in the state. Government also need to implement the short duration course for doctors, paramedical force and the presence of adequate number of grass root level health functionaries are to be ascertained to ensure community participation. Capacity building of cutting edge level functionaries is also the topmost priority.

#### a. Improved quality of service through adequate infrastructure, appropriate staffing and capacity building:-

The number of institutions will have to be increased as per population norms on the basis of Yr.2011 census. Innovative strategy like use of prefabricated low cost material need to be adopted for developing infrastructure timely. The package of services offered also needs to be upgraded. In order to ensure improved quality of services efforts will have to be made to ensure that the staff is available across all cadres at all service centers.

**State database management system;** A detailed master data bank should be maintained about all medico and non medico personnel with HR related details such as promotions and retirement of staffs. This data bank will also help in timely assessment of requirement of staffs.

#### b. Promoting access to improved health care at Household & village level through involvement of Gram Sabha, ASHA, ANM & PRIs, etc

Under the leadership of Madhya Pradesh State Planning Commission, The village master plan is already developed for each village of state through Decentralized planning process with the involvement and approval of Gram Sabha /PRIs and VOs. It is based on the actual local needs of the community. State now should proceed according to available primary information regarding community access to health care facility and the level of service satisfaction. This exercise is extremely valuable for XII<sup>th</sup> five year plan (Year 2012-17) for health sector.

The required number of ASHA and the outreach functionaries as per the latest population norms on the basis of 2011 census will need to be selected, trained and made functional in the stipulated time to ensure that improved health care is available at the household

level.

- c. Strengthening mechanism of Monitoring and Evaluation to ensure accountability and optimize outputs

State needs to give proper emphasis on monitoring and evaluation of all health care programmes. For this purpose an effective and exclusive Monitoring and Evaluation Cell should to be set up in the department of Health & Family welfare. Hence departments must undertake the independent Impact Evaluations/Assessments of key national programmes like NRHM, ICDS etc.

- d. Introducing social audit and Audits like Referral system audit, Maternal and Child death audit, Medical audit, Resource utilization audit, etc. to validate the authenticity of services

In order to ensure the authenticity of services, verify and validate the information about various health care programmes, the department needs to establish a mechanism of social Audit. An Audit System that looks at issues like referral system, maternal and child death, medical services offered and resource utilization will also have to be setup in the state.

- e. Introducing Public Health Course and placement of Hospital Management professionals at Government Health Facilities

The department should identify institutions where Public Health courses for existing doctors can be introduced. Efforts must also be made to appoint Hospital Management professionals in the key government health facilities.

## 2) Strengthening of Health Institutions

The strengthening of the health care institutions would focus on optimal expert care to the community, ensuring quality of care and above all making the services more responsive and sensitive to the needs of the beneficiaries. In order to provide a complete package of services adequate inputs will have to be channelized in terms of human resources, equipments, additional funds, etc. This will result in adequate up gradation of the system to handle the demand generated and will ensure patient's satisfaction.

- a. **Equipping Health Institutions/facilities through correct provision of manpower (for e.g. regular & contractual staffing), fiscal (for e.g. regular and untied funds) and physical resources (e.g. repair/renovation, extension, equipments)**

In the first step, 130 CHCs should be upgraded as per Indian Public Health Standard norms and be fully equipped. Efforts should be made to ensure deployment of sufficient manpower as well as ensure avail-

ability of fiscal and physical resources in the service centers.

- b. Introduce a Logistics Management System (LMS) to enhance functionality of Health Institutions

The state must design and establish a LMS at the State level and district level. This will ensure adequate availability of medicine, vaccines and equipments at block and lower level health institutions.

- c. Reforms under HRD e.g. Staff Appraisal System, incentives, promotions, transfers, etc. The state has already conducted a Workforce Management study under the Sector Investment Programme and the same is under circulation for obtaining the comments and suggestions. The recommendations of the study must be discussed and implemented soon.

## 3) Improving Maternal & Child health care

Maternal & Child Health care holds the key to addressing overall reproductive and child health problems. Madhya Pradesh has the MMR (269 as per SRS 2007-09 data) and IMR (67 as per SRS data) in the country<sup>1</sup>. Therefore, it is imperative to ensure proper provisioning of facility and services within the reach of poor people through the following programme strategies.

- a. Improving Maternal Health through enhancing quality of ANC & PNC and increasing institutional deliveries

Special efforts are being made to increase the number of institutional deliveries. Schemes like Janani Suraksha Yojana (JSY) have been introduced to provide cash incentives to the population living below poverty line. Cash incentives are being introduced for the staff working in health institutions where safe deliveries are taking place. It is hoped that these interventions will help in increasing the number of institutional deliveries in quality terms and reducing the maternal and infant mortality rates. However case has to be taken that there is a corresponding expansion and increase in the facilities so that complicated cases are not crowded out and service limit impression. Beside Skill up-gradation of ANM and other paramedical staff must be carried out on priority basis.

- b. **Improving Child Health to reduce Mortality, Morbidity and Malnutrition**

The health department is struggling at improving the quality of child health care, particularly new born care by ensuring better implementation of the Integrated Management of Neonatal and Childhood Illness Programme.

The health department will be required to work more closely with Women and Child Development Department in the implementation of Infant and Young Child Feeding norms. ICDS schemes also need to be revamped as suggested by the external evaluation carried out by Poverty Monitoring and Policy Support Unit of MPSPC<sup>3</sup>.

**c. Public Private Partnership to enhance MCH services**

Looking at the states requirement, the policy holders have to think seriously on accreditation of Private Health Providers, Public Private Partnership (PPP) for establishing health centers, Mobile clinics in remote inaccessible areas.

**4) Population Stabilization**

The Family Planning and Welfare Programme is vital for controlling and stabilizing the population of state. A favorable political and administrative climate is vital for successful implementation of population stabilization programme. The state has to focus on following interventions;

**a Enhancing the awareness, choice, acceptance and quality of family planning services**

Government will have to pay more attention towards the social marketing of contraceptives. Behavior Change Communication activities for socio-economic issues and utilization of family welfare services should be more intensified. Skill development of ANMs on IUD insertion and Medical Officers and Staff Nurses for injectable contraceptives ought to be carried out may be on a pilot basis.

**b. Increasing Male participation in Family Planning**

Male vasectomy in our state is still 01 percent of total sterilizations. Constant BCC efforts are required to change the mindset of people. The department is required to show efficiency in promoting Non Scalpel Vasectomy Technique to increase male participation.

**c. Family life education**

Issues like such as child marriage, age at marriage and precautions for preventing RTI/STI among adolescents are serious matter of concern for health. An organized effort in form of full package of Family life education is required from health department, which should cover all adolescents' girls including school going and non school going adolescent's girls.

**5) Resource allocation strategy for reducing out of pocket expenditure**

The department will need a better allocation of public resources. Public funds are currently not put to optimal use. Resources are not allocated in a cost effective manner. A high proportion of benefits go to the better off and there is evidence of inefficiency. Resources allocation should have a pro rural and pro poor bias.

**6) Inter Sector Convergence**

The overall well-being of the citizens depends upon the synergistic functioning of the various sectors in the socio-economy. The health status of the citizens would be dependent on various factors besides the health care service delivery i.e. adequate nutrition, safe drinking water, basic sanitation and a clean environment. The different sector can work in close coordination together to bring about a common objective, and then outcomes can be achieved in a shorter span of time and in a cost-effective manner.

**7) Financing health**

The financing for health care is inadequate and should be increased particularly from the public sources. Further the financing, as out of pocket payment at the time of receiving services is regressive from equity perspective, and is also against the interest of the poor. The health Department receives funding from the state government, the Government of India, External Aid Agencies and Rogi Kalyan Samitis (RKS). The RKS must raise resources through commercial use of assets and donations from local citizens. Other important sources of funds can be community contribution, MP & MLA Local Area Development funds.

Flexible financing approach for more resources needs to be adopted. The Government of India is supporting under NRHM for National Health Programmes. The department can receive additional funds under NRHM if performance on key indicators is good.

Expenditure on health sector by both centre and states government have to increase from 1.3% of GDP to at least 2.0%, and perhaps 2.5% of GDP by end of 12th Five Year Plan.

Successful implementation of the above mentioned initiatives will enable state health systems to contribute significantly to the health care of population of the state as well as our country. Above review has also raised some concerns that require greater research and policy attention.

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#### **REFERENCES**

1. Website of Census of India 2011. [www.censusindia.org](http://www.censusindia.org), SRS 2011, SRS 2007-09, Special Bulletin on Maternal Mortality in India 2007-09.

2. MP Factsheet of National Family Health Survey Round III, Yr.2005-06, <http://hetv.org/india/nfhs/nfhs3/NFHS-3-MP>
3. Study report of Impact Assessment of ICDS in MP, Poverty Monitoring and Policy Support Unit of MP SPC, Govt. of MP. [www.mp.gov.in/spb/international-aided-projects/pmpsu/default.htm](http://www.mp.gov.in/spb/international-aided-projects/pmpsu/default.htm)
4. MP State Report 2009, department of Family welfare, Health Policy of state Govt. of MP.
5. Annual Plan 2010-11 of Madhya Pradesh State Planning Commission, Govt. of MP.

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