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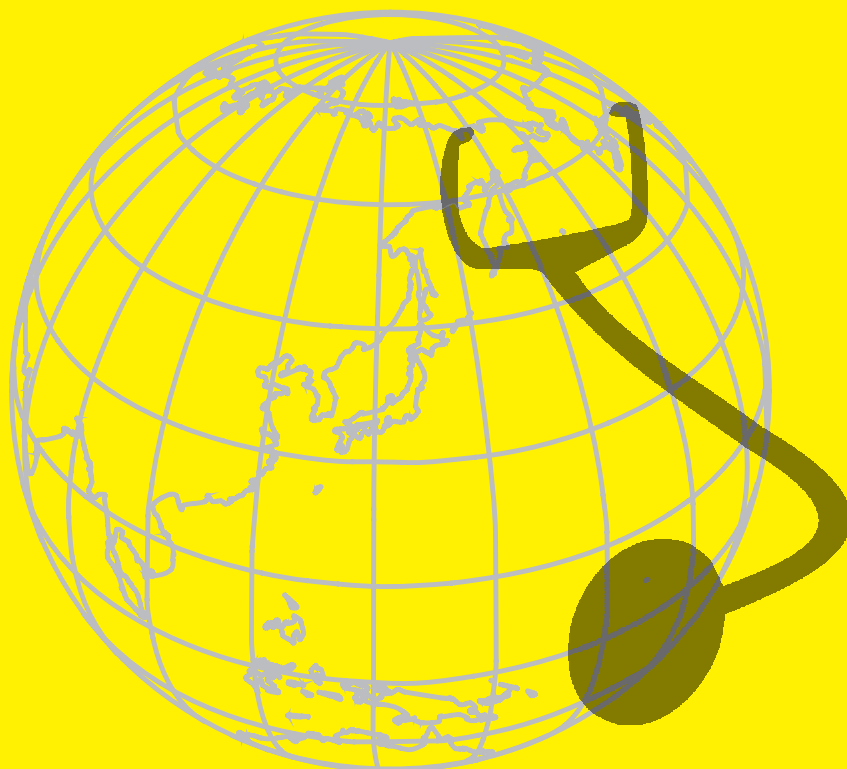
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# Assessment of Iodine Deficiency Disorders using 30 Cluster Approach in Puducherry (India)

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## ABSTRACT

**Background & objectives:** Iodine deficiency disorders (IDDs) though largely preventable continue to be an important public health problem worldwide. IDDs have been reported from Puducherry and the surrounding States. We undertook this survey in all the 4 districts of the UT of Puducherry to study the prevalence of goitre in a sample of school children, to measure the level of iodine in salt samples and to determine the median urinary iodine concentration in a sample of these children so that the progress towards IDD elimination in the region can be assessed.

**Method:** In a cross-sectional study among 2581 school-going children in the age group of 6-12 years in the UT of Puducherry. A total of 30 clusters were selected by the PPS (Population proportion to size) method. The children were clinically examined for presence of goitre, urine samples were collected and salt samples from their kitchens were tested for iodine concentration.

**Results:** The total goitre prevalence (TGP) was 27.5% (moderately endemic) among the children examined. The median urinary iodine concentration (MUI) was 142.9 µg/L (normal 100-199 µg/L). Only 7% of children (target <20%) showed low MUI (<100 µg/L). Iodine content was found to be adequate (> 15ppm) in over 60% (target > 90%) of the salt samples.

**Interpretation & conclusions:** Our study showed that goitre is still an important public health problem in Puducherry and as it's important for the mental development of children, the various operational factors need to be identified to strengthen the NIDDCP and improve the consumption of iodized salt.

**Keywords:** Iodine Deficiency Disorders (IDDs), Prevalence of Goitre, Median Urine Iodine (MUI) and Elimination of IDD

## INTRODUCTION

Iodine deficiency is an important preventable cause of brain damage in childhood and the primary motivation behind the current worldwide drive to eliminate it. The main factor responsible for iodine deficiency is low dietary supply of iodine<sup>[1]</sup>. In India,

no state is free from iodine deficiency and over 200 million people are 'at risk' of IDD<sup>[2]</sup>. Sample surveys conducted in 28 States and 7 Union Territories have revealed that out of 324 districts surveyed so far, 263 districts are IDD endemic<sup>[3]</sup> (prevalence of IDD was above 10 percent). In order to eliminate iodine deficiency in India and to comply with the international goal of universal iodization, compulsory iodization all table salt was introduced in 1983. The goal of the 'National Iodine Deficiency Disorders Control Programme' (NIDDCP) was to reduce the prevalence of IDDs to below 10 percent in endemic districts of the country by the year 2000<sup>[4]</sup>.

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There has been progress under this program as less than 5 percent total goitre prevalence (TGP) was found

in 9 of the 15 districts studied in 11 States by the Indian Council of Medical Research (ICMR)<sup>[5]</sup>. An earlier study indicated that Puducherry is also IDD endemic with the total goitre prevalence (TGP) of 15.2% and 44.4% of the children examined had less than 100µg/L levels of median urinary iodine (MUI) excretion<sup>[6]</sup>.

The NIDDCP recommends periodic evaluation and assessment of the IDD situation by prevalence surveys for goitre (TGP), measurement of urinary iodine levels and an analysis of the iodine content in salt utilized for domestic consumption. Although IDD affects the entire population, a school based sampling method using TGP and MUI methods has been recommended as the most efficient and practical approach to monitor IDD<sup>[7]</sup>.

We therefore undertook this survey for the Government of Puducherry to track the progress made towards elimination of IDDs in the UT of Puducherry with the objectives to estimate the prevalence of goitre in the school going children aged between 6-12 years and to compare it with the past survey; to determine the median urine iodine concentration in a sample of children and to assess the level of iodine in salt samples at the household level.

## MATERIAL & METHOD

*Selection of study area:* The UT of Puducherry with a population of 9, 73,829 in coastal South India encompasses an area of 492 sq. Km with 4 regions namely, Pondicherry (Pop.7, 35,004) and Karaikal (Pop. 1, 70,640) located in the state of Tamil Nadu, Mahe (pop. 36,823) is in the State of Kerala and Yanam (pop. 31,362) is in the State of Andhra Pradesh. Mahe and Yanam are purely urban and the 66.6% of the total population is urban. The UT has 263 villages/wards<sup>[8]</sup>. The main source of water is groundwater and being a coastal region rock salt (mostly not iodized) is freely available and used. There are 379 (63%) government and 219 (37%) private schools. There were 1, 50,747 enrolled in the 1<sup>st</sup> to 7<sup>th</sup> standards majority being in the age group of 6-12 years<sup>[9]</sup>. At any given point of time there are less than 5- 10 percent remain absent from schools.

The NIDDCP was implemented in 1992, the previous survey was undertaken in 1997 among 2065 school going children aged 6-11 yrs. The goitre rate

was 2.6%, 28.9% had MUI <100µg/l and only 31.3% of the households consumed with >15ppm of iodine salt<sup>[10]</sup>.

The study protocol was approved by the PIMS Institutional Ethical Committee. Prior permission of the Director of Health and Family Welfare Services and Director of Education, Government of Puducherry was obtained and was conveyed to all the school Principals.

*Selection of population:* A cross-sectional survey was carried out between November 2008- March 2009 and 12,685 school children in the age group 6-12 yrs were enlisted from 30 schools in the 4 districts of Puducherry from which the study sample of 2940 children were selected using standard guidelines<sup>7</sup>.

*Sampling method:* Multi-stage sampling with population proportionate to size (PPS) was used<sup>[11]</sup>. The sampling frame comprised of cumulative population of each village/ward (cluster) of the 4 districts of Puducherry. A total of 30 units (21 in Pondicherry, 4 in Karaikal, 3 in Mahe and 2 in Yanam) were selected by systematic random sampling using PPS. A village/ward wise list of all schools (Primary, Middle and Secondary schools) showing total number of enrolled children was prepared for each selected cluster and one school were selected from each cluster by simple random sampling. The school authorities were personally contacted and informed about the survey and their consent obtained. Ninety-eight children (49 boys and 49 girls) aged 6-12 years studying in Class 1 to Class VII were selected from each school by systematic random sampling, using the attendance register. An equal representation in the gender and age category was ensured. The informed consent forms (English and Tamil versions) were sent to the parents of the selected students with the help of the school Principal and Teachers. All children found to be below 6 years or above 12 years as per the date of birth records in the school and those who were found to be without the signed consent form were excluded from the study.

*Goitre examination:* Each child was clinically examined by the research team comprising of trained medical Interns and doctors under the supervision of a Faculty. The survey and examination methods were standardized to reduce inter-observer bias. A pre-designed and pre-tested questionnaire was used to record socio-demographic and physical examination



details. Goitre examination was done by palpation method and classified as grade 0, 1 and 2 according to WHO/UNICEF/ICCIDD Guidelines [12].

*Urine samples:* Spot urine samples were collected from 10 children studying in 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> class in each school (5 girls and 5 boys) in labelled sterile wide-mouthed screw- capped plastic containers of 50 ml capacity. The samples were transported to the clinical biochemistry laboratory of PIMS for processing and quantitative estimation of iodine in urine, using the method based on Sandell-Kolthoff reaction<sup>7</sup>. The rapid kit (Urine Iodine Test kit<sup>®</sup>) was obtained from Esteem Diagnostic products, Chennai. The test done on the auto analyser had a mechanism of internal quality control for every batch of 10 samples.

Median urine iodine (MUI) is an epidemiological criterion to assess iodine nutrition and a concentration of  $e^{-100\mu\text{g/l}}$  defines a population with no iodine deficiency [13], i.e. at least 50 percent of the samples should be above  $e^{-100\mu\text{g/l}}$ .

*Salt samples:* The selected students in each school were each given an air tight plastic pouch for salt collect and bring a spoonful of salt consumed by their families from their homes. About 70-80 samples were collected from each school. These samples were tested qualitatively on spot with MIB kit provided by UNICEF/GOI and iodine concentration was recorded

categorically as 0, 7, 15, and 30. Iodine concentration of  $> 15\text{ppm}$  was considered adequate.

Data was analyzed using SPSS version 16.0 available in the Department of Community Medicine, PIMS.  $P < 0.05$  was considered statistically significant.

## RESULTS

In the present study we initially selected 2940 from 30 school (16 Govt, 14 Private) in the four districts of Puducherry, However due to the exclusion criteria used this sample reduced to 2581 school children (1345 boys and 1236 girls) in the age group of 6-12 years who were examined for goitre, 2253 salt samples and 300 spot urine samples ( $> 10\%$  of study population) were collected for iodine estimation. Eighty percent (80.3%) were from urban areas.

Table 1. Summarizes the various indicators used for monitoring the IDD status<sup>[14,15]</sup> in the 4 districts of the UT of Puducherry in comparison to the rest of India and also the criteria used for monitoring progress towards sustainable elimination of IDD. The TGR in Puducherry is 27.5% (target  $< 5\%$ ) and the MUI is  $142.9\mu\text{g/l}$  (target  $>100\mu\text{g/l}$ ) and 60.9% (target  $>90\%$ ) of households consumed adequately iodized salt. Karaikal had the lowest consumption (37.9%) of adequately iodized salt.

**Table 1: Comparative summary of indicators to monitor IDD status in the UT of Puducherry. India**

Indicators	Criteria for IDD elimination <sup>[5]</sup>	Current Status in India <sup>[11]</sup>	Current Status In Puducherry				
			Pondicherry	Karaikal	Yanam	Mahe	Puducherry UT
Total goiter prevalence rate (Grade I+II)	$<5\%$	17.9%	25.94% (n=1773)	27.92% (n=351)	35% (n=180)	31.77% (n=277)	27.47% (n=2581)
Salt iodization Proportion of households using adequately iodized salt	$>90\%$	51%	59.45% (n=1534)	37.85% (n=288)	67.05% (n=173)	90.70% (n=258)	60.90% (n=2253)
Median Urinary iodine (In the general population)	100–199 $\mu\text{g/l}$	133 $\mu\text{g/l}$	128.35 $\mu\text{g/L}$ (n=206)	147.1 $\mu\text{g/L}$ (n=35)	149.55 $\mu\text{g/L}$ (n=18)	158.4 $\mu\text{g/L}$ (n=41)	142.9 $\mu\text{g/L}$ (n=300)

Table 2. Shows the age gender distribution of the study population with age wise data on TGP and MUI. TGP ranged from 24.9% to 29.8% in the 4 regions and

MUI ranged from  $126.2\mu\text{g/l}$  to  $152.5\mu\text{g/l}$ . There was no gender difference in the TGP and MUI.

**Table 2: Age and Gender wise distribution of MUI and TGP rate in Puducherry. India**

Age	Gender		Total	Median (UIE)(n=300)	Grade Goiter			
	Male	Female			0	1	2	Total goiter rate
6	208	197	405	130.35µg/L (n=44)	304	78	23	24.94%
7	198	186	384	126.2 µg/L (n=50)	275	82	27	28.39%
8	223	184	407	147.8µg/L(n=47)	295	87	25	27.52%
9	236	187	423	144.55µg/L (n=60)	305	88	30	27.90%
10	199	230	429	142.75µg/L(n=37)	301	101	27	29.84%
11	189	155	344	146 µg/L(n=45)	258	70	16	25.00%
12	92	97	189	152.5 µg/L(n=17)	134	40	15	29.10%
Total	1345	1236	2581	142.9 µg/L	1872	546	163	27.47%

Table 3. Compares the salt iodization status with the MUI and TGP in the study group. The households having adequately iodized salt had children with

higher MUI and lower TGP compared to those households with inadequately iodized salt (<15ppm).

**Table 3. TGP and MUI as per Salt iodization status in the study group in Puducherry, India**

Salt Iodine	No Goiter	Goiter	Total	TGP	Number of urine samples	MUI (Median)	Urine Iodine (Mean)
< 15 ppm	630	252	882	28.57%	109	128.3 µg/l	143.4 µg/l
> 15 ppm	1013	358	1371	26.11%	153	146 µg/l	155.9 µg/l
Total	1643	610	2253	27.08%	259		

$\chi^2 = 1.644$  p= value 0.20 not sig. TGP (Total goitre prevalence), MUI Median urine Iodine

The school authorities were informed about the children found with IDD (goitre or low urine iodine concentration). They were referred to the nearest Government Health centre for necessary follow up action.

### DISCUSSION & CONCLUSION

Periodic evaluation of health programmes is necessary to ensure that the overall goals and objectives are being met.

In our study the MUI concentration (142.9µg/l) was within normal range and only 6.8% of the population showed MIU of < 100µg/l indicating no iodine deficiency however using the other indicator of TGP (>20%) there was a moderate problem of IDD (27.5%). This discrepancy may be perhaps because MUI concentrations reflects the current situation of iodine supply while thyroid size indicates the long term iodine status or because of the inaccuracy of the palpation method, especially when the thyroids are small. The prevalence of IDD determined by the two indicators does not necessarily need to be consistent<sup>[16]</sup>.

An earlier study done in Pondicherry (2005)<sup>6</sup> showed a TGP of 15.2%, MUI of 100µg/l (44.4% of

children had MUI < 100µg/l), however this cannot be compared as the study was restricted to only one district of Puducherry and included older children 9-13 yrs. The present study done 11 years after the last survey (1997)<sup>10</sup> has shown considerable rise in terms of access to iodized salt (from 31.4% to 60.9%) and improvement in the MUI concentration 6.8% population showed deficiency compared to 28.9% in the last survey. Overall it appears that the UT of Puducherry has performed better than rest of India in its progress towards elimination of IDD as a public health problem (Table 1).

The limitation of our study was that we were unable to obtain a representation from the students absent from school on the day of the survey. However, this study based on a representative sample will serve as a benchmark for future comparisons and can lead to meaningful interventions culminating to elimination of IDD as a public health problem from Puducherry. There is a need to study the other causes of goitre in this age group, perhaps study the iodine status among antenatal mothers as this period is critical for the foetal brain development and also carry out behavioural change communication activities to improve consumption of iodized salt in the region.



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# Hyperammonemia in Intensive Care Unit - A Case Report

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## ABSTRACT

Hyperammonemia is often encountered in encephalopathy due to liver failure. It is less thought as a cause of encephalopathy in patients without liver failure. We describe a case of acute encephalopathy in a twenty four years female with psychiatric illness background. More than half of ammonia is produced in intestine in our body. In the absence of liver failure metabolic causes and drugs are to be considered as a cause of hyperammonemia.

**Keywords:** Encephalopathy, Hyperammonemia, Drugs

## INTRODUCTION

Encephalopathy is common reason for admission in ICU. In patients where the reason for altered sensorium is not very clear often metabolic causes were looked for. In this case report we describe a patient admitted with coma after treatment for psychiatric illness without any apparent reason for unconsciousness. Non hepatic causes for hyperammonemia<sup>1</sup> are many and often difficult to prove. In this patient we found sodium valproate as the cause and stopping the drug helped the patient to recover.

## CASE REPORT

24 yrs female was admitted in our medical intensive care unit with history of unconsciousness for one day. She was admitted under psychiatry unit with history of restlessness and irritability and diagnosed as manic episode with mood congruent syndrome. She was on antipsychotics with recent escalation of drug doses. During second week of hospital stay she developed unconsciousness with decerebrate rigidity. At the time admission to intensive care she was unconscious with features of aspiration and high grade fever. She was

mechanically ventilated and evaluated for encephalopathy. All her blood parameters were normal except for raised ammonium level<sup>2</sup> (265 microgram / dL) and diffuse cerebral edema in CT brain.

The possible causes we thought for her encephalopathy are sepsis related, hypoxemia and drug related. The possibility of infection was less due to normal blood picture and normal CSF study. Hypoxic encephalopathy was less likely as she was hospitalized and monitored.

Drug history was reviewed and she was on Haloperidol, Olanzapine and Sodium valproate. Sodium valproate was started 48 hrs before admission to our unit. Serotonin syndrome was ruled out due to absence of other features except for encephalopathy.

Sodium valproate induced acute hyperammonemia and encephalopathy<sup>3</sup> was the final diagnosis. She mechanically ventilated and treated with mannitol<sup>1</sup>, carnitor<sup>4, 5</sup> and extubated after 96 hrs. Her plasma ammonia on 3<sup>rd</sup> day after admission was 67 microgram / dL. She was treated in ward for 7 days with Olanzapine and lithium and discharged from hospital.

## DISCUSSION

Ammonia is a highly toxic compound. More than half of ammonia is produced in the intestine by the bacterial flora as a breakdown product of proteins and aminoacids. When the blood concentration of ammonia is elevated altered level of consciousness,

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respiratory alkalosis, cerebral edema, seizures and death occurs<sup>1, 2, and 3</sup>.

Hyperammonemia ensues by multiple mechanisms. When the production exceeds the metabolizing capacity of liver, if the portal circulation bypasses the liver and other etiologies such as urea cycle disorders, valproate toxicity. The exact level of ammonia that causes encephalopathy is not defined<sup>3</sup>. Though liver failure is often the cause of hyperammonemia in

Intensive care, intensivists should be aware of less common causes like sodium valproate and other metabolic causes.

Drugs like valproate can cause hyperammonemia by interfering with urea cycle. The possible mechanism of hyperammonemia by valproate is by increasing propionic acid level which inhibits carbamoyl phosphate synthase (CPS) enzyme. CPS is rate limiting enzyme in urea cycle<sup>4</sup>. Both therapeutic and toxic dose of valproate can cause hyperammonemia<sup>1</sup>.

Several treatment options are available for hyperammonemia. Often therapy has to be initiated empirically as in most adults as they present with symptoms of raised intracranial pressure. Mechanical ventilation to maintain oxygenation and airway protection has to be initiated appropriately as it was in this patient. Management of raised intracranial

pressure and dialysis for removal of ammonia can be considered. Offending drugs should be stopped. L-carnitine facilitates lipid metabolism and may reduce blood lactate level by indirectly stimulating pyruvate dehydrogenase.

In summary, in cases of unexplained unconsciousness blood ammonia level has to be checked. Early cessation of offending agent and initiation of supportive management will give better outcome.

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# A Study of Current Level of Coverage with Respect to Selective Components of RCH Services in Bangalore Urban District

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## ABSTRACT

**Introduction:** Promotion of maternal and child health has been one of the most important objectives of the Family Welfare Programme in India. It is being delivered through network of sub centers, primary health centers and first referral units. Primary Health Centers have the major responsibility of providing all the above services to the community as they are more easily accessible compared to district hospitals and sub district hospitals.

### Objectives:

1. To study the current coverage of selective components of RCH services at PHCs in Bangalore Urban district.
2. To find out the responses of MO of PHCs with respect to the current coverage of services.

**Study design:** Cross sectional study

**Results:** It was observed that ANC registration was 81%, early registration was 53% and minimum 3 ANC checkups was given for only 71% of the registered pregnancies. Review in monthly meeting, increase frequency of awareness program and making ANMs stay in the subcenter compulsory were the common response given by the medical officers.

**Conclusion:** More studies need to be done to find the reasons for not registering the pregnancies and also for not availing the available services from the beneficiaries.

**Keywords:** RCH, Coverage, Services, Response

## INTRODUCTION

Promotion of maternal and child health has been one of the most important objectives of the Family Welfare Programme in India. The government of India took steps to strengthen maternal and child health services as early as the First and Second Five –Year

Plans<sup>1</sup>. India changed the strategy of National Family Welfare Program to reproductive and child health in 1997.<sup>2</sup>

Reproductive and Child Health (RCH) Programme was launched in 1997. This program is envisaged to provide an integrated package of services, which includes services for mothers during pregnancy like early registration of pregnancy, regular follow up, supplementation of iron and folic acid in them, immunizing with tetanus toxoid vaccine treatment of anemia, and management and referral of high risk pregnancies<sup>1</sup>.

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Other services of RCH includes, institutional deliveries, provision of postnatal care, services for children like newborn care, immunization, management of common illness in children; services for adolescence and for eligible couples<sup>1</sup>.

These services are being delivered through organized infrastructure. We have well structured three tier health system in India. It is being delivered through network of sub centers, primary health centers and first referral units.<sup>3</sup> Primary Health Centers have the major responsibility of providing all the above services to the community as they are more easily accessible compared to district hospitals and sub district hospitals<sup>4</sup>.

So the current study was undertaken to study the current level of coverage of some of these services and also to get an insight about the responses of the Medical Officer of Primary Health Centers (PHCs), responsible for provision of these services to the women.

### OBJECTIVES

1. To study the current coverage of selective components of RCH services at PHCs in Bangalore Urban district.
2. To find out the responses of MO of PHCs with respect to the current coverage of services.

### MATERIALS AND METHOD

The study was conducted in Bangalore Urban district, which caters to a population of about 23,14,050 (2001 census). It consists of 4 talukas (Anekal, Bangalore South, Bangalore North, and Bangalore East). There are totally about 31 Primary Health Centers (PHCs) in this district.

**Study Design:** A cross sectional study.

### SOURCE OF DATA

- Reporting form No. 2, that is Action plan of PHCs available at DHOs' office.

- Monthly Reports, form No. 7, sent to DHO office.
- Interview with Medical Officer of PHC.

**Study duration:** January 2007 to August 2007

**Statistical analysis:** Descriptive statistics, proportions and percentages.

### METHODOLOGY

After obtaining necessary permission from District Health Office and RCH officers, basic information on planned performance and monthly performance with respect to interventions selected such as early registration of pregnancy, provision of minimum of three antenatal care visits, providing prophylaxis and treatment for anaemia with IFA and immunization of pregnant women with 2 doses of TT injections: was collected in DHO and RCH office, from Action Plan(Form No. 2) for the year 2006-07 and monthly reports of all the PHCs for the month of December06, January 07 and february07.

This data was analyzed and percentage of pregnant women registered, proportion of early registration and those availed minimum of 3 antenatal visits were found out.

Since there was lack of supply of IFA tablets, proportion of women treated or given prophylaxis with IFA could not be found.

For finding out the proportion of women who were completely immunized with TT, those women who had received two doses of TT or one booster dose of TT were considered completely immunized with TT.

After analyzing the initial data, all the PHCs were visited with this data and Medical Officer of PHC were interviewed. Data regarding the actions that the Medical officer of PHC, would like to take to modify the performances in each of these interventions were collected. If there were more than one MO in the PHC, then one who was designated as administrative medical officer was interviewed.



## RESULTS AND DISCUSSIONS

**Table1: Performance status with respect to selected components of RCH programme in Bangalore Urban District**

Taluk	RCH services( in 3months – Dec06, Jan07 & Feb07)							
	Registration of pregnancy		Early registration		Minimum 3 antenatal checkups availed		Complete immunization with 2 doses of TT	
	Expected number	Actual registration done (%)	Total registered pregnancies	Registered < 12 wks (%)	Expected number	Actual number who had 3 checkups (%)	Expected number	Actual number who are completely immunized (%)
Anekal	1878	1498 (79.76)	1498	814 (54.33)	1498	1036 (69.15)	1498	1636 (109.2)
Bangalore South	3487	2974 (85.28)	2974	1612 (54.2)	2974	2224 (74.78)	2974	2959 (99.50)
Bangalore East	3006	2417 (80.41)	2417	1200 (49.65)	2417	1601 (66.24)	2417	2277 (94.20)
Bangalore North	4932	3990 (81.99)	3990	2156 (52.13)	3990	2945 (73.81)	3990	4281 (107.3)
Total	13,303	10,879 (81.77)	10,879	5782 (52.44)	10,879	7806 (71.75)	10,879	11,153 (102.52)

The above table shows the coverage level of each taluk with respect to selected RCH services. It was found that the registration of pregnancy in this district was about 81.77%, which is well above the national average of 77% according to NFHS-3<sup>5</sup>. But the registration of pregnant women in this district was found to be less than that for Karnataka according to NFHS 2 & 3 results for Karnataka, which is 86% and 91% respectively<sup>1, 6</sup>.

The proportion of pregnant women getting registered <12 wks was found to be 52.44%, which is comparable with that for Karnataka which was 53% according to NFHS-2, but well above the national average of 33% according to NFHS-2 and 40% according to District Level Household Survey.<sup>1,7,8</sup>

Proportion of pregnant women availing minimum of 3 antenatal visits was 71.75%, which is comparable with that for Karnataka i.e, 79.3% in NFHS-3, while national average was 44%.<sup>6,7</sup>

With regards to proportion of women being immunized with TT, it was found to be unusually high with 102.52%, which is over-ambitious, incorrect &

inflated. This shows some misreporting of data.. When asked about the same to the medical officers, they told that since they do not have the practice of registering pregnant women who come late (after 2<sup>nd</sup> trimester), but they provide services, which includes immunizing them with TT. Usually these women would be registered elsewhere but would have come to our area for delivery.

They also added that pregnant women, who avail services in private set up, come to government setup only for immunization and the same, cannot be denied to them. These are the main reasons because of which the number of women immunized with TT is more than the number registered. Therefore, same thing was analyzed taking expected number of pregnancies instead of registered number of pregnancies as denominator and the coverage was found to be 83.84%.

When asked about the actions they would like to take to improve performance, the Medical officers not only listed some actions that they would take but also mentioned the factors which are affecting the current performance level of RCH services.

**Table 2: Common responses given by the medical officers to improve coverage**

Sl. No.	Responses	Frequency(n=30)	Percentage
1.	Review in monthly meeting	26	86.66
2.	Do awareness campaign for the population to improve early registration	13	43.33
3.	Will find out reasons and try to correct them	11	36.66
4.	Stay of ANM in sub center should be made compulsory, if we have to improve the performance	8	26.66
5.	Difficult to improve early registration because of strong beliefs, that it is not necessary to register early	8	26.66
6.	There should be a building for each sub center	6	20
7.	Have to start collection of cases from private setup.	3	10

Table 2 shows that majority 26 (87%) of them responded saying that they will review in monthly

meeting and take necessary actions. Less than half 43% (13) of them told that they will be increasing awareness

programme for the population, so that they can improve early registration.

About 8(27%) of them told that improving early registration is difficult because, it is deeply rooted in many that it is not necessary to inform until it is 3 months, and also have the opinion that till then there is nothing that the doctors or the health workers can identify.

Doctors also added that to improve early registration field activities should be of high quality. Same number of doctors, i.e. 8 (27%) of them was of the opinion that, it should be made compulsory for Auxillary Nurse Midwives to be a resident in their respective sub center area. They say, if this happens, coverage with respect to many aspects of RCH programme will automatically improve. 6 (20%) of them added that, there should be a separate building as sub center in all the areas, which is presently lacking.

**Table 3: Responses of medical officers with respect to factors affecting the coverage of RCH services:**

Sl. No.	Responses	Frequency(n=30)	Percentage
1.	Presence of floating population affects the coverage	20	66.66
2.	Population covered by each ANM is very high	17	56.66
3.	Many of them avail services from private sectors (10 – 30%)	18	60
4.	Many of them are workingwomen. So it is very difficult to meet them during working hours	12	40
5.	Unfilled vacancies for long will affect coverage	5	16.66
6.	Lack of supply of IFA tablets, indirectly affected coverage	10	33.33
7.	Many women move to mothers place after initial months, and few of them come to our area during later months.	8	26.66

It was found that presence of floating population in the city, reaching working women during PHC working hours and higher proportion of population to be covered by each ANM is major factors affecting the coverage as stated by MOs.

About 10(33%) of the doctors opined that lack of supply of IFA tablets since two years is affecting their coverage to some extent. They say that people look for some free items, when they seek government services for health care. When we don't give anything, instead prescribe the drugs; they prefer going to private clinics than ours.

About 27% (8) of doctors said that many registered women move to mothers place after 5 to 6 months of gestation and few come to their area during 8<sup>th</sup> or 9<sup>th</sup> month of their pregnancy. So for both these groups, they might not be able to give 3 visits, which may affect their coverage.

### Conclusions and recommendations

In our study one in 5 pregnant women are still going unregistered and out of them only half of them are registering early and 2 out of 3 registered women are getting minimum of 3 antenatal checkups. That

means, we need to study reasons for not registering the pregnancies and also for not availing the available services from the beneficiaries.

Meanwhile, suggestions from medical officers such as changing the timings of field visits to afternoon, making ANMs stay in sub center compulsory and maintaining uninterrupted supply of iron and folic acid tablets to the centers can be seriously looked into.

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# A Study of effect of Aerobic Strenuous Exercise on Oxidative Stress in Young Healthy Individuals by using Serum Malonyldialdehyde Levels

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## ABSTRACT

**Background:** Intense physical activity in the form of strenuous exercise causes more oxygen consumption and more free radical production termed as oxidative stress ,which is in the form of increased by products of lipid peroxidation (increased MDA levels) as the intensity and duration of exercise was more. On the other hand in other study it was found that endurance training reduced MDA level which is a byproduct of lipid peroxidation. The present study is designed to see the effect of "Aerobic strenuous exercise" on oxidative stress in young healthy individuals over a period of six months.

**Materials & Method:** The present study was undertaken 32 male individuals practicing aerobic strenuous exercise. Aerobic moderate to severe type of exercise given on bicycle ergometer. Pulse rate was used as an indicator of severity of exercise. Serum Malonyldialdehyde (MDA) was estimated as an index of lipid peroxidation.

**Result:** There is statistically significant increase in average serum MDA values between the before & after 3 months of Aerobic strenuous exercise training.( $p < 0.05$ ).Also there is statistically highly significant ( $p < 0.001$ ) decrease in average serum MDA values between before and after the 6 months of aerobic strenuous exercise training.

**Conclusions:** Awareness about the effects of short term exercise and long term endurance exercise should be spread amongst all the individuals joining these types of exercise schedules at various centers. They should be encouraged for long endurance exercises for most beneficial effects on the body.

**Keywords:** Oxidative stress, Strenuous exercise, Serum Malonyldialdehyde

## INTRODUCTION

Health is defined as Physical, mental and social well being and not merely the absence of disease.<sup>1</sup>

Since the time of industrial revolution, technology has advanced at an astounding rate. People are becoming more and more sedentary and many

individuals find significant physical outlet by engaging in sports during their leisure time or joining some physical training centre.

It is however important that Physical activity be appropriately regulated. Although on one hand sedentary lifestyle with too little activity is bad for health, excessively intense or wrong type of physical activity may create negative attitudes, damage or deform the body. Thus appropriate activity programmes ought to be scheduled and scientifically validated with an ultimate aim of improving the physical fitness. The beneficial effects of exercise in the form of long term training, on physical health has been repeated and proven beyond the doubt.<sup>2</sup>

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Ageing causes decrease in physical fitness and affects all the systems of body. The deterioration is enhanced by lack of Physical activity. To overcome or at least reduce the rate of decline, in the level of physical fitness, a number of different types of exercise schedules are prescribed. These are either some aerobic endurance exercises such as running, swimming, jogging, cycling, or anaerobic high intensity and short duration exercises like fifty and hundred meter sprint, weight lifting etc.

Intense physical activity in the form of strenuous exercise causes more oxygen consumption and more free radical production termed as oxidative stress; Oxidative stress is production of oxygen radicals in biological system. Various types of exercises and free radical production studies already have been done. It is observed that variable results are drawn from these studies.<sup>3</sup>

According to some studies there was increase in indicators of oxidative stress in the form of increased byproducts of lipid peroxidation (increased MDA levels) as the intensity and duration of exercise was more. On the other hand in other study it was found that endurance training reduced MDA level which is a byproduct of lipid peroxidation.<sup>4,5</sup>

The present study is designed to see the effect of "Aerobic strenuous exercise" on oxidative stress in young healthy individuals. In this study serum Malonyldialdehyde (MDA) levels are taken as an indicator of oxidative stress of an individual.

## MATERIALS AND METHOD

The present study was undertaken 32 male individuals practicing aerobic strenuous exercise. Male subjects aged between 20-35 yrs included in the study. Recording of vital data and pulse, blood pressure, respiratory rate, Dietary history of each subject was taken at the time of first meeting and was instructed to follow same dietary pattern throughout the study period & advised standard diet. No previous or current training in any type of exercise is confirmed. Subjects were asked not to eat Citrus fruits 48 hours prior to blood sample was scheduled.

A study design was told to each subject and informed written consent was taken from each individual. Volunteers with family h/o carcinoma, Recent exposure to radiation, addictions such as tobacco, Gutkha, alcohol, Cigarette smoking etc.were excluded from the study. It was confirmed that the

persons were not doing any sort of strenuous exercise and not doing any heavy physical works during routine job.

Aerobic moderate to severe type of exercise given on bicycle ergometer. Standardization-Standardization was necessary to have same type and duration of exercise. The exercise given to the subject was on a bicycle ergometer. The amount of resistance and the time for which the exercise is to be given was adjusted to avoid error or discrepancy in the data collection. In the study the same resistance was maintained and the subjects were asked to do the exercise. Though, ideally the VO<sub>2</sub> max is the best indicator of the intensity of exercise given, since heart rate closely resembles the VO<sub>2</sub> max and it is very much easier to measure the pulse rate: the pulse rate was used as an indicator of severity of exercise.<sup>6</sup>

Levels	METs	O2 consumption lit/min	Pulse rate **
Light	1.9-3.9	0.14-0.99	Upto 100
Moderate	4.0-5.9	1.00-1.49	100-120
Heavy/Severe	6.0-7.9	1.50-1.99	120-150
Very heavy	8.0-9.9	2.00-1.49	150-175
Unduly heavy	10 or more	2.50 or more	175 or more

METS-Multiple of resting metabolic rate .In this study pulse rate was ranging from 100-135 beats/min.This was corresponding to moderate to severe exercise.

Subjects were asked to exercise on bicycle ergometer and pulse rate was monitored continuously throughout the exercise. It was found that exercising for about 2± ½ min the pulse rate coincided with the value for moderate exercise.(pulse rate 100-120beats/min ) . Similarly when they exercised at the same resistance for about 4 min±1/2 min the values of pulse rate corresponded to severe exercise (pulse rate 120-150 beats /min).

As a precautionary measure, no time limit was set. It was found that almost all the individuals require roughly the same time.Yet; the pulse rate was continuously monitored throughout the exercise.

Collection of blood sample- The blood samples were collected from each individual. 1) Before aerobic strenuous exercise. 2) At the end of 3 months of aerobic strenuous exercise. 3) At the end of 6 months of aerobic strenuous exercise.

About 5 ml of blood was collected early morning hours without food, from anticubital vein with all

aseptic precautions. Serum was prepared by centrifugation and it was used for estimation of Malonyldialdehyde (MDA) as an index of lipid peroxidation.

Methods- Serum MDA is estimated by Buege and Aust (1978) method.<sup>7</sup> Malonyldialdehyde (MDA) is a

highly reactive three carbon dialdehyde, produced from lipid hydroperoxides. It can also be derived by the hydrolysis of pentose from amino acids and from DNA. MDA has most frequently been measured by thiobarbituric acid reaction.<sup>8,9</sup>

**Table no.1 Average serum MDA levels in Aerobic strenuous exercise group before and after aerobic strenuous exercise training (nmoles/ml).**

Sr. No.	Before Aerobic strenuous exercise (A) Mean+-S.D.	3 months after Aerobic strenuous exercise (B)Mean+-S.D.	6 months after Aerobic strenuous exercise. (C)Mean+-S.D.	Difference between A & B	Difference between A & C
1	2.86+ 0.33	2.99+ 0.35	2.65+ 0.26	0.13*	0.21**

There is statistically significant difference in average serum MDA values between the before & after 3 months of Aerobic strenuous exercise training.(p<0.05). Also there is statistically highly significant (p<0.001) difference in average serum MDA values between before and after the 6 months of aerobic strenuous exercise training.

### DISCUSSION

A combination of scientifically based information and circumstantial evidence indicates that physical activity is beneficial to health in general with specific physiological gains in various systems and many biochemical variables. Physical activity is associated with beneficial changes in serum lipid but exhaustive exercise has been suggested to increase oxidative stress. Increased mental stress also increases oxidative stress.<sup>10, 11, 12</sup>

Cells continuously produce free radicals and reactive oxygen species (ROS) as a part of metabolic processes. These free radicals are neutralized by an elaborate antioxidant defense system consisting of various antioxidant enzymes and antioxidant vitamins like Ascorbic acid (Vit.C) and  $\alpha$ -tocopherol (Vit. E). Excess physical activity, increased mental stress and exercise can produce an imbalance between ROS and antioxidants, which is referred to as oxidative stress.<sup>(4)</sup>

The marker used to determine the oxidative stress in blood and muscles is Malonyldialdehyde (MDA). MDA is sensitive marker of lipid peroxidation. The MDA - TBA reaction for MDA estimation is reliable indicator of lipid peroxidation and thus of oxidative stress.<sup>9, 12</sup>

It is well known that free radicals are generated deliberately by animal cells in certain special circumstances as these are beneficial as bactericidal agents. Also free radical chain reaction takes place in our body countless times a day. Cigarette smoking, alcohol consumption, pollutants, sunlight, radiations, emotional stress, mental stress, excess physical activity, and fast food all these can cause free radical formation and free radical chain reactions.

Most other factors influencing free radical production were ruled out and the present study was planned to study the effect of on the production of free radicals in aerobic strenuous muscular exercise which is dynamic exercise.

In this study the serum MDA levels were estimated as an indicator of oxidative stress in individuals performing aerobic strenuous exercise. The serum values were estimated before, 3 months after and 6 months after training.

As already stated physical activity is associated with beneficial changes in lipids and many other factors but exhaustive exercise has been suggested to increase oxidative stress. Initial suggestions that free radical processes such as lipid peroxidation were elevated during exercise came from studies of whole body exercise in man and rats. These were rapidly followed by studies of products of free radical reactions within the tissues of exercising animals. All these studies inferred that due to exercise induced damage to skeletal muscle, free radical generation increased.<sup>12</sup>

In the present study the exercise selected was aerobic, moderate to severe strenuous exercise. It was

done on bicycle ergometer. The serum MDA levels were estimated as an indicator of oxidative stress in exercising subjects before 3 month after and 6 months after aerobic strenuous exercise training.

Before exercise the values were ranging from 2.25 — 3.50 nmoles/ml. The serum MDA levels changed during strenuous exercise training these were shown in table no.1

Table 1 shows the average serum MDA levels in aerobic strenuous exercise group before and after strenuous exercise. It was found that there was significant increase in serum MDA levels( $2.99 \pm 0.35$  nmoles/ml) after 3 months of strenuous exercise training when compared with the values before exercise ( $2.86 \pm 0.33$  nmoles/ml ) ( $p < 0.05$ ). It was also observed that there was highly significant decrease ( $p < 0.001$ ) in serum MDA levels ( $2.65 \pm 0.26$  nmoles/ml ) after 6 months of strenuous exercise training results.

The study training results were matched with the previous studies done by Braun B, Kanter, Ashton T. and Ozbay B. The results were also coherent with the previous studies done by Clarkson P. M., Thompson H. S., Braun B. and Evans J. They showed that exercise resulted in increased amount of blood Malonyldialdehyde levels which served as an indirect indicator of lipid peroxidation, but exercise training resulted in reduction of lipid peroxidation and hence the oxidative stress of exercise.<sup>13-17</sup>

Strenuous exercise done on bicycle ergometer resulted in increased oxygen consumption. This resulted in increased generation of oxygen free radicals and increased oxidative stress. Also learning new type of exercise might be the mental stress as one of the contributing factors .Hence there was increase in serum MDA levels muscular exercise in a person, who is unconditioned or unaccustomed to exercise, induced oxidative damage and resulted in muscle injury. Increased physical exertion, increased oxygen consumption and muscle injury all together lead to increased oxidative stress and hence increased serum MDA levels.<sup>18-21</sup> Oxidative stress is increased significantly after 3 months of aerobic strenuous exercise (adverse effect) but there was highly significant decrease in oxidative stress after 6 months of aerobic strenuous exercise training.

Awareness about the effects of short term exercise and long term endurance exercise should be spread

amongst all the individuals joining these types of exercise schedules at various centers. They should be encouraged for long endurance exercises for most beneficial effects on the body.

**Limitations-**The study was done exclusively in males, so the effects in females yet to be confirmed. Also if there is any change in the oxidative stress in males and females with same type of exercise training is future study prospect.

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# A Comparative Study of Deritis in Alcoholic and Non-Alcoholic Liver Disease Patients in Pune, Maharashtra

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## ABSTRACT

**Objective:** The aim of the present study is to estimate the serum AST and ALT in alcoholic, non-alcoholic liver disease patients and in healthy controls for the assessment of Deritis to evaluate its clinical significance in differentiation of alcoholic liver disease from non-alcoholic liver disease.

**Method:** 100 cases of each alcoholic and non-alcoholic hepatitis between the ages of 40-65 years were included in the study and 100 ages matched healthy individuals served as control. Serum AST and ALT levels were determined by enzymatic methods by kits obtained from CPC diagnostics.

**Results:** It is found that AST and ALT levels are higher in both alcoholic as well as non-alcoholic hepatitis as compared to controls but it is statistically significant in case of alcoholic hepatitis. Similarly AST/ALT ratio is higher in both alcoholic and nonalcoholic hepatitis as compared to controls but it is statistically significant in case of alcoholic hepatitis only when compared to both non-alcoholic hepatitis and control.

**Conclusion:** The findings of the present study suggest that in alcoholic hepatitis release of transaminases into the circulation in such a way that amount of AST released is more than that of ALT so that ratio of AST to ALT is significantly higher in case of ALD. Hence, the Deritis ratio can be considered as a reliable marker of ALD. Thus estimation of the Deritis ratio is essential to understand the nature of liver disease.

**Keywords:** AST- Aspartate Amino Transferase, ALT- Alanine Amino Transferase, ALD- Alcoholic Liver Disease, Deritis Ratio - AST/ALT Ratio

## INTRODUCTION

Alcohol has been used all over the world over centuries for its mood lifting properties and taste. It is probably, however, the commonest drug of abuse worldwide and unfortunately causes considerable morbidity, mortality and social disruption. Regular excessive alcohol consumption is known to cause a wide range of diseases and disorders.

Alcohol permeates every system in the body as it is water soluble. Thus every system in the body is liable

to alcohol induced damage, and the spectrum of deaths attributed to alcohol misuse reflects this. The liver is the most important organ involved in metabolism of alcohol. Metabolites and free radicals generated during alcohol metabolism decreases the serum antioxidant status, this leads to hepatocellular injury.

ALD forms the largest component of gastrointestinal causes of alcohol related mortality. The spectrum of ALD is often grouped into three histological stages: fatty liver or simple steatosis, alcoholic hepatitis, and chronic hepatitis with hepatic fibrosis or cirrhosis.

Physicians have long sought for an accurate and inexpensive means to distinguish ALD from the non-alcoholic ones, as it has important implications for treatment and management<sup>1</sup>. Elevated levels of serum enzymes are frequently associated with both ALD and non-alcoholic liver disease. They may be influenced

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by nonalcohol-related diseases, enzyme-inducing drugs, nutritional factors, metabolic disorders, age, smoking, etc. Consequently, we have neither a single laboratory test–enzyme marker nor a test combination that is reliable enough for the exact diagnosis of ALD. Previous studies have shown that the Deritis ratio is greater than 2 in cases of ALD<sup>2</sup>. This ratio is based on common tests of liver function and can be investigated in any laboratory and is more relevant where alcohol abuse is a major cause of liver disease<sup>3</sup>. This has raised the interest in Deritis levels in liver disease. In this context, the present study was undertaken to assess the Deritis ratio in alcoholic and non alcoholic liver disease patients and to evaluate its significance in differentiating ALD from nonalcoholic liver disease.

### MATERIAL AND METHOD

The present study was conducted at Dr. D.Y.Patil Medical College Pune. Study group was composed of 300 subjects out of whom 100 were healthy controls, 100 were suffering from acute viral hepatitis, and 100 patients were suffering from alcoholic hepatitis. The control and diseased subjects were in the age group of 40-65 yrs. The control and diseased subjects were taken from the local population in and around Pune. Patients suffering from heart, renal, neurological and thyroid disorders, diabetes Mellitus, Pancreatic, bone diseases were excluded from the study. 5 ml blood samples of patient and control were collected in vacuum tubes and allowed to clot at room temperature for 60-120 minute followed by centrifugation at 3000 rpm for 10 min. at 40C. The estimation of serum AST and ALT was done by using commercial kits from CPC diagnostics. The readings were taken on a semiautoanalyser subsequently Deritis ratio is calculated. The statistical evaluation was done using the Student's 't' test.

### OBSERVATIONS AND RESULTS

**Table 1. Serum AST and ALT levels in control group**

Enzyme in serum	No. of controls	Enzyme Activity Mean U/L±SD
AST	100	14.30 ± 8.10
ALT	100	15.10±7.25

**Table 2. Serum AST and ALT levels in liver disease**

Disease group	Enzyme in serum	No. of Cases	Enzyme Activity Mean U/L±SD
Non-alcoholic hepatitis	AST	100	53.75±15.70
	ALT		34.25±20.35
Alcoholic hepatitis	AST	100	95.98±18.36*
	ALT		45.60±10.50*

\* p < 0.001 Compared to control

Table No. 2- Shows AST and ALT levels to be significantly increased (p < 0.001) in alcoholic hepatitis as compared to non-alcoholic hepatitis and control.

**Table 3. Ratio between AST and ALT in all the Groups**

Group	AST/ALT ratio Mean ±SD
Control	.95±1.11
Non-alcoholic hepatitis	1.57±.77
Alcoholic hepatitis	2.10±1.75*

\* p < 0.001 Compared to non-alcoholic hepatitis and control

Table No. - 3 shows AST/ALT ratio to be significantly increased (p < 0.001) in alcoholic hepatitis as compared to non-alcoholic hepatitis and control.

### DISCUSSION

Both alcoholic and nonalcoholic liver diseases are significant forms of liver disease and may progress to end-stage liver disease, cirrhosis. The most difficult aspect is to distinguish alcoholic from nonalcoholic liver disease. Correct diagnosis is necessary as it has important therapeutic and prognostic implications for the patient. The diagnosis of ALD is made by documentation of alcohol excess and evidence of liver disease<sup>4</sup>. A number of laboratory abnormalities, including elevated serum aminotransferases, have been reported in patients with alcoholic liver injury, and used to diagnose ALD<sup>5</sup>. Serum AST and ALT are often raised in patients who are alcoholics,<sup>6,7</sup> although generally not to more than 2-4 times upper normal limits; sensitivities are 25-60% for AST and 15-40% for ALT<sup>8</sup>.

Both transaminases are found in hepatocytes but AST is also found in skeletal and myocardial cells. AST itself has a mitochondrial (mAST) and cytosolic component. ALT is solely located in the cytosol<sup>9</sup>. In ALD, the AST is elevated more than the ALT, at least in part as a reflection of alcohol related skeletal damage. This is the reverse of the normal pattern in

acute hepatocellular disease (for example acute viral hepatitis) where the ALT exceeds the AST. The increase in AST may be due to increased cell membrane permeability, cell necrosis and mitochondrial leakage into the blood, caused by excessive alcohol consumption<sup>10</sup>. Since AST is located both in the cytosol and mitochondria, serum levels depend markedly on the degree of liver damage and also on how recently the alcohol has been consumed<sup>11</sup>. It appears that alcohol selectively affects the mitochondrial component following damage to this organelle so that the serum increase in alcohol misusers is mAST. The elevation in ALT is not as high as that of AST in alcoholic liver disease patients, thus reflecting the diminished hepatic activity of these enzymes which made them to leak into the serum from damaged hepatocytes<sup>12</sup>. The excess alcohol leads to increased oxidative stress, cell membrane permeability, cell necrosis and leakage of mitochondrial AST into the blood<sup>10</sup>. They may be influenced by non-alcohol-related diseases, enzyme-inducing drugs, nutritional factors, metabolic disorders, age, smoking, etc. Consequently, we have neither a single laboratory marker that definitively establishes alcohol to be the etiology of liver disease.

**The AST: ALT ratio improves the test:** a ratio > 1.5 strongly suggests, and a ratio > 2.0 is almost indicative of, alcohol induced damage to the liver<sup>13</sup>. One study has shown the AST: ALT ratio to be the best of several markers at distinguishing between alcohol-induced and non-alcoholic liver disease<sup>14</sup>. Some interrelated reasons have been reported for the high AST/ALT ratio in alcoholic liver disease: i) A decreased hepatic ALT activity<sup>15</sup> ii) Pyridoxal 5' phosphate depletion in the liver of alcoholics<sup>16</sup> iii) Mitochondrial damage leading to an increase in the serum activity of mitochondrial aspartate in patients with high alcohol consumption<sup>17</sup>. There may also be some contribution of the direct toxic effect of alcohol on the AST/ALT ratio<sup>18</sup>.

In this study it is found that AST and ALT levels are higher in both alcoholic as well as non-alcoholic hepatitis as compared to controls but it is statistically significant in case of alcoholic hepatitis ( $p < 0.001$ ). Similarly Deritis ratio is higher in both alcoholic and non-alcoholic hepatitis as compared to controls but it is statistically significant in case of alcoholic hepatitis when compared to both non-alcoholic hepatitis and control ( $p < 0.001$ ). These results are in favour of previous study carried out by PUJARS et al<sup>19</sup>. In which mean value of Deritis was found to be significantly higher in alcoholic hepatitis as compared to non-

alcoholic hepatitis. Our results are also in agreement with results of Salaspuro M.<sup>20</sup>, H. NYBLOM et al<sup>21</sup>, stating that patients with alcoholic hepatitis had a significantly higher Deritis ratio as compared to non-alcoholic hepatitis and controls.

Our findings of a high AST/ALT ratio in alcoholic liver disease patients are at variance with those reported by Rekha M. et al<sup>22</sup> and authors in a clinical series in an Australian private practice. They observed that the AST/ALT ratio is similar in non-alcoholic and alcoholic liver disease patients.

## CONCLUSION

Measurement of enzyme activities in serum is useful for diagnostic assessment of Hepatobiliary disease. Although no single test is specific for differentiation between non-alcoholic and alcoholic liver disease, a combination of the available tests, in addition to a complete history, may help in differentiating non-alcoholic liver disease from alcoholic liver disease.

Previous studies have shown that the Deritis ratio is greater than 2 in cases of alcoholic liver disease. The Deritis ratio is more sensitive during any phase of the disease. This ratio is based on common tests of liver function and can be investigated in any laboratory and is more relevant where alcohol abuse is a major cause of liver disease.

In this study it is found that Deritis ratio is higher in both alcoholic and non-alcoholic hepatitis as compared to controls but it is statistically significant in case of alcoholic hepatitis when compared to both non-alcoholic hepatitis and control. In summary, the Deritis ratio can be a useful new index to distinguish non-alcoholic liver disease from alcoholic liver disease.

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# Study of Sleep Hygiene in Relation with Quality of Life among Medical Students

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## ABSTRACT

**Aims and Objective:** 1. Assessment of quality of life, depression, anxiety and fatigue, among medical students who are late night sleepers. 2. Assessment of quality of sleep, alteration in sleep pattern among medical students who are late night sleepers.

**Methodology:** Ninety-six 2nd year MBBS students were grouped into normal sleepers and late night sleepers by taking 12 : 00 AM as the cut-off point and were assessed in terms of quality of life, depression, anxiety, fatigue, quality of sleep and sleep disorder in relation to the sleep pattern .

**Results:** Statistically significant association was found between quality of life, depression, anxiety, quality of sleep, sleep disorder in relation to the sleep pattern.

**Conclusion:** Among the medical students there has been considerable impairment with respect to the quality of life, depression, anxiety and sleep quality in late night sleepers.

**Keywords:** Medical Students, Late Night Sleepers, Quality of Life, Anxiety, Depression, Sleep Disorder

## INTRODUCTION

Getting 6-9 hours of sleep every night is associated with higher rating for quality of life and lower ratings for depression and anxiety.<sup>1</sup>

However, many students usually do not follow this pattern and are deprived of sleep for various reasons like exams, family reasons, health problems, improper management of time.

Some may also remain awake at night due to excessive environmental stimulation, such as roommate who snores, screams or tumultuous music.

According to a study, among students, medical students experienced the highest impact of poor sleep which affected their quality of life. Medical students, who spend more time in studying late night, are more anxious, and less satisfied with the results.<sup>2</sup>These factors are also implicated in studies assessing depression, anxiety, fatigue, quality of life and sleep disorders among medical students.

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### AIMS AND OBJECTIVES:

1. Assessment of quality of life, depression, anxiety and fatigue, among medical students who are late night sleepers.

- Assessment of quality of sleep, alteration in sleep pattern among medical students who are late night sleepers.

## MATERIALS AND METHOD

### Subjects

- Considering 50% prevalence, with absolute error 10%, the sample size is calculated to be 100 using the formula,  $4pq/L^2$ .
- Students of II MBBS have been selected for the study randomly.
- Out of 100 students who were selected, 4 refused to give their consent and hence study was done among 96 second year medical students.

### Inclusion Criteria

- Students studying in 2<sup>nd</sup> year of MBBS in Belgaum institute of Medical sciences, Belgaum.
- Students who belong to the age group 18-25 years.

### Exclusion Criteria

- Students not belonging to 2<sup>nd</sup> year of MBBS.
- Who are of the age <18 and >25 years.

### Instruments Used

#### Questionnaire based on following scales

- Quality of life scale.<sup>3</sup>
- The Hamilton rating scale for depression.<sup>4,5,6</sup>
- The Hamilton rating scale for anxiety.<sup>5</sup>
- The Pittsburgh Sleep quality index (PSQI).<sup>7</sup>
- Fatigue severity scale of sleep disorders.<sup>6</sup>
- Epworth sleepiness scale (ESS) of sleep disorders.<sup>8</sup>

## METHOD

- Study design: Questionnaire based cross sectional study
- Recruitment: Students studying in 2<sup>nd</sup> year MBBS at a government medical college (BIMS) in Karnataka were approached to participate in the study. They were grouped into normal sleepers and late night sleepers by taking 12 : 00 AM as the cut-off point.

Participants were informed about the purpose of the study and interviewed after obtaining informed consent and assuring confidentiality. Required information was collected using a pre-designed and pre-tested questionnaire.

- Assessment: Students were assessed on different domains using the scales mentioned above.

### Statistical Analysis

Differences between late night sleepers and the normal sleepers were analyzed using the chi-square test.

## RESULTS

Table I. A ) Quality of Life in Relation with Sleep Pattern

Sl. No	Quality of Life	Group I (Sleeps Before 12 Am)	Group II (Sleeps After 12am)	Total
1	Poor	20	34	54
2	Good	11	31	42

(p<0.05)

Out of 100 students who were selected randomly, 4 refused to give their consent and hence study was done among 96 second year medical students. Among 96 students, 54 had poor quality of life. Among the affected group, 34 (63%) belonged to group II (Sleeping after 12 AM). This association was found to be statistically significant (P<0.05). [Table I. A)]

Table I. B) Depressive Symptom In Relation With Sleep Pattern

Sl. No	Degree of Depression	Group I (Sleeps Before 12 Am)	Group II (Sleeps After 12 Am)	Total
1	very severe	nil	nil	nil
2	severe	nil	nil	nil
3	moderate	2	10	12
4	mild	13	31	44
5	No depression	16	24	40

(p<0.05, p<0.01)

Out of 96 students studied, 56 had depressive symptoms in which 12 of them had moderate depression and 44 of them had mild depression. Among 12 students having moderate depression, 10(83.3%) and among 44 students having mild depression 31(70.5%) belonged to group II (Sleeping after 12AM). This association was found to be statistically significant. (P<0.05, P<0.01). [Table I. B)]

**Table I. C) Anxiety in Relation with Sleep Pattern:**

Sl. No	Degree of Anxiety	Group I (Sleeps Before 12 Am)	Group II (Sleeps After 12 Am)	Total
1	Mild	31	65	96
2	Mild-Moderate	NIL	NIL	NIL
3	Moderate -Severe	NIL	NIL	NIL

(p<0.01)

It was found that all 96 students had mild anxiety. Of them 65 (67.7%) belonged to group II (Sleeping after 12AM). Chi square test was applied and the difference was found statistically significant (P<0.01). [Table I. C)]

**Table I. D) Fatigue in Relation with Sleep Pattern**

Sl. No	Degree of Fatigue	Group I (Sleeps Before 12 Am)	Group II (Sleeps After 12 Am)	Total
1	Not affected	21	53	74
2	Affected	10	12	22

(p<0.5)

Among the studied group it was found that 22 of them were affected with excessive fatigability. Of the affected group, only 12(54.5%) belonged to the group II (Sleeps after 12AM). Chi square test was applied and it was found statistically insignificant (P>0.5). [Table I. D)]

**Table II. A) Quality of Sleep in Relation with Sleep Pattern**

Sl. No	Quality of Sleep	Group I (Sleeps Before 12 Am)	Group II (Sleeps After 12 Am)	Total
1	Good	27	49	76
2	Poor	04	16	20

(p<0.01)

Among 96 students studied, it was found 20 had poor quality of sleep. Of the affected group, 16(80%) belong to group II (Sleeps after 12 AM). Chi square test was applied and it was found highly significant(P<0.001). [Table II. A)]

**Table II. B) Sleep Disorder in Relation with Sleep Pattern**

Sl. No	Degree of Sleep Disorder	Group I (Sleeps Before 12 Am)	Group II (Sleeps After 12 Am)	Total
1	Not Affected	20	41	61
2	Affected	11	24	35
3	Severely affected	Nil	Nil	Nil

(p<0.01)

Among 96 students studied, it was found that 35 of them had sleep disorders. Of the affected group 24(68.6%) belonged to the group II (Sleeps after 12 AM). Chi square test was applied and the difference was found to be statistically significant (P<0.05). [Table II. B)]

## DISCUSSION

The present study emphasizes on sleep disorders in medical students in relation to the sleep pattern. About 36.5% of the students were found to be suffering from sleep disorder. With regard to quality of life, about 56% of students were found to have poor quality of life; where as 44% of the students were enjoying good quality of life. Among the affected group 63% were sleeping after 12 AM and get up early in the morning to go for classes. This group of students was unable to concentrate in classes, and also experienced more fatigue, anxiety and depression. The American academy of sleep medicine reports that individual sleep needs vary. However, most adults need about 7-8 hours night sleep to feel alert and well rested during the day.

From our study it was found that, out of 56 depressed students, 41(73%) belonged to group II (Sleeps after 12AM), which showed that depression was more common among late night sleepers. However, depressive symptoms were found in both groups. The reason may be the stress and strain experienced by the students due to change in modern life style.

Among the total participants 20.8% were found to have poor quality of sleep. Out of this affected group 80% belonged to group II (Sleeping after 12AM). This shows that late night sleepers are at the risk of having poor quality of sleep when compared to group I (Sleeping before 12 AM).

- **Limitations:** 12 AM was an arbitrary taken as the cut off to differentiate between late night sleepers and normal sleepers.

## CONCLUSION

- Among the medical students there have been considerable impairment with respect to the quality of life, depression, anxiety and sleep quality in late night sleepers. The sleeping discipline with early sleeping habits may help the students to overcome these problems.

However this needs self determination and committed efforts to change their sleeping pattern.

- This study can be replicated with other category of students like engineering, nursing, management, arts students etc., so that student population will be helped to overcome anxiety, depression and to have improved quality of life and sleep. Life style modification can also encourage students to improve their concentration and memory.

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# Assessment of Knowledge about Dog Bite Infield Practice Area of Alluri Sitaramaraju Academy of Medical Sciences, Eluru, Andhra Pradesh

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## ABSTRACT

**Background:** Even though 100% preventable, deaths due to human rabies are continued to be reported due to various reasons. Dog-bites are responsible for 99% of human rabies cases in our country, data on dog-bites and people's knowledge, attitude and practice related to such cases are not properly studied at the community level.

**Objectives:** To assess the knowledge regarding dog bite in urban field practice area of ASRAM.

**Materials and Method:** A community based cross-sectional study was carried-out among the residents of urban field practice area of ASRAM Medical College, Eluru, Andhra Pradesh during the period from May 2011 to August 2011. Household visits were made to collect the data from a total of 110 residents of both sexes using a pre-structured questionnaire. The data was analysed by means of SPSS 17.0 version using proportions and chi-square as statistical tests.

**Results:** 57 percent of the study group belong to low socio economic status ,73.64 percent were literate,23.64 percent felt provoked Dog bite is more dangerousness.47.27 percent felt there is no relation between site of dog bite and its dangerousness ,45.46 percent knew symptoms of rabies,31.82 percent believe on myths like application of turmeric, cloth, mud etc,14 percent do not know the availability of vaccine,68 percent of the respondents are unaware about the vaccination of Dog as Control method.

**Conclusions:** Majority were literate, 55.05 percent were not aware about dangerousness of Dog bite. About 55 percent were unaware about rabies symptoms.31.82 percent of the respondents have myths regarding treatment of rabies.68 percent did not know vaccination as prevention and Control method for the rabies.

**Keywords:** Human Rabies, Dog Bite, Knowledge, Community, Myths

## INTRODUCTION

Rabies, a disease as old as our civilization continues to be the most feared of all the communicable diseases in view of its 100% fatality. Even though 100% preventable due to the availability of efficient vaccine, deaths are continued to be reported mainly due to

negligence, ignorance and lack of knowledge regarding importance of immediate wound care and timely vaccination.

Globally, the number of human deaths due to rabies is estimated to be 40,000 to 70,000 annually and estimated 10 million people require post-exposure treatment. More than 50% of the annual global deaths due to human rabies occur in the Asian Region<sup>1</sup>where Rabies is endemic. India is positioned in the very high incidence category with approximately 30,000 deaths annually which account for one third of the global burden, ranking 1 in the world<sup>2</sup>. Yet, it does not attract as much attention as it should either from the government or from the public.

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Persistence and to some extent expansion of the overall rabies situation in the countries of the Region indicates inadequacy of the control activities. Lack of a comprehensively co-ordinated Rabies Control Programme, its non-inclusion in National Rural Health Mission, weak epidemiological surveillance and absence of proper health education activities are the major constraints in the prevention of this fatal disease.

Knowledge about the disease and its prevention, responsible dog ownership and sound strategy like mass canine sterilization regarding management of stray dogs are of utmost importance to control this fatal disease which don't have any treatment. Health educational drives using IEC materials are the cost-effective method to disseminate correct information to the priority population.

Dog-bites are responsible for 99 per cent of human rabies cases in our country. In this context and also in view of recent epidemic of human rabies in Andhra Pradesh, the present study has been taken up to provide the baseline information regarding the knowledge levels and practices after a dog bite so that the study serves as a basis to frame correct strategy regarding IEC activities and rabies control measures.

## **MATERIALS AND METHOD**

A community based cross-sectional study was carried-out among the residents of urban field practice area of ASRAM Medical College, Eluru, Andhra Pradesh during the period from May 2011 to August, 2011. The urban field practice area (wards 2 and 3 of Eluru town) contains 1100 houses, of which 10% i.e. 110 were selected by simple random method. If the house was locked, adjacent one was included in the study and similarly, the non-willing and non-co-operative subjects were excluded from the study. An interview was conducted with one available adult member from each house, using a pretested, pre-structured questionnaire to collect the data. The data was analysed with SPSS 17.0 version. Necessary Statistical tests like proportions and chi-square tests were used.

## **RESULTS AND DISCUSSION**

Among the total Respondents, 69(63.3percent) were males and 40(36.7 percent) were females. Majority, that is 84(77.06%) of the study subjects were in the age group of 15-44, followed by more than 45 yrs of age

group, that is (21.10%) and the remaining are less than 15 yrs (1.83%). Similar to the study conducted by Agarvval et al<sup>1</sup>, where 42 of the respondents were males and 58 were females and majority were in the age group of 15-44 yrs.

Out of all the Study subjects 57(51.82percent) belong to low Socio economic status and the remaining 53(48.18 Percent) belong to high socioeconomic status according to poverty line concept. Regarding education, majority that is 81(73.64) percent are literate, Majority (50.9 Percent) of the study subjects included were unemployed and house wife's ,25.46 percent were skilled workers ,23.64 percent were unskilled workers.

Regarding Dangerousness of Dog bite, 47(43.12%) respondents felt correctly that unvaccinated street dog and Pet dog are equally dangerous; where as 60(55.05%) felt bite of street dog is more dangerous. 45(41 percent) respondents felt correctly that unprovoked dog bite is more dangerous than provoked dog bite, 26(23.64 percent) felt vice versa and the remaining 39 (35.46 percent) felt both types of bites are equally dangerous.

Out of 110 study subjects, Only 24(21.82 percent) felt that there is relation between site of dog bite and degree of danger, 52(47.27 percent) gave a view that there is no relation with site of dog bite, and the remaining 34(30.91percent) said they don't know about it. The results are similar to study conducted by Singh us et al<sup>4</sup> where 24 percent felt there is relation between Dog bite and degree of danger.

Regarding Consequences of Dog bite, 65(59.1percent) respondents believe that, Victims die after Dog bite if vaccination is not given, 32(29.1 percent) felt that nothing will happen and the remaining 13(11.8 percent) felt that victims will become insane after dog bite. Where as in a study conducted by Agarvval et al<sup>1</sup>, Pretty good percentage that is 84 percent felt death as consequence of unvaccinated dog bite.

Out of the members who said death as the consequence, all of them felt that death is due to spread of poison and in Agarvval et al<sup>1</sup> study only 41 percent death due to spread of poisoning. Regarding symptoms 62(56.37 Percent) respondents answered correctly regarding the symptoms of mad dog, and 50(45.46 percent) answered correctly the symptoms of

Rabid Man, Knowledge regarding symptoms in our study is pretty good compared to study in Gujarath bu singh US et al<sup>4</sup> where 12 percent knew correctly regarding symptoms.

57(52 percent) knew that dog should be observed for 10 days, to observe the symptoms of mad dog, 70(63.64 percent) people gave a view that mad dog should be killed immediately after it was found, similarly 66 percent of respondents of Singh US et al<sup>4</sup> study also felt that mad dog should be killed.

Regarding treatment and Prevention, Immediately after Dog bite, 94(85.46 percent) said they will rush to the hospital, a pretty good percentage compared to study Conducted by Singh Us et al<sup>4</sup> where only 36.4% felt they should rush to the hospital, remaining 7(6.37) said they will be approaching near by medical shop or RMP and the last 9(8.18) said that they will not bother about the wound.

If hospital is not near by then, good percentage of people, 75(68.2 percent) answered correctly that they will clean the wound with soap and water compared to Singh US et al<sup>4</sup> study where only 31.1 % answered correctly. In the present study 35(31.82 Percent) respondents were telling non specific answers like application of turmeric, cleaning with cloth, application of mud etc . The results are similar to the study conducted by agarvval et al study (42.4% ).

95(86.36%), a very good percentage of people knew that vaccine is available for Rabies which is comparable to reports of Centers for disease control (CDC)<sup>8</sup>, Singh US et al<sup>4</sup> Study where 86.6% and agarvval et al<sup>1</sup> study where 92% were aware about the vaccine. In the present study 90(81.82%) of the respondents, felt vaccine should be taken compulsorily after dog bite and they would pay for the vaccine irrespective of the cost similar to the results of Agarvval et al<sup>1</sup> study (78%). In the present study 51(46.37%) knew that it is available free of Cost slightly lesser percentage compared to agarvval et al<sup>1</sup> study(69%) and among those 46 (41.82%) knew the place of availability. Regarding prevention of rabies, 46(41.82%) said correctly that cleaning the wound and vaccination are equally important to prevent rabies.

In order to prevent Rabies in the community, Majority that is 39(35.46%) answered, Killing street and Pet dogs, Next 35(31.82%) answered vaccination of all

dogs and 20(18.18%) answered vaccination of all bitten persons.

In Agarvval et al<sup>1</sup> study, only 5.7% of people answered vaccination of Dog as Prevention and control method. Majority that is 71(64.55%) respondents gained the knowledge regarding Rabies from Television, 36(32.73%) from neighbours.

## CONCLUSIONS

Majority of the Respondents included in the study were literate. Majority were unaware about vaccination of pet dogs against rabies. Only 24 knew that there is relation between site of dog bite and its dangerousness. 40 percent do not know the serious consequence of dog bite that is death due to rabies. 45.46 percent of the individuals knew Symptoms of rabies. 48 percentage of the respondents did not know that after dog bite, the dog should be observed for symptoms of rabies. 35 members had myths on first aid of dog bite like application of turmeric, cloth, mud etc. 15 members do not know that vaccine is available to prevent Rabies. 18 percent of the respondents do not feel the requirement of vaccination after dog bite. 75 members do not agree that vaccination of dog as control method. Majority (64.55 percent) gained knowledge regarding Rabies from Television.

## RECOMMENDATIONS

1. Intensified health education regarding dangerousness of dog bite, symptoms, First aid measures of dog bite are required in the area.
2. There is also urgent need to educate people, about vaccination of pet dogs, post exposure vaccination to human beings, place of availability and cost of vaccine.
3. Focus group discussions should be conducted to remove myths like application of turmeric, cloth, mud etc.

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# Determination of Minimum Inhibitory Concentration Values of Ethambutol for Mycobacterium Tuberculosis

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## ABSTRACT

**Background:** Tuberculosis has always been and still has the distinction of being a leading contender for one of the top places on the list of the main cause of death in India. Ethambutol is a narrow-spectrum antimycobacterial agent that is used for the treatment of tuberculosis. At times the patients fail to respond to treatment with anti tubercular drugs, the reasons for this could be many, one of them being drug resistance, which is increasingly being reported from both developed and developing countries

**Objectives:** The present study was planned to establish a method for testing of an antitubercular agent i.e. ethambutol and to determine the minimal inhibitory concentration of ethambutol.

**Method:** From sputum samples of proved cases of pulmonary tuberculosis, who had not received any antitubercular drug earlier in their life time, the acid-fast bacilli were cultured and speciated by colony morphology, time taken to grow, and no growth on PNBA medium, niacin and nitrate reduction test positive were identified as *M. tuberculosis*. Resistance ratio method was followed. "Resistance ratio" is expressed as the ratio of the MIC of the test strain to the MIC of the standard H37Rv strain of *M. tuberculosis*. For each isolate, (originally from the sputum samples) L-J medium slants containing ethambutol, in serially doubling concentration ranging from 1mcg/ml to 16 mcg/ml were prepared. Two such sets were prepared: one for inoculating with test strain (obtained from sputum samples) and the other for standard H37Rv strain. Each set had a drug free L-J slope (control). All the L-J slants were labeled with appropriate drug concentrations and incubated at 37° C for 8 weeks for "growth." "Growth" was defined as presence of 20 colonies or more.

**Result & Conclusion:** The MIC for ethambutol for both test strain as well as standard H37Rv strain was 4 mcg/ml. Resistance ratio i.e. ratio of the MIC of test strain to that of std H37Rv strain was also calculated which was found to be indicating the strains being sensitive to ethambutol. The proper determination of drug resistance by the proper method is helpful to minimize the spread of drug resistant TB. Key to success in the treatment of drug resistant tuberculosis lies with supervised therapy with appropriate modification of regimen depending on sensitivity patterns.

**Keywords:** Ethambutol, Minimum Inhibitory Concentration

## INTRODUCTION

Tuberculosis has always been and still has the distinction of being a leading contender for one of the top places on the list of the main cause of death in

India. It has ravaged mankind for ages. John Bunyon in his world famous classic "Pilgrims Progress" has described tuberculosis as the captain of all the men of death. Bacterial drug resistance to antimicrobial agents is a principle obstacle to their successful therapeutic use. Drug resistance develops as a result of multiplication of resistant mutants. When a drug is given, the population of sensitive bacilli decreases allowing resistant mutants to increase <sup>1</sup>.

There still existed 20 million cases worldwide, with 10 million new cases added annually and only 7 million treated every year<sup>2</sup>. There is reliable evidence

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that tuberculosis problem in developed countries has been decreasing at least for past 40 years after introduction of chemotherapy. But the incidence has shot up again due to appearance of AIDS.

Ethambutol is a narrow-spectrum antimycobacterial agent that is used for the treatment of tuberculosis as well as infections caused by *Mycobacterium avium*. Ethambutol has been shown to have bactericidal action against *Mycobacterium tuberculosis* (MTB) and *M. avium*<sup>3</sup>.

Ethambutol is an important antimycobacterial drug as it enhances the effect of other companion drugs including aminoglycosides, rifamycins and quinolones. Moreover, this drug has also been shown to significantly decrease the levels of bacteraemia in patients with AIDS<sup>4</sup> showing its potential role in treatment of infections caused by *M. avium* strains. Hence drug susceptibility/resistance testing is a pre-requisite for the design and success of treatment regimens. For control measures to succeed, early detection and treatment of patients and contacts is very essential. At times the patients fail to respond to treatment with anti tubercular drugs, the reasons for this could be many, one of them being drug resistance, which is increasingly being reported from both developed and developing countries<sup>2,5,6,7</sup>. Tuberculosis resistant to treatment with the two most important antitubercular drugs (isoniazid and rifampicin) are known as multi drug resistant tuberculosis (MDR-TB). MDR-TB is reported both from India and other parts of the world. Different methods for testing drug susceptibility of the tubercle bacilli have been used in the past.

Multiple drug resistance (MDR) has become a new buzz word. The term covers the mycobacterial strains resistant to more than one commonly used highly potent ant tubercular drugs. During last few years MDR has been on rise especially in HIV positive patients<sup>8</sup>. Drug resistant patients are responsible for spread of resistant tuberculous infection. Emergence of drug resistance has reduced the efficacy of treatment to almost the level of pre-chemotherapeutic era and is a limiting factor in our attempts to cure individual patients and thereby to eradicate the disease from community<sup>9</sup>.

The present study was planned to establish a method for testing of an antitubercular agent i.e. ethambutol and to determine the minimal inhibitory concentration of ethambutol.

## MATERIALS AND METHOD

This study is conducted at B.J .Medical college, Pune. After ethical approval and written consent of human volunteers the sputum samples were collected early in the morning from proved cases of pulmonary tuberculosis who had not received any antitubercular drug earlier in their life time. Each sputum sample was collected in a sterile, wide mouth glass container with an airtight lid, and then transferred to our laboratory for Primary Culture for establishment of culture technique for *M. tuberculosis*.

From purulent portion of sputum a loopful (diameter 3 mm) was taken and smears were made. These were stained by Ziehl-Neelson technique. *M. tuberculosis* appeared as small red colored rods against faint blue background.

Concentration of sputum and inoculation: Each sputum sample was homogenized and concentrated by Petroffs method<sup>1,10</sup>. A loop full of this was inoculated on 2 L-J slants and on one L-J slant containing Para Nitro Benzoic Acid (PNBA). *M. tuberculosis* is sensitive to PNBA while atypical mycobacteria are insensitive to PNBA<sup>1,10</sup>.

The inoculated L-J slants were incubated at 37°C for 4 weeks. The slants were observed once every week for appearance of colonies. To prevent dryness of, the medium, sterile distilled water was added whenever necessary. When growth appeared; pigmentation, consistency shape etc. of colonies were looked for. *M. tuberculosis* colonies appeared to be buffy (pale yellow), irregular and rough. To confirm the presence of acid-fast bacilli smears were prepared and stained by Ziehl-Neelson technique. All the acid-fast bacilli were speciated by colony morphology, time taken to grow and growth on PNBA . Only strains which did not grow on PNBA medium and were niacin and nitrate reduction test positive were identified as *M. tuberculosis*<sup>11</sup>. With a 22 SWG (wire diameter 0.7mm), a representative sweep from the growth of primary culture was taken on the loop of 2mm<sup>3</sup> (approximately 2 mg moist weight). The growth taken was then discharged into 0.4 ml of sterile distilled water in sterile screw capped bijou bottles, together with 6 glass beads 3 mm in diameter. A suspension was prepared by shaking the bijou bottles for 1 minute on cyclomixer and then with a 27 SWG (wire diameter 0.4mm) Nichrome loop 3 plain L-J slopes were inoculated<sup>12</sup>. It was done by first touching the centre of the slope and then spreading the suspension evenly over the entire

medium. All the slopes were arranged serially and incubated at 37° C and read at the end of 4 weeks. The numbers of colonies were more than 100 on each L-J slant.

For determination of minimum inhibitory concentration (MIC) of ethambutol, pure ethambutol powder was used for finding the MIC values for ethambutol. Serial dilution of ethambutol was done as well as resistance ratio method was followed for which we had to include the standard H37Rv strain of *M.tuberculosis*. "Resistance ratio" is expressed as the ratio of the MIC of the test strain to the MIC of the standard strain. If resistance ratio is less than 2 the mycobacteria is considered sensitive, if it is 4 then doubtful (test has to be repeated) and if 8 and above they are considered resistant<sup>1</sup>. H37Rv strain was procured from Cardio Thoracic Centre (Pune) who in turn had obtained from National Institute of Tuberculosis (Bangalore). The H37Rv strain is used as a standard strain because its known high degree of virulence and well established metabolic, pathogenic and immunologic characteristics and because of its wide spread employment for investigations on the bacteriological aspects of tuberculous, including evaluation of drugs effective against *M. tuberculosis*.

For each isolate,(originally from the sputum samples) L-J medium (i.e. L-J slants) containing ethambutol, in serially doubling concentration ranging from 1mcg/ml to 16 mcg/ml were prepared<sup>1</sup>. Two such sets were prepared: one for inoculating with test strain (obtained from sputum samples) and the other for standard H37Rv strain. Each set had a drug free L-J slope (control).

Inoculum was prepared in the same way as done for standardizing the inoculum size, for both test and standard strain. One set of L-J slants was inoculated with test strain and the other set with standard H37Rv strain.

All the L-J slants were labeled with appropriate drug concentrations and incubated at 37° C for 8 weeks. Every week the bottles were examined for "growth." "Growth" was defined as presence of 20 colonies or more<sup>12</sup>. At the end of 8 weeks, readings were noted down. The control of the test and standard H37Rv strain showed more than 100 colonies, while growth in 1mcg/ml showed approximately 45-50 colonies, with 2 mcg/ml more than 20 colonies. No colonies were seen on slopes containing 4 mcg/ml, 8 mcg/ml & 16 mcg/ml. The observations were same

for all the 6 test isolates as well as standard strain H37Rv. Therefore MIC for ethambutol was found out to be 4 mcg/ml. Resistance ratio was 1 indicating the test strains being sensitive to ethambutol.

## FINDINGS

The control L-J slants showed growth of more than 100 colonies of test strains. The colonies were buff coloured, irregular, dry and heaped up. Similar was the observation for standard H37Rv strain. The H37Rv colonies appeared to be buff coloured, irregular, dry and rough. Presence of *M.tuberculosis* was confirmed by acid fast staining by Ziehl-Neelson technique i.e. *M. tuberculosis* appeared as red coloured rods and biochemical tests i.e. the nitrate reduction test and niacin test which were positive i.e. there was development of pink colour.

The MIC for ethambutol for both test strain as well as standard H37Rv strain was 4 mcg/ml. Resistance ratio method i.e. ratio of the MIC of test strain to that of std H37RV strain was also calculated which was found to be 1 indicating the strains being sensitive to Ethambutol.

## CONCLUSIONS

One of the most important problems encountered in the treatment of tuberculosis is drug resistance. The estimation of drug resistance termed 'sensitivity testing' is therefore of vital importance. The direct susceptibility methods give result faster than the indirect susceptibility method, but are not performed as contamination rates are high with the former.

The indirect susceptibility methods include Absolute concentration method, Resistance ratio method and Proportion method. The 'Resistance ratio' method is widely used by studies sponsored by World Health Organization (WHO), International Union against Tuberculosis (IUAT), Tuberculosis Institute of Madras, and National Institute of Tuberculosis (NTI) Bangalore. Most of the workers in India are using this method. Resistance is determined by the ratio of the minimum inhibitory concentration (MIC) of the test strain to that of the MIC of standard H37Rv strain. The technique has the advantage of not being affected by batch to batch variation.

WHO has recommended that the "resistance ratio" technique be commonly used in the various countries so that the results are comparable<sup>12</sup>. Therefore the

“resistance ratio” method was followed in the present study.

In the present study sputum samples were collected from proved cases of pulmonary tuberculosis. The patients had not received any antitubercular drugs earlier in their life time. All samples were subjected for smear examination by Z-N technique. All samples were smear positive for acid-fast bacilli. The bacilli appeared to be small red coloured rods on a faint blue background. The culture was necessary for species identification and for obtaining the primary culture for investigation of antimycobacterial activity.

The WHO expert committee on tuberculosis has recommended Lowenstein Jenson medium without potato starch for culture<sup>12</sup>. Hence this medium was employed in the present study. All the sputum samples were decontaminated by Petroffs method and subjected for culture on L-J slants. After incubation of 4 weeks results were noted. M.tuberculosis was speciated by colony morphology i.e. they appeared to be buff (pale yellow) coloured, rough, irregular and heaped up; by their inability to grow on PNBA medium, and the biochemical test i.e. the nitrate reduction and niacin test which were positive. Smear positivity by Z-N technique was also looked for, which show acid fast bacilli, for confirmation.<sup>1,11</sup>

For any sensitivity testing it is important to standardize the inoculum size. It was done so by taking a representative sweep from primary culture of colony of 2 mm<sup>3</sup> and discharging in 0.4 ml sterile distilled water to form a suspension. When a loopful of this suspension was inoculated onto drug free L-J slants and incubated for 4 weeks, growth appeared was more than 100 colonies which was an ideal for a control.

Ethambutol is one of the antitubercular drug commonly used in the first line treatment of tuberculosis. It is a bacteriostatic drug and is effective against mycobacteria resistant to INH, PAS, Ethionamide, Streptomycin as well as many atypical mycobacteria. Primary resistance to this drug has not been reported. When used along with other drugs resistance to Ethambutol develops slowly<sup>13</sup>.

In the present study the minimum inhibitory concentration (MIC) for ethambutol was found to be 4 mcg/ml in the L-J media for all the 6 samples tested. This was within the range reported earlier i.e. from 0.5 mcg/ml to 8 mcg/ml<sup>14</sup>. Out of 35 strains of M. tuberculosis studied by Mc Clatchy, 8% were susceptible to 2.5 mcg/ml concentration of

ethambutol, 88% to 5 mcg/ml and 100% to 10 mcg/ml<sup>15</sup>.

Thus in our study, in-vitro criteria for susceptibility testing was determined with representative clinical samples of Mycobacterium tuberculosis isolated from patients never treated with any antitubercular drug and standardized to obtain reproducible results. The proper determination of drug resistance by the proper method is helpful to minimize the spread of drug resistant TB. Key to success in the treatment of drug resistant tuberculosis lies with supervised therapy with appropriate modification of regimen depending on sensitivity patterns

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# To Study the Prevalence of Anemia and Related Biosocial Factors among College going Adolescent Girls in Urban Agra

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## ABSTRACT

**Background:** Although many micronutrients and co-factors are involved in the maintenance of normal hemoglobin concentration, the most common deficiency from public health point of view is iron deficiency. WHO estimates that more than 2 billion people worldwide and more than half of the population in India, is anemic.

**Aim:** To find the prevalence of IDA in College Going Adolescent Girls of urban Agra and find its correlation with other biosocial factors.

**Material and method:** A quasi-experimental study was conducted among college going girls in Agra in the age group of 16-19 years (n=300) who were randomly selected. Information regarding the biosocial profile of the girls was collected on a semistructured proforma. Their Hemoglobin levels were estimated by the Cynmeth-hemoglobin method using Drabkin's solution.

**Results & Discussion:** The overall prevalence of anemia was 65.3%, about three-fourth (71.4%) of them were suffering from mild anemia whereas about one fourth (24.5%) had moderate anemia and 4.1% were severely anemic. Overall prevalence of anemia is found to be statistically significant with education of mothers, vegetarian diet.

**Conclusion:** The prevalence of anemia in adolescent girls is high. Iron Deficiency Anemia is a condition where a person has inadequate amounts of iron in the blood to meet body demands.

**Keywords:** Cynmeth- Hemoglobin, Drabkin's Solution, Adolescent, IFA

## INTRODUCTION

Iron deficiency anemia (IDA) is one of the most prevalent nutritional deficiencies in the world. Anemia is decreased red cell mass (hematocrit  $\leq$  39% in an adult male or  $\leq$  35% in an adult female) & hemoglobin level  $<$  12 gm/dl.<sup>1</sup> A prevalence of  $<$  15% is "low", 15-40% is "medium" and  $>$  40% is "high". Asia has the highest rates of anaemia in the world. About half of the world's anemic women live in the Indian subcontinent, and 88% of them develop anaemia during pregnancy.<sup>2</sup> Iron deficiency anemia is the most common malnutrition among the adolescent population. Anemia is an indicator of both poor health and poor nutrition<sup>3</sup>. Iron requirements are increased during adolescence, reaching a maximum due to rapid pubertal growth. Iron requirements are even higher in developing countries because of infectious diseases and parasitic infestations that cause iron loss, and because of low bioavailability of iron from diet.

Iron deficiency anemia leads to, impaired school performance, decreased work productivity and other adverse outcomes like poor pregnancy outcome in the later phase as it attributes to high maternal mortality, high incidence of low birth weight babies, high perinatal mortality and fetal wastage. Adolescent population is a good start in addressing anaemia, since females at this age are more responsive and motivated to take action when mobilized in school or community groups. The need to combat anemia in adolescent girls had been suggested by the Nutrition Foundation of India<sup>4</sup>.

## MATERIALS AND METHOD

The present cross sectional study was conducted in an Inter college located in urban Agra, selected purposively for feasible reasons. School going adolescent girls of age 16-19 years whose parents or guardians gave voluntary written consent and were

ready to participate in the study comprised the study population. Those participants who were willing to participate in the study, their biosocial profile was collected on a semi structured proforma designed for the study and their hemoglobin status was assessed by Cynmeth-hemoglobin method. A total of 300 girls were randomly selected from eleventh and twelfth standard.

## METHODOLOGY

After seeking permission from the Head of the institution of Queen Victoria inter-college, for accomplishing the research work. A meeting was held wherein the participants/students were briefed with the help of audio-visual aids the purpose of the study, the students were made aware about anemia and its

deleterious effects on their health. Information regarding the biosocial profile of the girls was collected and their hemoglobin levels were determined by using, Cynmeth-hemoglobin method.

## Study tool

A pre-tested semi-structured comprehensive schedule socio-demographic interview schedule to be filled by the research worker was made, for the participants who voluntarily agreed to participate in the interventional study. The Bio-social schedule included points like age, religion, mother's occupation, mother's education, father's occupation and education, family size, family income, marital status, family type, past history of illness, menstrual history, dietary history and history of any long term medication.

## OBSERVATIONS AND RESULTS

**Table 1: Prevalence of Anemia in Participants and severitywise grading of anemia**

Hemoglobin Level	No. of Participants	Percentage
<12(anemia)	196	65.3
≥ 12(no anemia)	104	34.6
Total	300	100
Prevalence = 65.3%		
Severity of Anemia	Number of Participants	N=196 Prevalence %
MILD(10-<12gm/dl)	140	71.4
MODERATE(7-<10gm/dl)	48	24.5
SEVERE(<7gm/dl)	8	4.1
Total	196	100

The basis of anemia, in accordance with WHO criteria (hemoglobin less than 12gm/dl). In the present study majority (65.3%) of participants were found suffering from anemia. Of the participants suffering

from anemia about three-fourth (71.4%) of them were suffering from mild anemia whereas about one fourth (24.5%) had moderate anemia and 4.1% were severely anemic.

**Table 2: Bio-Social Profiles of the Participants**

VARIABLES		No. (N =300)	%	ANEMIA n=196 (%)
AGE	16-17	184	122(66.3)	x <sup>2</sup> =0.9 df= 2 p=0.22 Not significant
	17-18	102	62(60.7)	
	18-19	14	12(85.7)	
RELIGION	HINDU	268	176(65.6%)	x <sup>2</sup> =2.9 df=2 p=0.22 Not significant
	MUSLIM	28	16(57.1%)	
	SIKH	4	4(100%)	

**Table 2: Bio-Social Profiles of the Participants (Contd.)**

VARIABLES		No. (N =300)	%	ANEMIA n=196 (%)
TYPE OF FAMILY	NUCLEAR	228	144(63.1%)	x <sup>2</sup> = 1.99 df 1 p=.1 Not significant
	JOINT	72	52(72.2%)	
NO. OF SIBLINGS	0	8	4 (50%)	x <sup>2</sup> =4.9 df 2 p=.17 Not significant
	1	190	118(62.1%)	
	2 or more	102	40(39.2%)	
BIRTH ORDER	1	118	80 (67.7%)	Not significant
	2	84	56 (66.6%)	
	3 or more	98	60 (61.2%)	

Majority (62.3%) of the study participants were in age group 16-17 years. Majority (89.3%) of the study participants were Hindu by religion, while Muslims were only 9.3%. About three-fourth (76%) of the girls

were from nuclear families and the rest belonged to joint families. However no statistically significant association was observed between them and prevalence of anemia.

**Table 3: Association of Mother’s Education And Occupation with Anemia in their daughter’s anemia.**

VARIABLES	N=300		ANEMIA		Test of Significance
	n	%	n	(%)	
<b>Mother’s Education</b>					
Illiterate	22	7.3	20	(90.9)	X <sup>2</sup> =12.9 P=.04 df= 6 Significant
Primary	6	2	4	(66.6)	
Middle	18	6	14	(77.7)	
High school	36	12	26	(72.2)	
Intermediate	88	29.3	56	(63.6)	
Graduate and above	124	41.3	74	(59.7)	
Professional	6	2	2	(33.3)	
<b>Mother’s Occupation</b>					
Housewife	214	71.3	120	(56.1)	X <sup>2</sup> = 39.74 df= 6 p=.000 Highly significant
Unskilled Worker	38	12.6	36	(94.7)	
Semi-Skilled Worker	18	6	18	(100)	
Skilled Worker	10	3.3	10	(100)	
Clerical	2	0.6	2	(100)	
Semi profession	6	2	4	(66.6)	
Profession	12	4	6	(50)	

Overall prevalence of anemia is found to be positively associated with education of mothers as with increasing education level of mothers, the prevalence declines. The prevalence of anemia was very high (90.9%) among daughters of illiterate mothers as compared to that of literate mothers. Moreover it was substantially less (33.3%) in participants whose mothers were professionally educated and it is found statistically significant. Among the participants whose mothers were housewives and professionals, the prevalence of anemia was comparatively less (56.1% and 50.0% respectively) than that of semiprofessionals (66.6%).

Prevalence of anemia was found to be comparatively higher (47.3%) among vegetarians than that (35.2%) in non-vegetarians (who consumed non-veg twice a week) were anemic and was found to be statistically significant. Among the 22.6% participants who consumed lemon (mixed in food or separately) daily, the prevalence of anemia was comparatively much less (41.7%), than those who did not consume lemon regularly (72.4%) and was statistically significant. A gradual decrease of the prevalence of anemia was observed in the study participants as their socio-economic status improved, and was also found statistically significant.

## DISCUSSION

In the present study, the prevalence of anemia in the participants was found to be 65.3%. The severity-wise prevalence of mild, moderate and severe degree of anemia was found to be 48.6%, 16 % and 2.6% respectively in the present study. Deshmukh PR et al (2008)<sup>5</sup>, Binay K. Shah et al (2002)<sup>6</sup> and Anshu Sharma et al (2000)<sup>7</sup> reported almost similar prevalence of anemia i.e. 65.3%, 68.9% and 61.9% respectively. Mittal M. Bhanushali et al (2010)<sup>8</sup> observed comparatively lower (26.8%) prevalence of anemia, which may be because their study participants were from the private schools with children from middle and higher socioeconomic status. Jolly Rajaratnam et al (2000)<sup>9</sup> reported the prevalence of severe anemia 2.1%, moderate anemia 6.3% ,and mild anemia 36.5% which is more or less similar to that of the present study. Overall prevalence of anemia is found to be positively associated with education of mothers as with increasing education level of mothers, the prevalence declines. Jolly Rajaratnam et al (2000)<sup>9</sup> and Chaudhry S et al (2008)<sup>10</sup> also reported a significant association between the prevalence of anemia and mother's educational status.

A gradual decrease of the prevalence of anemia was observed in the study participants as their socio-economic status improved. Likewise Chaudhary S et al (2008)<sup>10</sup> also reported a statistically significant association of anemia with the socio-economic status of participants.

## CONCLUSION

On the basis of above findings it is concluded that the prevalence of anemia in adolescent girls is high(65.3%) as it is more than 40% it is a severe public health problem (according to Classification of anaemia as a problem of public health significance :Worldwide prevalence of anaemia 1993–2005: WHO). A statistically significant association in present study is observed between prevalence of anemia with dietary pattern and socioeconomic status of the participants and with educational status and occupation of mother. In order to combat anemia in adolescent girls timely intervention is needed, they should be encouraged to eat iron-rich foods and foods that enhance iron absorption. Last but not the least, health education programmes carried out at schools in consultation with health authorities, especially in relation to nutrition and personal health checkups can really be helpful to overcome the anemia problem.

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**Ethical Clearance:** Before starting the study approval of the principal, S.N.M.C. Agra & ethical committee of the college was taken.

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# Study of Factors affecting Individuals Having Locomotor Disability and their Adjustment with their Families in Urban Slums of Mumbai

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## ABSTRACT

**Background:** India has 18.49 million people suffering from disability. Locomotor disability is the highest among all the disabilities in urban as well as rural India.

### Objectives:

1. To identify demographic factors related to locomotor disabilities.
2. To study various factors affecting adjustment of individuals having locomotor disability with their families.

**Materials and Method:** A community based cross-sectional observation study was conducted in an urban slum of Mumbai. A sample of 3665 individuals was selected by systematic random sampling. The subjects were screened for loco motor disabilities and interviewed for adjustment with families.

**Results:** Out of the total sample, 204 individuals were found to be affected by locomotor disability (prevalence 5.57 %). Majority of the affected individuals were unemployed and from low socioeconomic class. Females were more affected than males. Both the sexes, employed as well as unemployed were equally adjusted with their families. Individuals with age more than 45 years, per capita income below Rs 500/, illiterate and with low IADL Scores were found to be unadjusted to their families.

**Conclusion:** Education, employment and limitation of disability will improve the adjusting capacity of the individuals with locomotor disability with their families, and thus improve their quality of life.

**Keywords:** Locomotor Disability, Adjustment with Family

## INTRODUCTION

Social perspective on disability affirms that a large number of persons with disabilities struggle to lead a normal life because of stereotypical attitudes, social stigma, discrimination and neglect. Various socio-cultural conditions also interact with different types of disability in a complex manner to make the overall

life qualitatively different.<sup>1</sup> According to The National Sample Survey 58<sup>th</sup> Round 2002 estimates, the number of disabled persons in the country was 18.49 million during July to December, 2002, and they formed about 1.8 per cent of the total estimated population. It is also observed that among the different types of disabilities, the number of persons having locomotor disability was the highest in both rural and urban India. The prevalence of locomotor disability was 1046 in the rural and 901 in the urban per 1,00,000 persons.<sup>2</sup> Also according to Census 2001, 27.9% of total disability in the country was disability in movement.<sup>3</sup> India has a large number of disabled population because of the population explosion. Rehabilitation of such large number of people is essential for improvement of their

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quality of life. Indeed, the process of rehabilitation is never complete unless the psychosocial aspects are duly taken care of. Psychological, social and economic rehabilitation of patients with motor handicaps are intimately inter-related.<sup>4</sup> Keeping this in mind, the current study was undertaken with the aim of finding out the factors which affect the adjustment to their families among individuals with locomotor disability in urban slum in a metropolitan city.

## MATERIAL AND METHOD

The study was carried out in an urban slum which is the field practice area of a municipal teaching hospital in Mumbai. The study is cross sectional and observation based. A pilot study was conducted which showed a prevalence of 10% of loco motor disability among the screened population. Based on this minimum sample of 3600 was estimated. A household was taken as a single unit by stratified systematic random sampling in two demarcated areas of the slum. All members of the household were included in the study. A sample of 3665 individuals was taken. A structured questionnaire was prepared and administered to individuals in the local language. Participants were screened for detection of loco motor disabilities by physical examination using the Index of Activity of Daily Living score<sup>5</sup> carried out by trained health professional. The study was conducted over a period of 3 months. The data was analysed using SPSS software (Version 17). 95 % confidence limits for prevalence, Z-test of difference between two proportions were applied.

## RESULTS

As per the pilot study conducted, a sample size of 3600 was estimated. Based on this finding, 3665 individuals of all ages were screened for locomotor disabilities. Out of the total sample, 204 individuals were diagnosed with loco motor disabilities. Thus, the prevalence of loco motor disabilities is 5.57 % (95 % C.L. 4.83 % to 6.31 %). The study was further carried out on these 204 disabled individuals. Mean age of the affected individuals was 38.89 years with standard deviation 15.1 years. As seen in Table 1, 54.4% of the disabled individuals are less than 45 years of age. 28.9 % are males and 71.1 % are females. 49 % of the total sample was illiterate, 51% were educated till primary or above. Out of the total sample, 62.7 % of disabled people had families with per capita income of less than

500 rupees and 75 % were un-employed.

Table 2 shows that majority of the affected individuals (96.6 %) perceived their locomotor impairment and accepted their disability. 2% were of the opinion that they were not disabled and 1.4 % did not have any opinion about it. Out of 204 affected individuals, 92.6 % were positively adjusted to their family members. 7.4 % felt that they were unwanted by their families. It has been observed that 93.6 % of the total sample showed high IADL score and 6.4 % showed score ranging from B – G.

Table 3 reveals various factors affecting adjustment of disabled individuals with their family. Statistically significant number of disabled individuals with age, more than or equal to 45 years, were found to be unadjusted with their families ( $p < 0.001$ ). Both the sexes are equally adjusted to their families. ( $p > 0.05$ ) Literacy was observed to have a positive effect, with literate individuals being better adjusted to their families than illiterate ones ( $p < 0.01$ ) Individuals whose families had per capita income below Rs 500/- per month were significantly un adjusted to their families than those with their families having per capita income more than Rs 500/- ( $p < 0.05$ ). The economic burden caused due to disability in these individuals on their families having low PCI, tend to produce disharmony in their relationship with other family members. However it has been observed that employed as well as unemployed individuals are equally adjusted to their families ( $p > 0.05$ ). Affected individuals with low IADL score are significantly unadjusted to their families compared to those with high IADL score. ( $p < 0.001$ )

## DISCUSSION

Estimated prevalence of locomotor disability in the current study is 5.57%. This is less as compared to some other findings. Census of India 2001, estimated 27.87 % of total disabled population with movement disabled where as NSS (National Sample Survey, 58<sup>th</sup> round, 2002) estimates them at 57.51 %.<sup>3,6</sup> Study conducted by Borker S. et al in rural Goa found a prevalence of 19.4 %.<sup>7</sup>

54.4 % of the affected individuals were less than 45 years of age. Similar findings were observed in an exploratory study undertaken by the Medical Social Work Department of the All India Institute of Physical Medicine and Rehabilitation, Mumbai on women

above the age of 18 years with locomotor disabilities, where it was observed that 86% belong to the young adult and adult category.<sup>8</sup> Similarly, an Empirical Study of Causes of Disability in India conducted by Patel shows that around 56 percent of disabled persons are from the working adult population aged 15-59 years, where as younger under 15 years and 60 plus years aged disabled account only 20 and 24 percent respectively. In the same study males were found to have a significantly higher risk of having different types of disabilities than females, except at later ages for visual and mental disability.<sup>9</sup> This is contrary to the findings of the current study where majority of the affected individuals are females. Similar findings have been observed in Census 2001, where Tamil Nadu was observed to have a higher number of disabled females than males.<sup>3</sup>

In the current study it is observed that there are almost equal number of literates and illiterates among people with locomotor disabilities. In the study conducted by All India Institute of Physical Medicine and Rehabilitation, 91% of the sample have some level of education, with 57% reaching up to the secondary level.<sup>8</sup> Borker S. et al shows that the maximum prevalence of disability was found in the uneducated group.<sup>7</sup> Mitra S. and Sambamoorthi U. observed that men with disabilities are older, less educated.<sup>10</sup>

It is observed that majority of the affected individuals are unemployed and belong to families with percapita income less than Rs 500. Study undertaken by All India Institute of Physical Medicine and Rehabilitation showed 54% women with locomotor disabilities to be were unemployed.<sup>8</sup> Sophie Mitra and Usha Sambamoorthi conducted a study to examine differences in employment and wages between persons with and without disabilities using data from the Village Disability Survey conducted in South India. Their observation was that the actual employment rate among non disabled individuals is 79.1% and among disabled is 52.3%, resulting in a substantial employment gap of 26.8% between the two groups.<sup>10</sup> Poverty is both a cause and a consequence of disability. In a study conducted by Philipa Thomas, most of the informants in the focus group discussions who had become disabled in later life commented that their disability had made them poorer.<sup>11</sup>

It is seen that 96.6 % of affected population accept their disability and 92.6 % are well adjusted to their families. Similar findings have been observed in other studies where acceptance of their condition and by family and community has been observed. <sup>8</sup>93.6 % of disabled individuals show a good score (A) of IADL. Similarly in NSSO, 58<sup>th</sup> round – 2002, about 60 per cent of the disabled were able to take self-care without any aid or appliances.<sup>2</sup>

### **Conclusion and Recommendations**

Majority of the affected individuals in the current study are young and unemployed females of low socioeconomic class. Literacy has had a positive effect on adjustment with families. Adjustment with families goes on decreasing as age increases. Adjustment at higher age is difficult and more so for disabled population. This is a cause of concern as India is currently experiencing increase in geriatric population. People with low family income are poorly adjusted; however unemployment has no effect on adjustment. This could be because majority of the population in the current study are females with low literacy rates and thus unemployed. However this could also be contributing to their decreased family income. Low IADL score indicates increased dependency for activities of daily living and thus less adjustment with their families.

People with disability should be accepted in the main stream of the society. Education should be imparted and employment opportunities should be generated to increase their family incomes. Early detection and rehabilitation of locomotor disability will help the individuals to lead more fruitful life. Special emphasis should be laid on affected females and geriatric population via the various existing National Health Programmes.

The social model of disability considers disability purely as a social construct and a human rights issue. Under this model, even though impairments are at the individual level, disability is the direct result of society's failure to account for the needs of persons with impairments. Disability is not the attribute of the individual rather it is related by the social environment and needs social change.<sup>12</sup>

**Table 1: Demographic profile of individuals affected by disability**

Socio Demographic Parameters		Number	Percentage(n= 204)
Age (years)	<45	111	54.4
	>= 45	93	45.6
Sex	Male	59	28.9
	Female	145	71.1
Education	Illiterate	100	49
	Primary and above	104	51
Per capita Income (Rs)	< 500	128	62.7
	>=500	76	37.3
Employment	Employed	51	25
	Unemployed	153	75

**Table 2: Classification of individuals with locomotor disability according to subjective opinion, adjustment to family and IADL Score**

Criteria		Number	Percentage(n=204)
Subjective opinion	Disabled	197	96.6
	Non disabled	4	2
	No opinion	3	1.4
Family Adjustment	Feels adjusted to the family	189	92.6
	Feels unwanted by the family	15	7.4
IADL score	A	191	93.6
	B-G	13	6.4

**Table3: Various factors affecting adjustment of disabled individuals with family**

Factor affecting adjustment with family	Adjusted with their families No. (%)	Unadjusted with their families No. (%)	Total No. (%)	Test of significance
<b>Age (years)</b>				
<45	110 (99.1)	1 (0.9)	111 (100)	$X^2= 14.88DF = 1 P<0.001$
>= 45	79 (84.9)	14(15.1)	93(100)	
<b>Sex</b>				
Male	54(91.5)	5(8.5)	59(100)	$X^2 = 0.15DF = 1 P>0.05$
Female	135(93.1)	10(6.9)	145(100)	
<b>Education</b>				
Illiterate	86(86)	14(14)	100(100)	$X^2= 10.89DF = 1 P<0.01$
Primary and above	103(99.04)	1 (0.96)	104(100)	
<b>Per capita Income (Rs)</b>				
< 500	115(89.98)	13(10.2)	128(100)	$X^2= 3.96DF = 1 P<0.05$
>=500	74 (97.4)	2 (2.6)	76(100)	
<b>Employment</b>				
Employed (self employed + service)	48(94.1)	3(5.9)	51(100)	$X^2= 0.21DF = 1 P>0.05$
Unemployed including retired	141(92.2)	12(7.8)	153(100)	
<b>IADL score</b>				
A	182(95.3)	9(4.7)	191 (100)	$X^2= 24.77DF = 1 P<0.001$
B-G	7(53.8)	6(46.2)	13(100)	

**Conflict of Interest:** Nil

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# Determination of Bilateral Asymmetry of Clavicle in the Population of Vidarbha Region of Maharashtra

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## ABSTRACT

**Objectives:** Anthropometric study of bones conveys information regarding race, sex, age and height of person. We conducted anthropometric study to know bilateral asymmetry in the clavicle of the population of Vidarbha region of Maharashtra.

**Materials and Method:** The study consist of fully ossified clavicles belonging to the 60 dissection hall cadavers out of which 48 were males and 12 were females of known sex and stature collected from different medical colleges of the region. Measurements were taken with the help of Osteometric board, Vernier calliper and Spreading caliper. The length of each bone was measured in millimeters and the weight was taken in grams. Data was analyzed using "t" test by Microsoft excel software.

**Results:** The length of right clavicle ranges from 108mm to 156mm with mean 137.78mm, SD 9.95, SEM 1.28 and coefficient of variation 7.22. On the left side the length varied from 108mm to 154mm with mean 138.76mm, SD 9.85, SEM 1.27 and coefficient of variation 7.09. The right clavicle is about 1mm smaller than the left clavicle ( $p > 0.05$ ). The mean weight of right clavicle was 17.2gm while for left it was 17.09gms indicating that right clavicle is heavier than the left clavicle.

**Conclusion:** We conclude that the left clavicle is slightly longer than the right clavicle in both sexes and the right clavicles are heavier than the left clavicle in both sexes in the population of Vidarbha region of Maharashtra.

**Keywords:** Clavicle, Bilateral Asymmetry, Anthropometry

## INTRODUCTION

Anthropometry is an advanced branch in the research field where the human skeleton is carried out to establish the individual identity like age, sex, stature, race etc<sup>1</sup>. Examination of the skeletal samples of the burials is often fragmentary and they are found in mixed lots. Anatomist and Forensic experts have been consulted frequently regarding identification of skeletal remains found under suspicious circumstances and are asked to pronounce an opinion which may form an important evidence in the court. The physical anthropology makes an important medico legal contribution through careful identification of skeletal remains and that law enforcement agencies appreciate this help.

Physiologically, the clavicle is an integrated element of the upper limb, transmitting loads to the axial skeleton and supporting the distal bones<sup>2</sup>. Recently it

has become apparent that anthropological study of clavicle has been somewhat neglected, as this bone has not appealed to anthropologist to any such degree as it has to comparative anatomist. But lots of studies were conducted regarding the asymmetry of clavicle. Since according to geographical area, nutritional status and race variations exists in humans beings. We planned the present study in the Vidarbha region of Maharashtra to know whether there is any bilateral asymmetry in the clavicle of the population of the region.

## MATERIAL AND METHOD

The present study was carried out in Department of Anatomy, Government Medical College, Nagpur from October 2003 to December 2005. It consist of fully ossified clavicles belonging to the 60 dissection hall cadavers out of which 48 were males and 12 were

females of known sex and stature. The above material for the research purpose was collected from the various medical colleges of Vidarbha region of Maharashtra, named to be Government Medical College, Nagpur, Indira Gandhi Government Medical College, Nagpur and N.K.P. Salve Medical College, Nagpur, Maharashtra.

The bones of each side of both sexes were numbered and kept separately. The bones showing pathological deformity or fractures were excluded from present study. Each bone was measured between its anatomical ends with the articular cartilage intact (A millimeter at each end should be allowed when the bones are devoid of articular cartilage)<sup>3</sup>.

Measurements were taken with the help of Osteometric board<sup>3</sup>, Vernier caliper and Spreading caliper<sup>4</sup>. The bony points were first localized and the measurements of both the sides were taken simultaneously. The length of each bone was measured on an osteometric board in millimeters and the weight was taken in grams. Each parameter was analyzed statistically to find out mean, standard deviation, coefficient of variation and standard error of mean. Data was analyzed using Microsoft excel software. The average differences in length and weight for right and left clavicles was calculated and recorded separately. "t" test was applied to known whether the differences were significant or not.

## RESULTS

### Length of clavicle

The length of right clavicle ranges from 108 mm to 156 mm. The average length was 137.78 mm and standard deviation was 9.95. The coefficient of variation was 7.22 and standard error of mean calculated was 1.28. On the left side the length of clavicle varied from 108 mm to 154 mm. The mean length was 138.76 mm and standard deviation was 9.85. The coefficient of variation was 7.09 and standard error of mean was 1.27.

From the above result it was observed that the right clavicle is about 1 mm smaller than the left clavicle thus showing the difference in length between the two sides.

The P value was calculated after applying the "t" test to know whether this difference between the clavicles of two sides were significant or not. As observed "t" value was 0.5439 and p value was 0.5875

( $p > 0.05$ ) indicating that there is no significant difference in length of clavicle between right and left side of both in males and females. Table- 1

### Weight of clavicle

The weight of right clavicle varied from 10.2gms to 25.7gms. The average weight was 17.2gm with standard deviation 3.87. The coefficient of variation was 22.5 and standard error of mean was calculated to be 0.50. On the left side the weight of clavicle varied from 9gms to 25.9gms. The mean weight was 17.09gms and standard deviation was 4.12. The coefficient of variation was 24.10 and standard error was found to be 0.53. From the observations it was seen that the right clavicle averages 0.11gm heavier than the left clavicle. The "t" test was applied to know this difference in mean between the right and left clavicles is significant or not. Observed "t" value was 0.0946 and p value was 0.9208 indicating statistically no significant difference in weight of right and left clavicle in both the genders. Table- 2

**Table 1: Linear measurement of each pair of clavicle in males and females**

Measurements	Right clavicle	Left clavicle
Number of bones	60	60
Range	108 – 156 mm	108 – 154 mm
Mean	137.78 mm	138.76 mm
Standard Deviation	9.95	9.85
Coefficient of Variation	7.22	7.09
Standard Error of Mean	1.28	1.27

**Table 2: Weight in grams of each pair of clavicle in both sexes**

Measurements	Right clavicle	Left clavicle
Number of bones	60	60
Range in gram	10.2 – 25.7 gms	9.0 – 25.9 gms
Mean in gram	17.2 gms	17.09 gms
Standard Deviation	3.87	4.12
Coefficient of Variation	22.5	24.10
Standard Error of Mean	0.50	0.53

## DISCUSSION

In the present series we studied the bilateral asymmetry in the clavicle of either sides of the same individual with regards to its length and weight. In the present study it was observed that the length of left clavicle was about 1mm longer than the right clavicle. It indicates that there was least difference in the length of both the clavicles. The weight of the clavicle also showed a very slight difference in that the right clavicle was about 0.11gms heavier than the

left clavicle. After statistical analysis for both the criteria it was seen that there was no statistically significant difference between the length and weight of the clavicle of two sides.

Most of the studies on bilateral asymmetry were done on the long bones of American natives. Jit and Singh<sup>5</sup> in their study which was conducted in 1966 found left clavicle to be longer by 0.5 mm to 22.5 mm in 63 pairs of male clavicle. They also noted that female left clavicle was longer in 50% instances than the right. Auerbach BM and, Raxter MH<sup>2</sup> in their study observed that there is a left-biased length asymmetry in the clavicles. In present study also left clavicles were found to be longer than right in both sexes.

### CONCLUSION

We conclude that the left clavicle is slightly longer than the right clavicle in both sexes and the right clavicles are heavier than the left clavicle in both sexes

in the population of Vidarbha region of Maharashtra. But the differences are statistically not significant.

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# A Study on Awareness among Adolescent Males in Rural Area of District Amritsar on Iron Deficiency Anemia

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## ABSTRACT

Iron deficiency anaemia remains a significant public health problem in vulnerable groups like adolescents. In India, the prevalence of iron deficiency anemia had been reported to be 55.8% among females and 30.2% among males in age group of 15-19 years.[3] This necessitates the importance of awareness about the disease among adolescents. Policy makers should focus their strategy right from adolescence beginning with raising awareness about iron deficiency anemia.

**Objective:** To assess the level of awareness about causes, prevention and treatment of iron deficiency anemia among adolescent males in rural area of Chhapa Ram Singh village, District Amritsar.

**Method:** A cross-sectional study conducted using a self designed standardized questionnaire from November, 2013 to January, 2014. The study population consists of all adolescent males of the village (n=179). Statistical analysis was done using Epi Info™ 7.1.3 14

**Results:** Our study indicates that only 15.6 % of the participants knew well about iron deficiency anemia and 59.78 % of the participants had poor knowledge on iron deficiency anemia. Chi square statistics shows significant relationship (p <0.05) between awareness about iron deficiency anemia with education, type of family, caste and socio-economic status of the participant.

**Conclusion:** Awareness regarding iron deficiency anemia is poor among adolescents and it is directly linked with the educational and social status of a community. This reflects into high prevalence of anemia among adolescents in India, necessitating the importance of inclusion of health education regarding awareness and knowledge about iron deficiency anemia in school going children.

**Keywords:** Iron Deficiency Anemia, Adolescent Males, Awareness

## INTRODUCTION

Iron deficiency anemia is a major public health problem globally, making it the only nutrient deficiency which is also significantly prevalent in Industrialized Countries.<sup>(1)</sup> 2 billion people – over 30% of the world's population – are anaemic.<sup>(1)</sup> In developing countries the prevalence rate is higher (44%) whereas it is lower in developed countries (12%).<sup>(2)</sup>

Adolescence is defined by WHO, ages between 10-19 years, a period characterized by physical, mental and psychological development.

In India, the prevalence of iron deficiency anemia had been reported to be 55.8% among females and 30.2% among males in age group of 15–19 years.<sup>[3]</sup> However, there has been a 5% decline in incidence of anemia amongst adolescents between National Family Health Survey (NFHS)-II (1998-99) and National Family Health Survey (NFHS)-III (2005-06).<sup>(8)</sup>

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The prevalence of anaemia (Haemoglobin value of <12 g% in girls and Haemoglobin value of <13g% in boys) is high amongst adolescents as per the report of NFHS-III.<sup>(8)</sup>

According to NFHS III report on Punjab state, men under age 20, rural men and men with no or little education are more likely to suffer from anaemia than most other men. <sup>(9)</sup>

Iron deficiency anemia reduces not only the physical ability of children and adolescents, but it also hampers the mental development. <sup>(4,5)</sup>

**The reasons for anaemia amongst adolescents are:**

- Growth spurt leading to increased demand of Iron in the body
- Poor dietary intake of Iron
- Worm infestation and high rate of infection
- Increased loss of Iron due to onset of menstruation (in girls)

**Rationale of our study:** The objective of our research is to study the level of awareness regarding iron deficiency anemia in adolescent males as lot of studies have been done to highlight the issue in adolescent females. <sup>(6,7)</sup>

**MATERIAL AND METHOD**

This is a cross-sectional study conducted from November, 2013 to January, 2014. The study population consists of all adolescent males of rural area of Chhapa Ram Singh village, District Amritsar.

As per the information available from 3 Anganwadi centers of the village, total population of the village is 2075 (Males: 1098, Females: 977). The total number of adolescent males in the village is 179.

**Sample size:**All adolescent males of the village, i.e 179.

**Questionnaire:**The survey was done with a face to face interview by going door to door in the village. The questions were appropriately translated in local language, ie. Punjabi mixed with Hindi. Informed verbal consent was taken from the participants. Survey instrument was a self designed open-ended questionnaire consisting of total 35 questions out of which 10 questions were on demographic characteristics and 25 questions were on knowledge about iron deficiency anemia (for awareness score), created according to relevant literature on Iron Deficiency Anemia.

**Awareness score:** A self formulated composite score was developed based on questionnaire on iron deficiency anemia. Its interpretation is as follow:

Awareness score	Interpretation
0-9	Poor knowledge
10-19	Fair knowledge
20-25	Good knowledge

**The questionnaire included details such as:**

**Personal details:** Age, religion, caste, education

**Family details:** Type of family, father’s employment, income

[Socioeconomic status as per modified BG Prasad’s scale (CPI Rs. 610 July 2011)] <sup>10</sup>

**Nutritional awareness:** Importance of frequency of intake of green leafy vegetables, non-vegetarian diet, such as red meat, chicken, liver, iron folic acid tablets

**Health information:** Awareness regarding anemia such as definition, causes and symptoms of anemia were included.

Chi-square (X<sup>2</sup>) and p value have been used to analyse the data using Epi Info™ 7.1.3 <sup>14</sup>

**RESULT AND DISCUSSION**

Out of 179 adolescent males included in the study, 107 of them got poor score, i.e. 0-9. The result of the study clearly indicates that 59.78 % participants had poor knowledge on iron deficiency anemia. Only 15.6 % of the participants knew well about iron deficiency anemia. (see table 1)

Result of this study is quite similar to the observations made by D Shojaezadeh, <sup>(11)</sup> which indicates that 57.3% of participants had poor knowledge on iron deficiency anemia.

A study done by Premalatha T et al <sup>(12)</sup> indicated that 80.75% of the participants were unaware of anemia.

This emphasized the need to improve in awareness campaigns before implementing any interventions like Weekly Iron and Folic Acid Supplementation (WIFS) Programme for adolescents. <sup>(13)</sup>



**Table No. 1: Relationship between awareness and age group of adolescents**

Awareness score	Younger adolescents (10-14 years)	Older adolescents (15-19 years)	Total	Percentage (%)
0-9	68	39	107	59.78%
10-19	23	21	44	24.58%
20-25	12	16	28	15.64%
Total	103	76	179	

Chi square value ( $X^2$ )= 4.553, degree of freedom=2,  $p$  value=0.1026

In this study, statistical analysis does not show any significant relationship between awareness and age of adolescents. Contrary to this, study done by D Shojaeizadeh <sup>11</sup> found that there was statistically significant relationship between knowledge and the age of the student.

**Table No. 2: Relationship between awareness and father's employment status**

Awareness score	Unemployed	Employed
0-9	25	82
10-19	6	38
20-25	5	23
Total	36	143

Chi square value ( $X^2$ )= 1.941, degree of freedom=2,  $p$  value=0.3788

In our study, we found no statistically significant relationship between awareness about iron deficiency anemia and fathers' employment status.

**Table No. 3: Relationship between awareness and education of adolescent male**

Awareness score	School dropouts adolescents	School going adolescents	College going adolescents
0-9	19	82	6
10-19	5	31	8
20-25	0	11	17
Total	24	124	31

Chi square value ( $X^2$ )= 48.821, degree of freedom=4,  $p$  value < 0.0001

In our study we found strong statistical relationship between awareness on iron deficiency anemia and education of the participant. This finding coincides with the finding that men (15-24y) with 10 or more years of completed education suffer less from iron deficiency anemia (17.1%) compared to those men with no education (35.4%) and men with < 5 years of completed education (33.8%). <sup>8</sup>

**Table No. 4 : Relationship between awareness and caste**

Awareness score	General	Backward class	Schedule caste
0-9	11	22	74
10-19	21	6	17
20-25	10	12	6
Total	42	40	97

Chi square value ( $X^2$ )= 39.609, degree of freedom=4,  $p$  value < 0.0001

Our study indicates statistical significant relationship between awareness and knowledge of iron deficiency anemia and caste of the participants.

According to Census-2011, Punjab is the state with highest proportion of Scheduled Castes (28.9%) <sup>15</sup>. Iron deficiency anemia of mild (Hb; 10.0-10.9 g/dl) and moderate (Hb; 7.0-9.9 g/dl) severity is common among all caste of the society, but severe anemia (Hb; <7 g/dl) is more pronounced among schedule caste children (9.9%) compared to that of other backward class (4.2%) and others (4.8%). <sup>9</sup>

**Table No. 5: Relationship between awareness and type of family**

Awareness score	Nuclear	Joint
0-9	78	29
10-19	13	31
20-25	20	8
Total	111	68

Chi square value ( $X^2$ )= 26.124, degree of freedom=2,  $p$  value < 0.0001

In our study, type of family has a significant relationship with awareness on iron deficiency anemia, as awareness is lesser in nuclear families compared to those with joint families. The most probable reason for this relationship might be sharing of knowledge on various health problems by elder persons of the joint family.

The prevalence studies on iron deficiency anemia among adolescent girls by Premalatha T et al.<sup>12</sup> and Gupta et al.<sup>16</sup> also shows high prevalence of iron deficiency anemia in nuclear families.

Contrary to this, Rawat et al.<sup>17</sup> found higher prevalence of iron deficiency anemia in joint families.

**Table No. 6: Relationship between awareness and socio-economic status \***

Awareness score	Upper	Upper Middle	Lower Middle	Upper Lower	Lower
0-9	10	4	19	21	53
10-19	17	3	8	9	7
20-25	8	2	2	10	6
Total	35	9	29	40	66

\*Modified BG Prasad's scale (July, 2011) 10

Chi square value ( $X^2$ )= 32.000, degree of freedom=8,  $p$  value < 0.0001

We found statistically significant relationship between awareness on iron deficiency anemia and socio-economic status of the participant, which indicates higher degree of knowledge among upper and upper-middle strata of the society compared to lower-middle, upper-lower or lower strata.

According to NFHS III (India, 2005-2006), prevalence of any form of iron deficiency anemia among men (15-24 years) is highest in participants belonging to lowest wealth index (36.9%) as compared to those belonging to highest wealth index (15.9%).<sup>3</sup>

The prevalence of anaemia is considerably higher among the scheduled castes and tribes and among children from households in the lower wealth quintiles.<sup>19</sup>

Findings of our study are further supported by the fact that lower socioeconomic status is associated with the increase in the risk of development of iron deficiency anemia in pregnancy.<sup>18</sup>

## CONCLUSION

There is no doubt that iron deficiency anemia is an extremely serious public health problem in India, especially in rural areas. Traditionally, the problem of iron deficiency anemia is under-estimated among men especially among adolescent males, which is a serious concern.

Our study on awareness regarding iron deficiency anemia among adolescent males indicates that only

15.6 % of the participants knew well about iron deficiency anemia and 59.78 % participants had poor knowledge on iron deficiency anemia. These figures emphasizes on importance of proper implementation of awareness campaigns on iron deficiency anemia in rural areas especially those belonging to lower socio-economic strata or schedule caste before launching intervention program.

The burden of iron deficiency can be reduced by taking a more holistic approach targeting wider population rather than the traditionally considered groups of the pregnant females, lactating females, children and adolescent females.

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# Ocular Morbidity among Welders in the Shipbuilding Industry, Goa

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## ABSTRACT

**Background:** While welding has conventionally been known to predispose welders to ocular morbidity (OM), organised sector requires implementation of stringent workplace safety rules. Are welders still predisposed to OM by virtue of their occupation?

**Materials and Method:** This cross-sectional study involved 552 workers; 276 welders and 276 nonwelders. An interviewer-administered questionnaire was followed by ocular examination and testing by means of a Titmus Vision Tester.

**Results:** The prevalence of OM among the two study groups comparable in age and duration of employment (DOE), was found to be significantly higher among welders with odds ratio (OR) of 1.75 (95% confidence interval (CI):1.45 - 2.11) despite regular PPE (personal protective equipment) use. Arc eye was limited to welders. Prevalence of cataract was greater in welders (OR = 3.60, 95% CI: 2.27-5.70) and was associated with a younger age and a shorter DOE compared to nonwelders. There were more cases of diminished colour vision among the welders (OR = 4.09, 95% CI: 1.63 - 10.28) and they did not differ significantly from the nonwelders with the same ocular morbidity in terms of mean age and DOE. Visual field defects, pterygium and myopia were more prevalent among welders; however statistical significance was weak.

**Conclusions:** Welders have a greater burden of ocular morbidity compared to nonwelders despite regular PPE use.

**Keywords:** *Welding, Ocular Morbidity, Pterygium, ARC Eye, Colour Vision*

## INTRODUCTION

It is known that the shipbuilding industry relies heavily on welding defined as a fusion process to join metal pieces at joint faces rendered plastic by heat, pressure of both<sup>1</sup>. Historically, welding has been associated with a variety of ocular morbidity (OM). Organised shipbuilding sector requires the implementation of stringent use of protective equipment and safety workplace rules. In such a scenario, are welders still predisposed to develop

morbidity by virtue of their occupation? This is the answer the current study seeks to find answer to.

### Ocular morbidity (OM)

The most common occupational hazard of welding is a metal foreign body impacting on the surface of the eye<sup>2,3</sup>. Light emitted from the welding arc (which includes ultraviolet (UV) and infrared radiation) can also cause primary eye injury. Repeated exposure to UV radiation is associated with cataracts, scleral

hyperemia, pterygia and accelerating senile eye changes<sup>4</sup>. A Swedish shipyard with approximately 3000 workers reported more than 7000 eye hazards in one year, about 30% of which were caused by exposure to ultraviolet radiation<sup>5</sup>.

Infrared radiation absorbed by the lens is implicated in giving rise to cataractous changes, and when absorbed by the retina along with visible light, it can give rise to retinitis photoelectrica. While some sources state that these retinal injuries heal spontaneously without loss of visual acuity<sup>6</sup>, others report findings of paracentral or central scotoma, macular edema, sub-retinal scarring, haemorrhage, neovascularisation and macular detachment leading to permanent decrease in visual activity, colour vision and visual field<sup>7</sup>. The work of the welder involves minute detail and precision, therefore identifying and correcting even a small refractive error can greatly increase visual efficiency and productivity. Besides, welders with defective vision may have to bring their eyes and breathing zone closer to the plume than if vision is properly corrected, which may put them at a higher risk of inhalation of welding fumes.

These ocular effects have known to be largely controlled by the use of PPE in the form of welding screens and curtains<sup>6</sup>. While such PPE was widely made available at the said shipyard, this study examines the prevalence of the various types of OM among welders here and compares it with that of nonwelders.

## MATERIALS AND METHOD

### Study population and subjects

A cross-sectional study was conducted in 2008-09 involving 552 workers working in the shipbuilding industry in Goa, India. All the 276 welders who were employed in the industry were included in the study while 276 subjects, comparable to welders in terms of age and socioeconomic status but who were neither involved in nor exposed to welding activity during the course of their work were chosen to constitute the nonwelders.

### DATA COLLECTION METHOD

An interviewer-administered questionnaire was used to record patient details, history of ocular injury at work and PPE use. This was followed by clinical examination of each subject to detect arc eye (defined as lacrimation, photophobia, blepharospasm 30

minutes to 24 hours following welding<sup>4</sup>), cataract and pterygium. Following this, vision was evaluated by means of a Titmus vision tester, which identified cases of myopia, hypermetropia, diminished colour vision and visual field defects.

### Data analysis

Inferential statistics used included calculation of Odds ratio (OR) and its 95% confidence interval (CI) (Woolfe's method), z test, two-way ANOVA, Fisher's exact test; the level of significance for which was taken to be p value of <0.05. Informed consent was obtained from all subjects prior to inclusion in the study. The study protocol was approved by the institutional ethics committee.

## RESULTS

This cross-sectional study was conducted from June 2008 to February 2009.

### Characteristics of both study groups

The welders were comparable to the nonwelders in terms of age, DOE (duration of employment) and smoking habit (Table 3).

### Prevalence of ocular morbidity and types

All the 276 welders used the welding screen or goggles regularly during welding, yet 79% reported experiencing arc eye at frequencies ranging from thrice in a year to thrice in a month. Twenty-three welders were found to have the condition at the time of examination. Regarding eye injuries, 52 (19%) of welders gave history of foreign body (cold metal injury) for which 21 required medical help but none of them were seen to have any sequelae.

The denominator for the calculation of prevalence of OM was taken in terms of person morbidities since seven types of non-mutually-exclusive OM were under study. Thus, taking the denominator as 1932 (7\*276) for each group, prevalence of OM was found to be 18% among welders and 11% among nonwelders in terms of person-morbidities with welders having a significantly greater burden of OM (OR=1.75 (95% CI: 1.45 – 2.11)). Types of OM among study subjects are given in Table 4. Arc eye was found in 23 welders and understandably none was detected among the nonwelders. Refractive error in Table 4 denotes that which was either not diagnosed hitherto or was under-corrected. All the welders who were already prescribed correction used it regularly at the time of welding.



### Comparison of age distribution of OM between the two groups

Mean age of all subjects with OM was above 40 years. While welders with cataract were significantly younger than nonwelders with cataract, those with diminished colour vision and visual field defects were significantly of a higher mean age compared to nonwelders with the same OM (Table 5).

### Comparison of DOE between welders and nonwelders with OM

OM was on an average commoner after the first decade of employment in both groups (Table 6). Similar to age distribution, the nonwelders with cataract had significantly higher mean DOE than their welder counterparts. Myopic and hypermetropic welders had greater DOE than nonwelders with the same refractive error.

**Table 1. Comparison between welders and nonwelders with respect to relevant factors**

Variables	Welders(N=276)	Nonwelders(N=276)
<b>Age (completed years)</b>		
Mean (SD)	43.2 (11.37)	42.2 (11.16)
Range	19-59	21-59
<b>Duration of employment (completed years)</b>		
Mean (SD)	19.9 (11.5)	19.1 (10.38)
Range	1-40	1-40
<b>Smoking habit n (%)</b>		
Smoker	48 (17)	37 (13)
Ex-smoker	16 (6)	10 (4)
Non-smoker	212(77)	229 (83)
<b>Age of smokers (completed years) Mean (SD)</b>	45.5 (9.57)	43.2 (10.27)

**Table 2: Ocular morbidity in welders and nonwelders.**

Ocular morbidity	Occupation				Odds ratio	(95% CI)
	Welders (N=276)		Nonwelders (N=276)			
	n	%	n	%		
Arc eye	23	8	0	0	-	-
Cataract	82	30	29	11	3.6	(2.27 – 5.70)
Pterygium	42	15	25	9	1.8	(1.06 – 3.06)
Diminished colour vision	23	8	6	2	4.09	(1.63 – 10.28)
Hypermetropia	99	36	108	39	0.87	(0.62 – 1.22)
Myopia	56	20	36	13	1.69	(1.06 – 2.66)
Visual field defects	23	8	11	4	2.19	(1.04 – 4.57)

**Table 3: Mean age of welders and nonwelders with ocular morbidity**

Ocular morbidity	Mean age	SD age	z value	p value	df
<b>Arc eye</b>					
Welders	43.3	11.27			
Nonwelders	0	0	Not applicable	Not applicable	Not applicable
<b>Cataract</b>					
Welders	48.9	8.42	2.823		
Nonwelders	53.5	3.82		0.016	109
<b>Pterygium</b>					
Welders	47.6	7.93	1.135		
Nonwelders	49.6	5.29		0.204	65
<b>Diminished colour vision</b>					
Welders	47.8	5.83	1.193		
Nonwelders	43.8	11.75		0.005	27

**Table 3: Mean age of welders and nonwelders with ocular morbidity(Contd.)**

Ocular morbidity	Mean age	SD age	z value	p value	df
<b>Hypermetropia</b>					
Welders	49.8	6.27	2.482		
Nonwelders	41.8	10.78		0.055	205
<b>Myopia</b>					
Welders	49.8	7.32	0.105		
Nonwelders	46.7	9.65		0.279	90
<b>Visual field defects</b>					
Welders	48.7	8.26	2.075		
Nonwelders	41.6	11.2		0.025	32

**Table 4: Mean duration of employment (DOE) of welders and nonwelders with ocular morbidity**

Ocular morbidity	Mean DOE	SD DOE	z value	p value	df
<b>Arc eye</b>					
Welders	19.6	11.65			
Nonwelders	0	0	Not applicable	Not applicable	Not applicable
<b>Cataract</b>					
Welders	25.9	8.88			
Nonwelders	29.7	4.21	2.258	0.013	109
<b>Pterygium</b>					
Welders	24.1	8.64			
Nonwelders	26.1	5.85	1.050	0.19	65
<b>Diminished colour vision</b>					
Welders	24.3	5.55			
Nonwelders	18.8	8.38	1.919	0.152	27
<b>Hypermetropia</b>					
Welders	26.8	6.57			
Nonwelders	19.3	9.99	2.465	0.001	205
<b>Myopia</b>					
Welders	26.8	7.69			
Nonwelders	22.6	8.92	0.432	0.011	90
<b>Visual field defects</b>					
Welders	26.4	9.53			
Nonwelders	17.4	10.1	2.523	0.287	32

## DISCUSSION

The findings of this study indicate that welders have a greater burden of OM compared the nonwelders despite regular PPE use. While the small percentage of eye injuries, indicates a less than meticulous use of PPE. Another reason is that in shipbuilding, once the vessel begins to take shape, welders are required to work in proximity to each other and sometimes in groups. In such situations, a welder is exposed to arcs that are struck in the vicinity, despite the fact that the welder did use PPE to protect himself against his own arc. Besides, actinic radiation reflected off unpainted metals and concrete floors adds to exposure<sup>6</sup>. A study in the past has reported PPE use

among welders reporting eye injury around 15%<sup>3</sup>. Promotion of ergonomically designed goggles over hand-held screens and welding curtains, ensuring a snug fit around eye-sockets to obstruct incident radiation is a feasible solution.

Arc eye, a condition clearly associated with welding, was limited to welders. Prevalence of cataract in welders was four times that in the nonwelders and associated with a younger age and a shorter DOE compared to nonwelders indicating welding-related acceleration of senile eye changes that are cumulative over time. Similarly, the burden of cases of diminished colour vision was greater among the welders though they did not differ significantly from the nonwelders

with the same condition in terms of mean age and DOE. Visual field defects, pterygium and myopia were more prevalent among welders though the statistical significance was but weak. Higher mean age and DOE among welders marked the distribution of visual field defect and refractive error respectively. The findings of other authors differ from those of the current study: while one<sup>4</sup> reported a significant prevalence of pterygium in welders compared to controls, Doughty *et al*<sup>8</sup> found none.

Though the present study is of cross-sectional design obviating possibilities to explore temporal relations between exposures and outcomes, the association of OM with occupation as a welder despite regular use of PPE has clearly emerged. These findings have been of use in alerting the authorities to the still-prevalent problem of OM among welders. This has fuelled further investigations to identify underlying issues thereby enabling amendment of workplace regulation, screening criteria and worker education material. The authors recommend similar studies perhaps with greater logistic support (quantifying radiation exposures with dosimeters for instance) and prospective design, in settings involving significant welding activity even if safety regulations are in place, so that authorities may have access to evidence-based recommendations tailor-made to the actual workplace situation.

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# Prevalence of Peripheral Retinal Degenerations in the Cases of Myopia- A Prospective Study

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## ABSTRACT

**Background:** Myopia is one of the common refractive errors in general population. If examination of retinal periphery becomes part of a routine clinical procedure in all myopic eyes then a significant number of pathologic alterations could be detected at the earliest and it can be appropriately treated. This study was conducted with a view to emphasize the need for the above.

**Materials and Method:** A total of 87 patients between 11 years to 71 years of age were included. Cases which presented with photopsiae, floaters, history of trauma, diabetes, hypertension and any other obvious ocular disease were also excluded. Retinoscopy was done in all cases to assess the total refractive error. The axial length of each eye was recorded using cooper vision ultrasound digital A-I I using automatic freeze method.

**Results:** Peripheral retinal degenerations were found in 42% of cases and in these cases lattice degeneration was most common followed by white without pressure. The maximum percentage of lesions were observed in eyes between axial lengths of 25mm-30mm. Majority of cases of lattice degeneration and white without pressure were in the age group of 21-30 years. Majority of lesions were in the superotemporal quadrant (60%). Lattice degeneration was bilateral in 50% of cases while it was 57% in white without pressure and 56% in pigmentary degeneration. Percentage of eyes showing single lesion was found to be 83%.

**Conclusion:** We conclude that lattice degeneration and white without pressure are important peripheral retinal degenerations in myopic eyes of the regional population are related to an increased axial length.

**Keywords:** Myopia, Peripheral Degeneration, Lattice Degeneration

## INTRODUCTION

Myopia is one of the common refractive errors in general population. In myopic eyes there is an increased vulnerability of both disease and trauma due to the thinner peripheral retina, presence of poorly developed retinal elements and poor vascularization. There is also a decreased resistance to vitreous traction due to absence of large blood vessels and optic nerve

fibers. The myopic eye is predisposed to retinal detachment due to peripheral retinal changes which are more marked in globes of higher axial lengths<sup>(1)</sup>. If examination of retinal periphery becomes part of a routine clinical procedure in all myopic eyes then a significant number of pathologic alterations could be detected at the earliest and it can be appropriately treated.

This study was conducted with a view to emphasize the need for the above. Our main aim is to correlate the lesions of peripheral retina with axial length and their interrelationship to each other and other factors like age, sex, area of distribution and bilateralism.

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**MATERIAL AND METHOD**

A total of 87 (53 males and 34 females) cases of age group between 11 to 71 years were included in the study. Patients having myopia were selected from the department of refraction of Sarojini Devi Eye Hospital Hyderabad, India.

After a detailed history, the cases which presented with photopsiae, floaters, history of trauma, history of diabetes and hypertension were excluded from the study. Cases with any other obvious ocular disease were also excluded.

Pupils of all eyes were fully dilated with tropicamide 1% and phenylephrine hydrochloride 5%. Retinoscopy was done in all cases to assess the total refractive error. A thorough anterior segment examination was done with a slit lamp and intraocular pressure was measured by applanation tonometry. Binocular indirect ophthalmoscopy with 360p indentation of sclera was done in all cases .Slit lamp

biomicroscopy with Goldman 3- mirror contact lens was performed in few selected cases. The axial length of each eye was recorded using cooper vision ultrasound digital A-I I having ultrasonic frequency of 10 MHz by using automatic freeze method. An average of 3 readings were taken in every case. A fundus sketch was drawn in every case by using the standard color code.

**RESULTS**

Peripheral degenerations were found in most of the myopic eyes i.e. 42% of cases and in that lattice degeneration was most common followed by white without pressure (See Table-1).

Number of eyes showing peripheral degenerations increased as the axial length increased. The maximum percentages of cases were observed in eyes between axial lengths of 25mm-30mm (See Table-2).

**Table 1: Incidence of various types of peripheral degenerations**

Type of Degeneration	Eyes showing lesions	Percentage
Lattice degeneration	33	19.00%
White without pressure	21	12.00%
Pigmentary degeneration	14	08.00%
Pavingstone degeneration	07	04.00%
Retinoschisis	04	02.00%
Meridional Folds	02	01.00%

**Table 2: Percentage of peripheral lesions in various axial length (mm) groups**

Axial length	Lattice	WWP*	PC**	PS***	Retinoschisis	****MF
22 – 23	—	—	—	—	—	—
23 – 24	4%	—	—	4%	—	—
24 - 25	3%	6%	6%	—	—	—
25 – 26	21%	13%	13%	—	—	4%
26 – 27	22%	22%	22%	11%	—	4%
27 – 28	21%	21%	21%	5%	5%	—
28 – 29	58%	8%	—	—	17%	—
29 – 30	60%	40%	—	—	10%	—
30 – 31	33%	—	—	—	—	—
> 31	25%	—	—	25%	—	—

\*White Without Pressure, \*\*Pigment Clumping, \*\*\*Pavingstone, \*\*\*\*Meridional Fold

We observed maximum incidence of peripheral retinal degenerations in patients who were above 60 years of age (See Table- 3). Maximum incidence of lattice degeneration and white without pressure were found in the age group of 21-30 years. Pigmentary

degeneration increased as the age increased ranging from zero percent upto the age of 30 years to an incidence of 50% after the age of 60 years. Retinoschisis was found only in the 2<sup>nd</sup> decade while meridional folds were found in 2<sup>nd</sup> decade (2%) and 3<sup>rd</sup> decade (3%).

**Table 3: Percentage showing peripheral degenerations in various age groups**

Age group	Number of eyes	Eyes showing Lesions	Percentage
11 – 20	61	24	39%
21 – 30	40	18	45%
31 – 40	26	11	42%
41 – 50	18	06	30%
51 – 60	16	05	31%
> 60	10	07	70%

The incidence of different types of degenerations was more among males except in lattice degeneration

which was more common among females (See Table- 4).

**Table 4: Percentage of degenerations among males**

Type of Degeneration	Males	Percentage	Females	Percentage
Lattice degeneration	12	23%	10	29%
White without pressure	9	17%	4	12%
Pigmentary degeneration	7	13%	2	6%
Pavingstone degeneration	5	9%	1	3%
Retinoschisis	3	6%	—	—
Merdonial fold	2	4%	—	—

Majority of lesions were in the superotemporal quadrant i.e.60% followed by inferotemporal i.e. 23%, superonasal quadrant i.e.13% and 5% in the inferonasal quadrant. Lattice degeneration, white without pressure and pigmentary degeneration were most

common in the superotemporal quadrant. Retinoschisis was equally distributed in the superotemporal and inferotemporal quadrants while Meridional folds were seen only in the superonasal quadrant (See Table- 5).

**Table 5: Quadrantic distribution of peripheral degeneration**

Type of Degeneration	ST* Quadrant	IT** Quadrant	Superonasal Quadrant	Inferonasal Quadrant
Lattice	78%	19%	3%	—
White without pressure	63%	21%	13%	4%
Pigmentary degeneration	47%	33%	13%	7%
Pavingstone degeneration	43%	29%	14%	14%
Retinoschisis	40%	40%	20%	—
Merdonial fold	—	—	100%	—

\*IT= Inferotemporal, \*\*ST= Superotemporal

Lattice degeneration was bilateral in 50% of cases while it was 57% in white without pressure and 56% in pigmentary degeneration. Pavingstone degeneration was mostly unilateral in 83% of cases while meridional folds were unilateral in all cases.

The Percentage of eyes showing single lesion was found in 83% of cases and those showing multiple lesions were found in 17% of cases. Among these lesions lattice degeneration was most commonly associated with other degenerations.

## DISCUSSION

There is a significant association between peripheral degenerative changes and increased axial length of the eye. The greater the anteroposterior ocular diameter more will be the peripheral degenerative changes. Furthermore it is the temporal aspect of the globe that is most frequently involved with each type of change in our study.

All these type of degenerative changes may be attributed to

\* The peripheral retina being thinner than its central part.

\* Retinal cells in the periphery are fewer and often poorly developed.

\* The peripheral retina is less resistant to traction by vitreous because of the absence of optic nerve fibers and large blood vessels and

\* Poor vascularization is thought to be an important factor in the production of cystoid degeneration and may contribute to the formation of other peripheral changes notably lattice degeneration which is most important among all other degenerations.

As demonstrated in our study increasing age was found to be a significant factor in the incidence of pavingstone and pigmentary degeneration. Both lattice degeneration and white without pressure were found in younger age groups i.e. 3<sup>rd</sup> decade in our study with white without pressure showing a decrease in prevalence as the age increases. This suggests that white without pressure may be either an earlier stage of other forms of degenerations or it may be a transient phenomenon. The reduced prevalence of lattice degeneration in older eyes may be the result of undetected lesions in the presence of associated pigmentary degeneration.

As far as lattice degeneration is concerned, our statistics are congruent with those reported by others. Cambiaggi et al<sup>(2)</sup> reported the incidence of lattice degeneration upto 19.1% in myopic eyes. Kirker and McDonald<sup>(3)</sup> reported an incidence of 22%. But the incidence reported by Karlin & Curtin<sup>(4)</sup> in their large study group was only 6.1% among myopic eyes. A slightly higher incidence was reported by Celorio and Pruett<sup>(5)</sup> who reported an overall incidence of 24.1% among myopic eyes.

As in our study many studies reported a higher preponderance of females than males. Most of the studies showed maximum involvement of the temporal quadrant as in our study. In our study bilateral involvement was observed in 50% of cases which is a bit higher than that reported in other studies. Celorio and Pruett<sup>(5)</sup> reported bilateral involvement in 46% while it was reported as 32% by Shiomi<sup>(6)</sup>, 34% by Byer<sup>(7)</sup> and 40% by Karlin and Curtin<sup>(4)</sup>. Lattice degeneration was highly prevalent among eyes with axial lengths between 28mm to 30mm. Karlin and Curtin<sup>(4)</sup> indicated that lattice was highly prevalent among eyes with axial lengths of 30mm and above, where as Celorio and Pruett<sup>(5)</sup> indicated highest prevalence among moderate myopes with axial lengths between 26.0 to 26.9mm. Maximum incidence of lattice observed in our study is in between the two studies mentioned above. The most important difference in these studies may be the manner in which patients were selected for examination. In Karlin and Curtin<sup>(4)</sup> study the source of patients was a myopia clinic where perhaps most of the patients came on their own for examination rather than being referred for a specific problem. In Celorio & Pruett<sup>(5)</sup> study patients were referred for examination by other ophthalmologists. Whereas in our study the patients examined were both who came on their own for examination to the refraction clinic and also those who were referred from peripheral centers to rule out retinal degenerations in myopia cases as ours being a referral centre.

Further studies of relationship between axial length and lattice degeneration could be useful because certain studies for example as done by Smith and associates<sup>(8)</sup> showed an incidence of 6.3% of retinal detachment among moderate myopes and only 4.8% among severe myopes. Only an unselected population survey could be more helpful to measure accurately the true prevalence of lattice degeneration among patients with myopia of various degrees.

The findings of white without pressure in our study were different from others as Karlin and Curtin<sup>(4)</sup> showed on overall prevalence of 27% with maximum patients in younger age groups and with a tendency towards bilaterality with no appreciable sex difference. The great variability of this lesion may be the cause of low prevalence in our study. Added to that as pigmentation in the body in our patients is far more compared to the patients who were examined in other studies, the incidence might be more affected.

The prevalence of pigmentary degeneration was found to be 8% in our study. It was mainly in eyes with axial lengths between 26mm-28mm, Majority of cases were found in above 60 years of age. Superotemporal quadrant was most commonly affected. A tendency towards bilaterality was also found. Males were predominantly affected and lattice degeneration was the most common paired lesion.

Rutnin et al<sup>(9)</sup> noted an incidence of 10.24% in their clinical study and pointed out that it was almost equally distributed among myopes, emmetropes and aphakes; and it was unilateral in 100% of cases. Karlin and Curtin<sup>(4)</sup> demonstrated an overall incidence of 24% among all myopes and pointed out that the maximum incidence was among all patients of 40 years of age or older than this as shown in our study. A tendency towards bilaterality was detected, superotemporal quadrant was most frequently involved and there was no significant sex difference in their study. Everett<sup>(10)</sup> found pigmentary degeneration to be associated with retinal tears in 32% of eyes. This discrepancy raises the question of whether these retinal breaks were due to pigmentary degeneration itself or pigmentation occurred secondary to the development of breaks with vitreous traction causing an irritation of retinal pigment epithelium. Kumar Paul and Singh<sup>(11)</sup> found the association of pigmentary degeneration with myopia and found this lesion to preferentially affect males. The lower prevalence among our study may be due to different population groups and racial factors.

Pavingstone degeneration was prevalent only in 4% of situations. It was mainly in axial lengths of more than 31mm and majority of cases were after the age of 40 years. Bilateral involvement was not prominent and superotemporal quadrant was most frequently affected. Males were more frequently affected than females and it was not preferentially associated with any other chorioretinal lesion.

Karlin and Curtin<sup>(4)</sup> reported an overall incidence of 16.8% with maximum number of cases in the age groups of 40 years and above. The lesions showed a tendency towards bilaterality (57%) and males were more frequently affected than females and the lesions were not preferentially associated with any other lesion in their study. Malley et al<sup>(12)</sup> showed that the lesions were unilateral in 67% of cases. The most common site reported by most of the workers was inferotemporal quadrant. Rutnin & Schepens<sup>(9)</sup> noted it to be 3 times more common in males than females as noted in our study.

Retinoschisis was found in 2% of all myopic eyes examined. It was seen only in the axial lengths of 27mm-30mm. All the cases were seen in the 2<sup>nd</sup> decade of life. All patients were males and the lesions were equally distributed in superotemporal and inferotemporal quadrants (40% each) and 20% cases were in the superonasal quadrant and 33% of cases showed bilateral lesions.

Meridional folds were seen only in 1% of myopic eyes examined. They were seen only in the axial length groups of 25mm-27mm. The cases were seen only in the 2<sup>nd</sup> & 3<sup>rd</sup> decade. All the patients were males and all the lesions were seen only in the superonasal quadrant (100%) and all of them were unilateral (100%). These lesions are not specifically associated with myopia, as retinoschisis is more common in hyperopes and meridional fold is described as a developmental variation.

## CONCLUSION

We conclude that the lattice degeneration, white without pressure; pigmentary degeneration and pavingstone degeneration are important peripheral retinal degenerations in myopes and are related to an increased axial length. The Lattice degeneration is the most common lesion with a predominant distribution in the superotemporal quadrant. Tendency towards bilaterality is found in all the degenerations except pavingstone degeneration. Lattice degeneration is mainly found in axial length groups of 28mm- 30mm and ageing significantly reduced the prevalence of white without pressure. Pavingstone and pigmentary degenerations significantly increase as the age increases and are mainly present in patients above the age group of 40 years. The most common paired lesions are lattice degeneration and white without pressure.

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# Association of Posterior Pole Degeneration with Axial Length in the Cases of Myopia- A Cross Sectional Study

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## ABSTRACT

**Background:** Posterior pole degeneration is associated with myopia which is understudied specifically in our region. Therefore, we performed the present study with the aim to know the relationship of posterior chorioretinal degeneration with axial length and their interrelationship with each other and other factors like demographic distribution.

**Materials and Method:** In the prospective study 53 males and 34 females (Total 87 cases) that were already diagnosed as myopia were included. The recording of axial length of each eye was done using cooper vision ultrasound digital A-I I which has an ultrasonic frequency of 10 MHz and we utilized automatic freeze method.

**Results:** Posterior pole degeneration was present only in 14% (23) cases. Upto an axial length of 25mm no eyes showed posterior pole degeneration. As the axial length increases from 26mm onwards the percentage of eyes showing posterior pole degeneration also increases. Upto 100% increase was observed at the axial lengths of 30mm and above. The incidence of posterior pole degeneration increased in all patients who were above 50 in age with no gender difference.

**Conclusion:** Posterior chorioretinal changes are relatively much less compare to peripheral degenerative changes and they are directly related to an increase in axial length of all myopic eyes, specifically after the length of 25 mm and maximum incidence is observed after the length of 30 mm.

**Keywords:** Myopia, Posterior Pole Degeneration, Peripheral Retinal Degeneration

## INTRODUCTION

Myopia is a refractive error which is one of the most common ophthalmic disorders and has a lifelong financial burden in the form of spectacles or contact lenses<sup>(1)</sup>. Pathological or high myopia has an elongated globe with at least "6 dioptres<sup>(2)</sup>. Those persons who have a high degree of myopia specifically associated with retinal degenerative conditions and other ophthalmic pathologies are more prone for permanent visual impairment or blindness from macular degeneration, retinal detachment, glaucoma, and

cataract<sup>(3, 4, 5)</sup>. High myopia is usually associated with various kinds of retinal degenerations like lattice degeneration, retinal detachment, choroidal neovascularisation and macular hemorrhage<sup>(6)</sup>.

Many researchers have conducted studies regarding myopia and retinal degenerations specifically about peripheral retinal degeneration in association with axial length<sup>(7, 8)</sup>. Some studies also suggest that an increase risk of posterior pole chorioretinal abnormalities<sup>(9, 10)</sup>. But results of relationship between axial length and retinal degenerations are different. Prevalence of myopia is different according to race and geographical areas that's why the results of all the studies cannot be applicable for all people of the world. Moreover, the relationship between posterior pole degeneration and axial length are not assessed properly specially in our region.

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Therefore, we performed the present study with the aim to know the relationship between posterior pole degeneration with axial length and their interrelationship to each other and other factors like demographic distribution.

### MATERIAL AND METHOD

The prospective study was conducted in the department of refraction of Sarojini Devi Eye Hospital Hyderabad, India. 53 males and 34 females (Total 87 cases) were selected for the study. The age group of the patients was in between 11 years to 71 years. Patients who were already diagnosed as myopic were included.

Patients suffering from diabetes, hypertension, history of trauma, photopsiae and floaters were excluded from the study and all those patients who had any other ocular disorders, after going through ophthalmological examination were also excluded from the study.

Dilatation of pupil was done by using tropicamide 1% and phenylephrine hydrochloride 5%. Retinoscopy was done in all cases to assess the total refractive error. Fundus examination was done with an indirect ophthalmoscope with scleral indentation and three mirror examination wherever is necessary. Applanation tonometry was used for the measurement of intraocular pressure while anterior segment was thoroughly examined with the help of a slit lamp. The recording of axial length of each eye was done by using cooper vision ultrasound digital A-I I with an ultrasonic frequency of 10 MHz by utilizing automatic freeze method. An average of 3 readings was taken in every case for the analysis. Standard colour code was used to draw sketch of fundus in all cases.

### RESULTS

We observed degenerative changes in 56% of cases. But posterior pole degeneration was present only in 14% of cases while peripheral degenerative changes were observed in 42% of cases among all the myopic eyes.

Upto an axial length of 25mm no eyes showed posterior pole degeneration. As the axial length increases from 26mm onwards the percentage of eyes showing posterior pole degeneration also increases. Upto 100% increase was observed at the axial length of 30mm and above which indicates that the posterior

pole degenerative changes are directly related to an increase in axial length of all myopic eyes (See Table-1). The incidence of posterior pole degeneration increases in all patients who are above 50 years in age (See Table- 2). Sex had no relation to the incidence of posterior pole degeneration (See Table- 3). Almost 77% cases of posterior pole degeneration were bilateral. Only 9% of the eyes showed both peripheral degenerations and posterior pole degenerative changes (See Table- 4).

**Table 1: Percentage of post pole degeneration in various axial lengths**

Axial Length (in mm)	Number of eyes	Eyes showing Lesions	Percentage
22 – 23	12	0	0.00%
23 – 24	26	0	0.00%
24 - 25	34	0	0.00%
25 – 26	24	0	0.00%
26 – 27	27	2	7.00%
27 – 28	19	8	42.0%
28 – 29	12	4	33.0%
29 – 30	10	2	20.0%
30 - 31	3	3	100%
> 31	4	4	100%

**Table 2: Posterior pole degeneration in various age groups**

Age group	Number of eyes	Eyes showing Lesions	Percentage
11 – 20	61	7	11%
21 – 30	40	6	15%
31 – 40	26	1	4.0%
41 – 50	18	1	6.0%
51 – 60	16	4	25%
> 60	10	4	40%

**Table 3: Sex incidence of posterior pole degeneration**

Sex Group	No. of patients	Patients with Lesions	Percentage
Males	53	8	15%
Females	34	5	15%

**Table 4: Relationship between peripheral degenerations & post pole degeneration**

Type of lesion	Eyes showing Lesions	Percentage
Peripheral degenerations	64	74%
Posterior chorioretinal	15	17%
Both	8	9%

## DISCUSSION

In our study we observed overall degenerative changes upto 56% in myopic eyes in which most of the cases were from the category of peripheral degenerations while posterior chorioretinal degeneration was observed only in 14% cases. Lai TYY et al <sup>(11)</sup> in their study which was conducted in Hong Kong on Chinese population found 11% cases of myopia with posterior chorioretinal degeneration while various types of peripheral degenerations were observed in 50% individuals. Lam DS et al <sup>(12)</sup> also found more number of peripheral retinal degenerations compare to posterior chorioretinal degeneration in adult Chinese who had very high myopia. But Vongphanit J et al <sup>(13)</sup> observed 25% of cases of posterior pole degeneration in patients of myopia which is higher than what we got in our study.

In our study the incidence of posterior pole degeneration increased substantially after the age of 50 years and we did not observe any gender difference in those cases. In the study of Lai TYY et al <sup>(11)</sup> people of old age along with higher magnitude of refractive errors were independently associated with the presence of posterior pole chorioretinal lesions. Pierro L et al <sup>(14)</sup> in their study which was conducted in Italy did not find any significant relationship between any kind of peripheral retinal lesion and posterior vitreous detachment with gender of the patients and their age. Gozum N et al <sup>(9)</sup> in their study of high myopia cases found that posterior pole lesions including pole degeneration, Fuchs' spot and posterior staphyloma were associated with older age. Vongphanit J et al <sup>(13)</sup> observed age-related trend for the prevalence of myopic macular lesions including posterior staphyloma, lacquer cracks, Fuchs' spot and posterior pole degeneration.

We found that upto an axial length of 25mm no eyes showed posterior pole degeneration and posterior pole degeneration was more common in eyes with axial length of more than 31mm with an incidence of 100%; whereas peripheral degenerations were more in eyes with axial lengths between 28mm to 30mm. It was also observed that as the axial length increased beyond 26mm the percentage of eyes showing posterior pole degeneration also increased indicating that the posterior pole degenerative changes are directly related to an increase in axial length of all myopic eyes. In the eyes with posterior pole

degenerative changes, the incidence of peripheral degenerations was lesser than the eyes showing no posterior pole degenerative changes among myopes.

Lai TYY et al <sup>(11)</sup> found that eyes of those cases in which axial length was longer and had higher magnitude of myopia, the chorioretinal lesions at the posterior pole were more compare to the eyes with less axial length. Saw SM et al also stated that pole degeneration has association with severity of myopia and greater axial length. Lam DS et al found strong correlation between presence of retinal holes and very high myopia of an axial length of 30 mm or above. While Celorio JM and Pruett RC <sup>(15)</sup> observed that peripheral retinal degenerations were more common in moderate myopia cases in which axial length was always less than 30 mm and usually in between 26 mm to 26.9 mm.

## CONCLUSION

Posterior chorioretinal changes are relatively much less compare to peripheral degenerative changes. Posterior pole degenerative changes are directly related to an increase in axial length of all myopic eyes specifically after the length of 25 mm with maximum incidence after the length of 30 mm. These are common after the age of 50 years with no sexual differentiation. Bilateralism is a common phenomenon in our study population. We suggest that such type of patients should be made aware regarding symptoms of retinal complications as posterior pole degeneration can lead to serious vision threatening complications.

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# Comparative Study of Palmar Dermatoglyphics in Thalassemic Population of Vidarbha Region of Maharashtra India

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## ABSTRACT

**Background:** Dermatoglyphics is useful in the management of various genetic disorders. Thalassaemia is a genetic disorder of early age which in severe forms needs blood transfusion. By dermatoglyphics which deals with epidermal ridges we can diagnose the cases of thalassaemia. This study was conducted to find whether any specific pattern of palmar dermatoglyphics exist for thalassaemic population of Vidarbha region of India.

**Materials and Method:** 100 thalassaemic cases with equal number of healthy volunteers were included in this prospective study. Palmer dermatoglyphic study was performed by using "Ink method" of Cummins.

**Results:** Palmar patterns are significantly more in thalassaemics mainly in hypothenar and thenar/ID1 areas than controls. Significant increase in number of palmar triradii is also seen. There is distal displacement of axial triradii is available in both male and female thalassaemics. 'atd' angles and 'a-b' ridge count is also more in thalassaemics than control cases.

**Conclusion:** Vidarbha region have specific differences in patients of thalassaemia as far as palmar dermatoglyphic patterns is concerned. The knowledge will be useful in the management of the disease.

**Keywords:** *Palmer Dermatoglyphics, Thalassaemia, Cooley's Anaemia*

## INTRODUCTION

Dermatoglyphics is one of the important and establish branch of forensic science which deals with study of epidermal ridges and their configurations on the palmar region of hand and fingers and plantar region of foot and toes. The epidermal ridges appear during foetal life and remain throughout the life until skin is damaged at the depth of 1mm<sup>1</sup> although the epidermal ridge configurations and their component ridges enlarge with growth, but their essential characteristics remain same throughout the life<sup>2</sup>. Dermatoglyphics is studied and used in the predictions of genetic disorders<sup>3</sup> since epidermal ridge patterns are under genetic influence<sup>4</sup>. Genetic abnormalities are inherited to the children and are reflected in dermatoglyphic pattern<sup>5</sup>. The correlation between dermatoglyphics and other aspects of constitution like disease process is already established<sup>6</sup>. Hence the

study of dermatoglyphics proves to be very useful in predicting the hereditary diseases in patients. Moreover, it shows definite diagnostic changes in those disorders which have genetic basis<sup>3</sup>.

Thalassaemia is a genetic disorder in which thalassaemia major or Cooley's (homozygous) anemia is a clinically severe disorder with severe adverse consequences. It is a haemoglobinopathy affecting early age of life. In India almost 11,316 cases are added every year in the existing pool of thalassaemia major<sup>7</sup>. The affected children are normal at birth. There is onset of anemia at about 3 months of age. Then the physical growth is retarded. There occurs hepatomegaly and splenomegaly and characteristic bone changes and mongoloid features set in<sup>8</sup>. Many workers performed dermatoglyphics studies in thalassaemic cases in various regions of the world and observed differences between normal cases and also difference in



thalassemic cases according to region <sup>9,10</sup>. In this background we have undertaken this study to know the dermatoglyphic pattern in thalassemic cases of Vidarbha region of Maharashtra India so that preventive measures can be taken and early diagnosis can be done with this cheap method.

**MATERIAL AND METHOD**

In this prospective study, 100 thalassemic and 100 control cases belonging to both the genders were included with 60:40 male, female ratios. Cases from different regions of Vidarbha were studied in government medical college Nagpur. Diagnosis was made by physicians and pediatricians of respective departments of government medical college Nagpur after through clinical examinations, laboratories investigations and examination of past medical records.

For measurements of dermatoglyphic patterns, "Ink method" which was originally demonstrated by Cummins <sup>1,3,6</sup> was used. In this method ink is applied over the palm by a roller after cleaning both hands thoroughly with keeping some moisture. Then hands are placed over a white paper sheet and after drying of the print dermatoglyphic examinations are performed using magnifying hand lens and ridge counting was done with the help of a sharp needle. Data was analyzed using nonparametric test for quantitative analysis while qualitative analysis was done using analysis chi-square test.

**RESULTS**

In male thalassemic percentage of palmar patterns in hypothenar (8.16%) and thenar 1<sup>st</sup> interdigital area (6.66%) was more than of controls. It was also increased in female thalassemic (hypothenar (8.75%) and thenar 1<sup>st</sup> interdigital area- 3.00%) table- 1.

Higher percentage of axial triradii at T1 (Triradius between T0 and T2) position was observed in thalassemic than controls. It was 71.25% in female thalassemic. Higher percentage of triradius at T2 (Triradius near centre of palm) position was also observed in male thalassemic. The percentage of T0 (Triradius near wrist crease) was less in thalassemic males. There is statistically significant distal displacement of axial triradii in thalassemic males, females and males and females combined series as compared to that of controls (Table- 2).

Frequency of 6 and 7 palmar triradii was significantly increased in thalassemic when compared with the controls while 4 palmer triradii was decreased (Table 3).

The mean values for 'atd' angle for both males and females were increased in thalassemic. The males and females combined series showed higher mean values in thalassemic. Overall 'atd' angle showed significant increase in thalassemic (Table- 4).

We observed increased mean values for thalassemic males and females and also in males and females combined series of thalassemic indicating significant increase in overall 'a-b' ridge count in thalassemic than controls (Table- 5).

**Table 1: Frequency distribution of palmar pattern types**

Subject	Sex	Hypo(%)	Th/ID1(%)	ID2(%)	ID3(%)	ID4(%)
	M	49(8.16)*	40(6.66)*	5(0.83)*	77(12.83)*	43(7.16)
	F	36(8.75)*	12(3.00)*	2(0.50)*	53(13.25)*	34(8.50)
	M+F	84(8.40)*	52(5.20)*	7(0.70)*	130(13.0)*	77(7.70)
Control	M	29(4.83)	16(2.66)	15(2.5)	28(4.66)	43(7.16)
	F	19(4.50)	04(1.00)	6(1.50)	13(3.25)	24(6.00)
	M+F	48(4.80)	20(2.00)	21(2.1)	41(4.10)	67(6.70)

Hypo- Hypothenar, Th/ID1- Thenar 1<sup>st</sup> Interdigital area, ID- Interdigital area

**Table 2: Distal displacement of axial triradii**

Subject	Sex	T0 (%)	T1 (%)	T2 (%)
		No.	No.	No.
Thalassemic	M	30(25)	78(65)*	12(10)*
	F	19(24)	57(71)*	4(5)*
	M + F	49(25)	135(68)*	16(8)*
Controls	M	24(66)	62(12)	24(4)
	F	22(90)	40(5)	18(5)
	M +F	56(76)	102(3)	42(5)

T0- Triradius near wrist crease, T2- Triradius near centre of palm, T1- Triradius between T0 and T2

**Table 3: Frequency distribution of palmar triradii (Male+Female)**

	No. ofPalmar Triradii	Right	Left	Right+Left
Thalassemia	4	0(0)	0(0)	0(0)
	5	49(49)	47(47)	96(48)*
	6	49(49)	51(51)	100(50)*
	7	2(2)	2(2)	4(2)*
Control	4	9(9)	7(7)	16(8)
	5	88(88)	91(91)	179(90)
	6	3(3)	2(2)	5(3)
	7	0(0)	0(0)	0(0)

**Table 4: Statistical calculations for 'atd' angle**

Subject	Sex	Side	Mean	SD	SEM	CV%
Thalassemia	Male	R	55.88*	8.84	1.14	15.82
		L	52.46*	7.86	1.02	14.98
	Female	R	56.12*	9.87	1.56	17.60
		L	61.45*	9.03	1.43	14.70
	Male+Female	R	56.00*	9.36	0.94	16.71
		L	56.95*	8.45	0.84	14.83
Control	Male	R	46.78	6.09	0.79	13.02
		L	44.93	4.46	0.58	9.94
	Female	R	50.40	8.69	1.37	17.23
		L	54.37	9.11	1.44	16.75
	Male+Female	R	48.59	7.39	0.74	15.20
		L	49.65	6.79	0.68	13.67

**Table 5: 'a-b' ridge count**

Subject	Sex	Side	Mean	SD	SEM	CV%
Thalassemia	Male	R	41.60*	2.22	0.29	5.32
		L	42.01*	3.10	0.40	7.37
	Female	R	40.70*	2.14	0.34	5.25
		L	40.62*	2.36	0.37	5.82
	Male+Female	R	41.15*	2.18	0.22	5.29
		L	41.31*	2.73	0.27	6.61
Control	Male	R	36.45	4.30	0.55	11.78
		L	36.41	4.18	0.54	11.47
	Female	R	37.42	4.99	0.79	13.35
		L	37.48	3.94	0.62	10.51
	Male+Female	R	36.93	4.64	0.46	12.58
		L	36.94	4.06	0.41	10.99
		R+L	36.93	4.35	0.31	11.78

\*-  $p < 0.05$ , SD- Standard Deviation, SEM- Standard Error of Mean, CV %- Coefficient of Variation (in %)

## DISCUSSION

This study attempts to analyze whether any specific pattern, exist for thalassemia and whether that serve as an early diagnostic tool. We observed true palmar patterns in the form of loops are more in hypothenar

and thenar 1<sup>st</sup> interdigital areas in both male and female thalasseemics when compared with control groups. There is distal displacement of axial triradii seen in both male and female thalasseemics, which is a significant finding; it is seen at either T1 or T2 level on palm. Dallapicola B <sup>10</sup> Saha KC <sup>11</sup> Santosh Kumar <sup>12</sup> in

their analysis found that there is significant increase in the frequency of patterns in hypothenar, thenar/ID1 and third interdigital areas of both male and female thalassemics. Rosener F and Spriggs HA<sup>9</sup> found palmar patterns in thenar areas of both hands of male patients such as loops, whorls and vestiges than controls. Santosh Kumar, Narendra Kumar and Mittra MK<sup>12</sup> found patterns in the form of radial loops and whorls more in patients than controls.

In this study total number of palmar triradii are significantly increased in both male and female thalassemics than controls. 5, 6 and 7 palmar triradii shows significant difference between patient and controls. Thus accessory palmar triradii are significantly increased in both sexes of thalassemia than controls. These observations coincides with Saha KC et al<sup>11</sup> they observed increased number of palmar triradii in both male and female thalassemics. Santosh Kumar, Narendra Kumar and Mittra MK<sup>12</sup> found multiple axial triradii unilaterally in 18.2% cases and bilaterally in 9.1% cases. Thus they found total 27.3% multiple axial triradii in both hands of male and female thalassemics than controls. Dallapiccola B et al<sup>10</sup> found accessory triradii in fourth interdigital area of both male and female patients than that of controls.

We found significantly increased 'atd' angles in both hands of male and female thalassemics than those of control groups. This coincides with observations of Rosener F and Spriggs HA<sup>9</sup> who found 'atd' angle significantly larger than controls in both sexes. Dallapiccola B et al<sup>10</sup> also observed increased 'atd' angle maximum. Mutalimova AB and Kurdiumova TIU<sup>13</sup> also observed increase of 'atd' angle in patients of thalassemia than controls.

Our study shows that there is significant increase in 'a-b' ridge count in thalassemic cases. Mutalimova and Kurdiumova TIU<sup>13</sup> found an increase in 'a-b' ridge count in both sexes of thalassemics than controls and Rosener F and Spriggs HA<sup>9</sup> also observed low 'a-b' ridge count in both hands of female controls and increase 'a-b' ridge count in patients.

### CONCLUSION

We conclude that palmar patterns are significantly more in thalassemics chiefly in hypothenar and thenar/ID1 areas than controls. Significant increase in number of palmar triradii is also there in both male and female thalassemics on both hands. There is distal displacement of axial triradii is available in both male

and female thalassemics. 'atd' angles and 'a-b' ridge count is are more in thalassemics. Thus we have observed specific pattern of palmar dermatoglyphics for the region of Vidarbha in thalassemic cases. Our findings can be useful in the management of thalassemia in the region specifically at the level of prevention.

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# Clinico-Epidemiological Investigation of an Epidemic Dropsy Outbreak in a Village of Haryana, India

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## ABSTRACT

**Introduction:** Food-borne illness is a common phenomenon in developing nations frequently leading to increased morbidity and mortality among the affected community. Outbreaks due to food contamination occur either due to natural events or to deliberate adulteration of food. Epidemic dropsy is characterized by bilateral swelling of legs, often associated with diarrhoea. In severe cases, fatalities are due to congestive heart failure. The study was designed to find the clinico-epidemiology profile of patients and to identify the etiological agent for this epidemic.

**Method:** This is a cross-sectional, community-based study, undertaken on 46 rural patients aged 4-65 years.

**Results:** Forty-six cases of epidemic dropsy were detected from an epidemic in a village in Haryana, of all affected patients 19 (41.3%) were males and 27(58.69%) were females. The age group of the affected individuals varied from 4 years to 65 years. The clinical manifestations and epidemiological factors were studied. GIT symptoms were present in 86.3% of the cases. Sanguinarine was detected in all mustard oil samples collected from the homes of affected families.

**Conclusion:** Adulteration of mustard oil with argemone oil, either deliberate or accidental is the main cause of the disease.

**Keywords:** *Text YTC*

## INTRODUCTION

Foodborne diseases are a widespread and a growing health problem, particularly in developing countries which causes considerable morbidity and mortality. Epidemic dropsy is an acute non-infectious disease characterized by pitting oedema of the extremities especially of the lower limbs; cutaneous erythema; and local tenderness. In severe cases, fatalities are due to cardiac decompensation.<sup>1-4</sup>

Epidemic dropsy is caused by accidental or deliberate contamination of cooking oil (esp. mustard oil) by toxic argemone oil (*Argemone mexicana*). It is

a medical problem caused by plant poison.<sup>5</sup> *Argemone Mexicana*, known as prickly poppy, belonging to family Papaveraceae, grows widely as a weed during the wheat and mustard harvesting season in the Indian subcontinent.<sup>6,7</sup> The toxic effects of argemone oil have been attributed to the presence of benzophenanthridine alkaloids, sanguinarine. In humans, argemone oil contained in adulterated mustard oil causes oxidative stress and death of red blood cells via methemoglobin formation by altering pyridine nucleotide(s) and glutathione redox potential.<sup>8</sup>

Since the first report of epidemic dropsy from West Bengal (India) by Lyon in 1877,<sup>9</sup> a large number of outbreaks have been reported from various states of India viz. West Bengal, Bihar, Orissa, Madhya Pradesh, Uttar Pradesh, Gujarat, Maharashtra and Delhi.<sup>10-14</sup> The outbreaks have also reported from other countries including the Fiji Islands, Mauritius, Madagascar, South Africa and Burma (Myanmar).<sup>15</sup>

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There were four epidemics reported from Delhi in years 1975, 1983, 1994 and the last one in 1998, with cardiac failure in 14% of cases and also a mortality rate of 2.8% which had a significant impact on socio-political environment also.<sup>16-19</sup> The overall incidence epidemic dropsy has decreased significantly in the country as a result of identification of its causes, availability of better diagnostic facilities and enforcement of Prevention of Food Adulteration act, 1954.<sup>20</sup>

In this study, the outbreak investigation (May 2010) in the district of Ambala (Haryana) was undertaken on request of Director General Health Services (DGHS), Haryana by a team of experts from Pt B D Sharma PGIMS, Rohtak, Haryana and this paper outlines the epidemiological and clinical investigation.

## **MATERIAL AND METHOD**

### **Setting**

The present outbreak occurred in Samlehri village, Ambala district of Haryana state, India. This District is situated on G T Road NH-1 approximately 200 km from New Delhi (India). The District has a total population of 1176794 of which 418081 (35%) reside in urban and 758713 (65%) in rural area. In terms of public health infrastructure, this district has 01 civil hospital, 02 sub district hospitals, 4 Community Health Centres, 14 Primary Health Centres and 104 Subcentres that are providing health care services to the resident population.

Samlehri village of district Ambala is situated on Ambala-Yamunanagar Road approximately 20-25 km from District Ambala. This village has 4030 population with 2118 (52%) male and 1912 (48%) female. The health services of this village are provided by one subcentre situated at Samlehri with two multipurpose health workers female and one Primary Health Centre Samlehri under overall supervision of Community Health Centre, Maulana.

### **Epidemiological and clinical investigation**

House to house survey in the village was carried out with the assistance of local staff after a brief orientation training to detect any similar but hidden cases with simultaneous carrying of health education activities. Oil samples from affected and also from non-affected families in the village were also taken up for laboratory investigation.

### **Testing of oil samples for argemone oil contamination**

The cooking oil samples of affected families and non affected families were picked up for lab analysis in clean containers. Mustard oil samples were tested for presence of the toxin sanguinarine by nitric acid test.<sup>21</sup> The nitric acid test is positive only when the level of argemone oil in the cooking oil medium is about 0.25 per cent suggestive of very high level of contamination.<sup>22</sup> The test is sensitive to a concentration of >0.25%. It has a high false-positive rate and a positive test must be confirmed.<sup>23</sup> The statistical analysis was carried out using SPSS software version 18.0 for simple proportions and percentages.

## **OBSERVATIONS**

There were a total of 46 patients belonging to 20 affected families in the village. Out of total affected patients, 19 (41.3%) were male and 27 (58.69%) females. Two patients were below 10 years. The age of patients ranged between 4 and 65 years with no case found below 4 years of age (Table-I); 20 and 12 patients were admitted in civil hospital and private nursing home of Ambala respectively. Two seriously ill female patients (15 and 19 years old) were referred by civil hospital to tertiary care centre, Chandigarh where they succumbed to illness within few hours of initiation of treatment and could not be covered in the present study. These deaths were due to cardiac failure leading to case fatality rate (CFR) of 4.3% in the present outbreak.

All affected families had purchased loose form mustard oil from a shop in the same village approximately 1-2 months ago. The accused vendor had left the city and was untraceable. All samples from affected families were found to be positive for nitric acid test (sanguinarine) whereas it was found negative for those consuming either self prepared (harvested) mustard oil or purchased from other shops in the same village.

### **Clinical features**

The symptoms of all affected patients appeared within one month of consumption of the suspected oil. The most common symptom appeared was bilateral lower limb pitting oedema extending from foot to mid-thigh. It was present in all the patients, 46 (100%). The overlying skin was erythematous in 30 cases (68.1%) which blanched on pressure. The



associated findings were erythema in 42 (95.4%), local tenderness over oedematous lower limbs was noticed in 40 (90.9%), pigmentation in 35 (79.5%), nausea/vomiting/diarrhea in 38 (86.3%), exertional dyspnoea in 18 (40.9%), orthopnoea in 16 (36.3%), dry cough in 10 (22.7%) and expectoration in 6 (13.6%) patients. Another important finding of soft, non tender enlargement of liver without jaundice was observed among 8 (18.1%) patients. (Table-II)

**Table I: Age and sex distribution of patients (n=46)**

Age (years)	Male	Female	Total
0-10	1	1	02
11- 20	6	6	12
21-30	5	4	09
31-40	2	5	07
41-50	3	7	10
51-60	1	3	04
>60	1	1	02

**Table II: Clinical features of patients with epidemic dropsy (n=44)**

Clinical features	No. of patients	(%)
<b>Pitting oedema</b>		
Lower Limb	44	100
Erythema	42	95.4
Local Tenderness	40	90.9
Pigmentation	35	79.5
Warmth	10	22.7
Fever	18	40.9
Malaise	18	26.5
<b>Gastrointestinal</b>		
Nausea/Vomiting/Diarrhea	38	86.3
Pain abdomen	11	25.0
Liver enlargement	08	18.1
<b>Cardiovascular</b>		
Palpitation	12	27.2
Exertional dyspnoea	18	40.9
Orthopnoea	16	36.3
Congestive heart failure	02	4.4
<b>Respiratory</b>		
Dry cough	10	22.7
Expectoration	06	13.6
<b>Wheezing</b>	<b>04</b>	<b>9.0</b>

### Investigations

The blood reports revealed that mild anemia (Hb 8-11 gm%) in 17 (50.0%) and moderate anemia (Hb 5-8 gm%) in 8 (23.5%) patients respectively. No patients were found to be affected from severe anemia (less than 5 gm%). The peripheral blood film picture reflected

normocytic and hypochromic type of anemia. Total Leucocyte Count (TLC) was within the normal range except one where TLC was found increased this was because of presence of secondary infection. The reports of liver function test (LFT), kidney function test (KFT) and fasting blood sugar of patients were in normal range. However the platelet counts of two (5.8%) patients were less than 1 lakh and 15 (44.2%) patients were 1-1.5 lacs. No abnormality was detected on urine examination (albumin and sugar). Chest x-rays were found normal. (Table-III). Also no facilities were available to check the level of sanguarine in serum and urine of the patients.

**Table III: Blood and urine investigation report of patients (n=34)**

Blood examination	Number	(%)
<b>Haemoglobin</b>		
<11gm%	25	(73.4)
>11gm%	09	(26.6)
<b>Total Leucocyte Count</b>		
<4000	0	(0.0)
4000-11000	33	(97.0)
>11000	01	(3.0)
<b>Fasting Blood Sugar</b>		
<110	34	(100)
>110	00	(0.0)
<b>Blood urea</b>		
15-45mg/dl	34	(100)
>45mg/dl	00	(0.0)
<b>Serum Creatinine</b>		
0.5-1.5mg/dl	34	(100)
>1.5mg/dl	00	(0.0)
<b>Liver Function Test</b>		
S. Bilirubin		
<0.1mg/dl	34	(100)
>0.1mg/dl	00	(0.0)
<b>SGPT</b>		
<50IU/dl	34	(100)
>50IU/dl	00	(0.0)
<b>SGOT</b>		
<50IU/dl	34	(100)
>50IU/dl	00	(0.0)
<b>Platelets</b>		
<1 Lakh	02	(5.8)
1-1.5 Lakhs	15	(44.2)
>1.5 Lakhs	17	(50.0)
<b>Urine Examination</b>		
Albumin- nil	34	(100)
Sugar-nil	34	(100)

## DISCUSSION

The occurrence of characteristic clinical picture in patients of a community, consuming mustard oil adulterated with argemone oil, established the diagnosis of epidemic dropsy. The present epidemic started from mid of April 2010 and most of the earlier epidemics reported in India have occurred between the months of May and November. The explanation given for this seasonal occurrence is that crops of mustard are gathered during March and during this time the seeds of argemone also mature. The contaminated seeds come to the market and it takes about 10-15 days or more for crushing the seeds, preparation of oil, and its distribution.<sup>24</sup> No person below 4 years of age was affected and all affected household belonged to middle to lower socioeconomic status. Both of these factors would preclude liberal exposure to food articles fried in mustard oil. Families of high socioeconomic group are unlikely to utilize cheaper, loose, edible oils which are more often adulterated. That is why the low to middle socioeconomic group with large families is most often affected.<sup>25</sup>

The present epidemic dropsy outbreak was identified by observing a similar time of onset in all family members, characteristic clinical features, and finding more than one family member affected. It was seen that epidemic dropsy affected individuals of any all age and both sexes, as found in earlier studies.<sup>26,27</sup> Children less than 2 years old are usually not affected; being breastfed they ingest very few solids, and sanguinarine is not found in breast milk.<sup>2</sup> In all families, mustard oil was used for cooking. These signs and symptoms appeared within one month of consumption of suspected oil.

As in earlier studies, the most striking clinical feature was the presence of initial pitting oedema of both lower limbs (bilateral oedema), which is the hallmark of epidemic dropsy.<sup>27</sup> All 46 (100%) cases presented with bilateral pitting pedal oedema. Similar finding was also observed by Kar HK et al.<sup>28</sup> Erythema, which blanched on pressure, was observed in 42 (95.4%). Erythema started from distal parts of the limbs and progressed proximally. Similar finding was also observed by Kar HK et al.<sup>28</sup> Local tenderness over the edematous limb was present in 40 cases (90.9%). Similar observation was also observed by Gomber et

al.<sup>27</sup> Pigmentation was observed in this study was 35 (79.5%). Similar finding was also observed by Krishnamachari, et al.<sup>14</sup>

Other striking features noted were gastrointestinal symptoms such as nausea, vomiting, and diarrhoea (86.3%) prior to the onset of oedema and were more evident than in earlier studies.<sup>27,29</sup> Fever (mild to moderate grade) was seen in 18 (40.9%) cases, which may be due to pain and erythema associated with oedema and due to the toxic action of sanguinarine. In the present epidemic 8 (18.1%) patients had non tender soft hepatomegaly in the absence of congestive failure. This is because of toxic liver injury by sanguinarine. Others similar observations have also reported hepatomegaly in a small percentage of cases (8-20%) in the absence of congestive heart failure.<sup>26</sup>

Laboratory investigations of admitted patients revealed mild to moderate anemia in 17 (50.0%) and 8 (23.5%) patients respectively. Anemia may be due to the direct effect of sanguinarine on bone marrow and which is exaggerated by diarrhea, malabsorption, and others symptoms. Similar finding was also observed by Singh R et al.<sup>30</sup> Other reports like Kidney Function Test, Liver Function Tests of admitted patients were in normal range and the report of urinalysis were normal. Similar observation was made by Sharma B D et al.<sup>31</sup>

There were two deaths reported in this epidemic due to cardiac failure. Both patients were young female from same family. Case fatality rate noted in present epidemic was 4.3% however others have reported in the range of 5-10% and these death may be caused by cardiac failure, extrasystoles, acute pulmonary oedema, atrial fibrillation, or acute renal failure.<sup>3,32</sup>

Withdrawal of the contaminated cooking oil is the most important initial step. Early identification of the condition is crucial from epidemiological point of view so that preventive measures can be taken promptly to stop the further use of the adulterated mustard oil.

## CONCLUSION

Adulteration of mustard oil with argemone oil, either deliberate or accidental is the main cause of the disease.

**Following measures may help to prevent further such type of outbreaks in India**

- Education and motivation of farmers to cultivate yellow-seeded mustard, and strict ban on the sale of unbranded, and unpacked mustard oil.
- Food quality control system should be made more effective and strengthening of the Prevention of Food Adulteration (PFA) Act.

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# Window Surgical Technique for Recurrent Cases of Aural Haematoma

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## ABSTRACT

Window surgical technique is a simple surgical procedure for cases of aural haematoma. This surgical technique prevents recurrence of disease which is seen with aspiration of haematoma and also prevents development of cauliflower ear which occurs with incision and drainage of aural haematoma. In this article this surgical technique is done in 45 patients of recurrent aural haematoma which occurred following aspiration of haematoma during the period of January 2007 and January 2010.

All the 45 patients who underwent this technique showed improvement Postoperatively without any complications. Window surgical technique is the simple and the best surgical technique for aural haematoma.

**Keywords:** Aural Haematoma, Window Surgical Technique

## INTRODUCTION

Aural haematoma occurs as a result of trauma which may be minor or it can occur spontaneously. It is often painless and very fluctuant. An effusion of serous fluid occurs under the perichondrium and forms swelling on the lateral or anterior surface of the auricle, some times suppuration of haematoma may take place, resulting in destruction of auricular cartilage, and finally in shriveling of the auricle.

If Uncomplicated by inflammation, the serum becomes absorbed, but a certain amount of permanent thickening remains. Repeated trauma, as may occur in boxing or rugby football, can result in gross scarring, thickening, and disfigurement of the auricle and is commonly known as "cauliflower ear".

## METHOD AND PATIENT

The window surgical technique was done in 45 cases of aural haematoma which were reoccurred following the aspiration technique during the period of three years from January 2007 to January 2010.

### Window Surgical Technique

**POSITION:** Patient is made to lie in supine position with head turned to opposite side as In case of mastoidectomy operation.

**ANAESTHESIA:** This procedure in adults is done under local anaesthesia using 2% lignocaine with 1:100000 adrenaline. The medial surface of pinna along with postaural area is infiltrated with local anaesthetic.

**SURGICAL PROCEDURE:** After painting the area with antiseptic and draping, local anaesthetic is infiltrated. Depending on the site of aural haematoma, incision is taken on Medial surface of pinna. The skin and perichondrial layer are incised, then the cartilage is incised taking care not to incise the other side perichondrial layer. Perichondrium over a Small area of cartilage were elevated on both sides and small piece of aural cartilage is excised thus creating an window. After removal of cartilage whole haematoma will be drained out. The wound was closed in layers. A firm compression bandage is applied which is removed after 48 hours. Post operatively patients are advised not to sleep on operated Side. This procedure can be done as a day care surgery.

## RESULTS

Window surgical technique was done in 45 patients with aural haematoma which were reoccurred following aspiration technique. All the patients were followed up during post operative period. None of the



operated patients showed any complications or recurrence of aural haematoma after one week of surgery.

## DISCUSSION

Aural haematoma is a common condition in which there is collection of Serous fluid between the perichondrial layer and cartilage of pinna<sup>1</sup>. Most common cause for its occurrence is trauma but some times no etiology has been identified. Different people have tried various surgical techniques for the treatment of aural haematoma ranging from sterile aspiration using wide bore needle to incision and drainage technique with little success rate<sup>2</sup>.

Needle aspiration, although still widely used, this method is no longer recommended by many sources because of haematoma reoccurrence. The aspiration is often inadequate and haematoma requires additional management. In this method an 18 or 20 gauge needle is used to aspirate the blood from the most fluctuant or full area<sup>3</sup>.

Window surgical technique was done in 45 patients of aural haematoma which reoccurred after aspiration<sup>4</sup>. This is a simple surgical technique, none of the Patients showed any complications of surgery including recurrence<sup>5</sup>. All the patients were followed up at regular interval. Thus this technique avoids the development of cauliflower ear which was seen with incision and drainage technique<sup>6</sup>.

In incision and drainage method, incise the edge of haematoma along the natural skin fold using a no. 15 scalpel. A small incision is often all that is necessary. The incision and drainage and aspiration technique were associated with reaccumulation of the haematoma, infection of site, chondritis and scar formation (cauliflower ear)<sup>7</sup>.

## CONCLUSION

Window surgical technique for cases of auricular haematoma was the best modality of surgical management as it prevents the reoccurrence of haematoma which was seen with aspiration technique and the surgical scarring of pinna resulting in permanent thickening and disfigurement of auricle which is known as cauliflower ear this was seen with incision and drainage technique.

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# A Study to assess Knowledge and Awareness about the HIV/AIDS among Students of Government Senior Secondary School of Central India

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## ABSTRACT

**Background:** The lives of millions of adolescents worldwide are at risk because they do not have the information; skills, health services and support which they need to go through sexual development during adolescence.

**Aims& Objective:** To assess knowledge of school students towards HIV / AIDS Awareness, Prevention & Control.

**Material& Method:** An educational interventional study was conducted in Gujarati Samaj A.N.M.E.N. School. Study population included all 10th standard students. Sample size was 200 students. Inclusion Criteria included all 10th standard students present at the time of pre intervention interview. Mc Nemar test was applied for statistical significance of knowledge improvement by intervention.

**Result:** Most of the students (95%) were correctly known that HIV is a viral disease. Sexual route of transmission of HIV was known by 89% of the students. 67% of the students were aware about preventive measures against HIV / AIDS. Television (44%) was main source of knowledge for them.

**Conclusion:** The study revealed that although a significant proportion of students were aware of HIV/ AIDS, their knowledge on prevention modalities was low. Students also harbored misconceptions on the modes of HIV transmission. Television, newspapers and internet were quoted as the most common source of information.

**Keywords:** HIV, AIDS, School students, Knowledge, Awareness, Prevention

## INTRODUCTION

Acquired immunodeficiency syndrome (AIDS) is a disease of the immune system caused by the human immunodeficiency virus (HIV). HIV/AIDS has had a great impact on society, both as an illness and as a source of discrimination. The disease also has significant economic impacts.<sup>1</sup> AIDS can be called the Modern Pandemic, affecting both industrialized and modern countries.<sup>2</sup>

School children of today are exposed to the risk of being victims of HIV / AIDS. Studies have reported that young people form a significant segment of those attending sexually transmitted infection (STI) clinics and those infected by HIV.<sup>3</sup> Many sexual contacts among adolescents are unprotected, they are at risk of contracting sexually transmitted diseases (STDs). Another reason for their vulnerability to STDs is the

lack of sex education, including education on STDs prevention.<sup>4</sup> most parents do not discuss topics related to sexual issues and hence many teens turn to peers and to the media and get inaccurate information.<sup>5</sup> Knowledge of adolescent girls about various STDs and HIV / AIDS was limited, which improved significantly with the educational intervention.<sup>6</sup>

HIV prevalence among the young population (15-24years) at national level has also declined from 0.30% in 2000 and has stabilized over the last four to five years at around 0.11%. Stable to declining trends in HIV prevalence among the young population (15-24 years) are also noted in most of the States.<sup>7</sup> It was often found that schools can act at the center point for disseminating information and education on HIV / AIDS. Hence school education has been described as a 'social vaccine', and it can serve as a powerful preventive tool.<sup>8</sup>

The present study was conducted primarily to assess the level of knowledge, attitude and beliefs regarding HIV/AIDS among Government school students as well as increasing their awareness regarding the same through health education and also to find the change in the level of awareness about HIV/AIDS and its prevention and control as a result of intervention.

### MATERIALS & METHOD

An educational interventional study was conducted in urban area of Indore district. Study site included Gujarati Samaj A.N.M.E.N. School. Study site was selected using simple random sampling method. Study population included all 10<sup>th</sup> standard students. Verbal informed consent was obtained prior to interview. Sample size was 200 students (both boys and girls). Study Duration was 3 months duration. Inclusion Criteria included all 10<sup>th</sup> standard students present at the time of pre intervention interview and who gave informed consent. A semi structured questionnaire was used for interview both pre interventional and post interventional. The questionnaire was designed to know their knowledge

and awareness about various aspects of HIV/AIDS like etiology, mode of transmission, diagnosis, prevention, treatment and sources of information. Interventions were take place by means of series of 3 lectures using audio visual aids and discussions. Intervention was taken place for boys and girls separately. Ethical permission was obtained both from Institution and Principal of school. The data was analyzed using appropriate statistical software (MS excel and SPSS version 20). Mc Nemar test was applied for statistical significance of knowledge improvement by educational intervention.

### RESULTS & DISCUSSION

In the present study, the students belonged to the age group of 14-16 years. The mean age was 14.92 ± 1.3 years. Out of 200 students, 46.5% were females and 53.5% were males. (Table 1) All the students had heard of HIV/AIDS although only 78.5% were able to tell the full form of HIV. This is comparable to the other studies.<sup>9,10,11,12</sup> However, a study on Nigerian school students revealed that only 5% were able to expand HIV and AIDS.<sup>13</sup> (Table 2)

Table 1: Showing Age wise and sex wise distribution of Students

Age(in years)	Male	Female	Total
	Number (%)	Number (%)	Number (%)
14	14(35.8)	25(64.2)	39(19.5)
15	61(51.7)	57(48.3)	118(59)
16	32(74)	11(26)	43(21.5)
Total	107(53.5)	93(46.5)	200(100)

Table 2: Showing Knowledge and Awareness of Students about HIV/AIDS (N=200)

General Knowledge about HIV/AIDS	Pre interventional			Post interventional			p value
	Yes	No	Do not Know	Yes	No	Do not Know	
World AIDS Day	125(62.5)	58(29)	17(8.5)	191(95.5)	7(3.5)	2(1)	0.01*
Organization for AIDS control	108(54)	68(34)	24(12)	177(88.5)	19 (9.5)	4(2)	0.012*
First Case detected in year	62(31)	107(53.5)	31(15.5)	192 (96)	7 (3.5)	1(0.5)	<0.01*
First case detected in City	65(32.5)	111(52.5)	24(12)	196(98)	4(2)	0	<0.01*
Symbol for HIV/AIDS	187(93.5)	3 (1.5)	10 (5)	198 (99)	1 (0.5)	1(0.5)	0.054
Aim of HIV/AIDS Control Program	77(38.5)	96(48)	27(13.5)	144 (72)	52 (26)	4 (2)	0.01*

\*p value less than 0.05 is statistically significantly

In case of Knowledge and awareness of HIV/AIDS of etiology and mode of transmission, 93% students correctly knew etiology of disease after intervention which is comparable to other studies.<sup>12, 14</sup> 56.5% students correctly identified blood, sexual fluids and breast milk as a route of transmission which increased to 90.5% post interventional. 89% of the students could identify sexual intercourse as a route of transmission

which increased to 99.5% after interventional. Similar findings were observed in a study at Mumbai (50%).<sup>15</sup> Low levels of knowledge about general aspects and transmission of HIV/AIDS was found in secondary school students in Kolkata.<sup>16</sup> Studies conducted in other countries have reported higher levels of knowledge regarding transmission routes.<sup>13,17</sup> (Table 3)

**Table 3: Showing Knowledge and Awareness of Students about HIV/AIDS (N=200)**

Knowledge about Etiology and Mode of transmission	Pre interventional			Post interventional			p value
	Yes	No	Do not Know	Yes	No	Do not Know	
Is it cause by a virus	190(95)	9(4.5)	1(0.5)	198(99)	2(1)	0	0.042*
Full form of HIV/AIDS	157(78.5)	38(9)	5(4.5)	189(94.5)	11(5.5)	0	<0.01*
Most commonly affected age group	150(75)	32(16)	18(9)	180(90)	16(8)	4(2)	<0.01*
Is Immune system mainly affected	183(91.5)	14(7)	3(1.5)	194(97)	6(3)	0	0.018*
HIV is infection and AIDS is Disease	133(66.5)	59(29.5)	8(4)	173(86.5)	25(12.5)	2 (1)	<0.01*
Country With Maximum No. of PLHIV	65(32.5)	112(56)	23(11.5)	198(99)	2(1)	0	<0.01*
Time to develop AIDS from HIV	67(33.5)	118(59)	15(7.5)	143(71.5)	49(24.5)	8(4)	<0.01*
Direct contact of various body fluids lead to HIV transmission	113(56.5)	81(40.5)	6(3)	181(90.5)	18(9)	1(0.5)	<0.01*
Unprotected sexual relation as important route of transmission	178(89)	20(10)	2(1)	199(99.5)	0	1(0.5)	<0.01*

\*p value less than 0.05 is statistically significantly

72.5% correctly identified sharing of razor blades as source of transmission which increased to 96.5% post interventional. 12.5% students had belief that AIDS can be transmitted by casual contact or handshake, 14% through eating from same stuff and 16% through sharing utensils. 13.2% students had belief that mosquito/insect bite can be able to transmit the HIV. These findings are comparable to the findings of other studies.<sup>12, 14, 18</sup> (Table 4)

**Table 4: Showing Knowledge and Awareness of Students about HIV/AIDS (N=200)**

Belief about Communicability	Pre interventional			Post interventional			p value
	Yes	No	Do not Know	Yes	No	Do not Know	
Casual hand shake	25(12.5)	122(61)	53(26.5)	2(1)	198(99)	0	<0.01*
Eating from same stuff	28(14)	113(56.5)	59(29.5)	1(0.5)	199(99.5)	0	<0.01*
Mosquito/insect bite	32(16)	130(65)	38(19)	6(3)	194(97)	0	<0.01*
Sharing utensils	32(16)	144(72)	24(12)	4(2)	196(98)	0	<0.01*
Using Public Toilets	8(4)	144(72)	48(24)	2(1)	198(99)	0	<0.01*
Sharing Razor blades	145(72.5)	43(21.5)	12(6)	193(96.5)	7(3.5)	0	<0.01*

\*p value less than 0.05 is statistically significantly

In this study Knowledge and awareness of students were less in term of diagnosis, prevention and treatment which increases as effort of intervention. 43% of student stated that this disease cannot be cured only prevent which increase to 83.5% after intervention. In contrast to this study, 32% students of Meerut<sup>20</sup>, 4.5% students of rural Punjab<sup>12</sup> and 96% students of Nainital<sup>19</sup> stated that it is an incurable disease.

Awareness of testing method (34%) and name of testing centre as integrated counseling and testing centre (ICTC) (56.5%) was changed to 53% and 93.5% respectively. 67% of students were aware about HIV/AIDS as being preventable and could identify the preventable measures. This improved to 83.5% afterwards. Moreover, awareness about the different methods of prevention was rather low. In contrast to our study, higher levels of awareness was found in

Students of Haryana.<sup>9</sup> In studies conducted in various parts of world showed significant improvement in awareness of preventive measures.<sup>20, 21</sup>

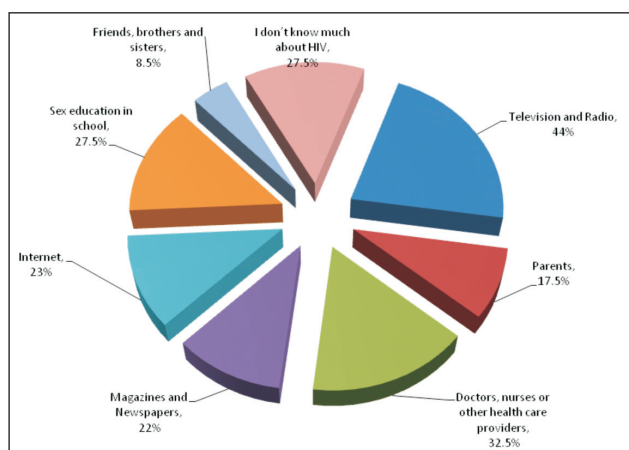
Majority (80.5%) of students had a favorable attitude towards People Living with HIV/AIDS (PLHIV), which improved to 94.5% after intervention. However, this favorable attitude towards HIV positive patients was not observed among college students in study of Ganguli SK et al<sup>22</sup> and Maimaiti N et al<sup>21</sup>. Another study of Sharma P et al<sup>20</sup> 99% had positive attitude towards infected patients after intervention. Only 31% students had knowledge about the availability of drugs for HIV/AIDS. This was lower than students of Gujarat<sup>18</sup> (68.3%) and in Mumbai<sup>15</sup> (34%) but higher than students of Udupi district in Karnataka<sup>23</sup> (24.3%) and in Punjab<sup>12</sup> (15.9%). (Table 5)

**Table 5: Showing Knowledge and Awareness of Students about HIV/AIDS (N=200)**

Knowledge about diagnosis, prevention and treatment	Pre interventional			Post interventional			p value
	Yes	No	Do not Know	Yes	No	Do not Know	
Is testing the only way to know if you have infection	65(32.5)	122(61)	13(6.5)	130(65)	65(32.5)	5(2.5)	<0.01*
Reason why people do not get tested	28(14)	159(79.5)	13(6.5)	45(22.5)	152(76)	3(1.5)	0.021*
Person with HIV/AIDS cannot be cured however life can be prolonged	86(43)	93(46.5)	21(10.5)	167(83.5)	29(14.5)	4(2)	<0.01*
Method of HIV/AIDS testing	68(34)	113(56.5)	19(9.5)	112(56)	79(39.5)	9(4.5)	<0.01*
Name of testing centre (ICTC)	113(56.5)	68(34)	19(9.5)	187(93.5)	12(6)	1(0.5)	<0.01*
Preventive measure for HIV/AIDS	134(67)	53(26.5)	13(6.5)	167(83.5)	30(15)	3(1.5)	<0.01*
Opportunistic infections occurs in HIV/AIDS	61(30.5)	102(51)	37(18.5)	125(62.5)	63(31.5)	12(6)	<0.01*
Attitude towards patient infected with HIV/AIDS	161(80.5)	32(16)	7(3.5)	189(94.5)	8(4)	3(1.5)	<0.01*
As a citizen your job to help HIV infected Persons	102(51)	80(40)	18(9)	132(66)	59(29.5)	9(4.5)	0.034*
Name of treatment centre (ART Centre)	62(31)	102(51)	36(18)	196(98)	4(2)	0	<0.01*

\*p value less than 0.05 is statistically significantly

44% of the students mentioned that television and radio were the main sources of information to them and internet contributed about 23% to their knowledge. This was lower to observations made amongst senior secondary students of Delhi<sup>11</sup> (79.6%), Punjab<sup>12</sup> (77.5%) and Chandigarh<sup>24</sup> (62.7%). In this study 27.5% of children had heard about HIV/AIDS through their respective school sex education program. This finding suggests that school AIDS education should be strengthened further in schools. Published literature indicates that peer education has a significant impact in reducing risk behavior.<sup>6,9</sup> (Figure 1)



This study was carried out with 200 students who was not representative of all the students of various schools in Indore District, needs more sample size to

be incorporated which unfortunately was not included due to time constraint.

The findings in the present study reiterate the need for re-enforcing school AIDS education. While the teacher plays a pivotal role in imparting education, the use of multi-pronged methods such as films, group discussions, dramas, puppet shows and role-plays must be incorporated. There is a strong need that school education must directly address stigmatizing attitudes about HIV/AIDS, gaps in HIV/AIDS knowledge and awareness of HIV-related health resources. HIV prevention program should not only give information, but also build skills and provide access to essential commodities such as condoms or sterile injecting equipment. As children are a valuable resource for the future of a country, it is imperative that they be equipped with ample amount of information so as to protect themselves and their counterparts, which made possible only through compulsory inclusion of HIV/AIDS education in school curriculum and train teachers to specifically teach issues pertaining to HIV/AIDS.

### CONCLUSION

The study revealed that although a significant proportion of students were aware of HIV/AIDS, their knowledge on diagnosis prevention and treatment modalities was low. Students also harbored



misconceptions on the modes of HIV transmission. Many students had misbelieved about communicability specially eating in a same stuff, insect bite and sharing public toilets. Regarding access to information, the survey revealed that most students obtained information on HIV/AIDS from the mass media. Television, newspapers and internet were quoted as the most common source of information. Information from parents and friends were least common source of information.

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# Clinical Audit of the Patients: A Retrospective Study in a Govt Medical College, Hassan

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## ABSTRACT

**Background:** Audit is a means of quality control for medical practice by which the profession should regulate its activities with intention of improving overall patient care. Objective of this study was to report three year clinical audit of a general ward and emergency ward medical admissions.

**Method:** All patients admitted and managed in Department Of General Medicine, Hassan Institute of Medical Sciences, Hassan, Karnataka from January 2009 to December 2011 were included in the study for clinical audit. Data of all medical patients admitted during this period were retrieved from the departmental register. Details of medical treatment, procedures, and complications were recorded from the patient's case sheets.

**Results:** Total number of patients was 30240, out of which 17804 (58.85%) were males and 12436 (41.14%) were females. Majority (70.02%) of the patients were between 30 to 65 years of age. General ward admissions were 14613 (48.39%) and emergency admissions 15587 (51.61%) cases. The most common general ward admissions were fever(malaria, enteric fever and viral fever) 5471(18.09%), and retro viral disease with co-infection 1859(6.15%), cirrhosis of liver 571(1.88%), chronic renal failure 411(1.37%) and diabetes mellitus 1306(4.32%). In emergency admissions, most of the cases were poisoning 5320(17.59%), acute asthma/COPD 3384(11.19%), Myocardial infarction 2196(7.26%), Cerebrovascular accidents 2422(8.0%), Bee sting and Snake bites 1196(3.95%) and hypertensive emergencies 635(2.1%).

Average duration of hospital stay in general ward admissions was 1-8 days and in emergency ward it was 3-16 days. There was an overall mortality rate of 3.9%.

**Conclusion:** We conclude that clinical audit has potential benefits for patients, physicians, helps to update knowledge & do research. We also recommend the proper computerised audit programs and committees, periodic meetings for its monitoring and evaluation in our institution for providing quality care.

**Keywords:** Clinical Audit, Treatment, Procedure, Outcome

## INTRODUCTION

Audit is defined as a means of quality control for medical practice by which the profession shall regulate activities with the intention of improving overall patient care<sup>1</sup>. Slee defines clinical audit as 'the evaluation of the quality of medical care as reflected in the medical records'. The term audit is usually associated with accounting –implies numerical review by an outside investigator directed at, among other things, the prevention of fraud<sup>2</sup>, but in the clinical setting it is collection of data for purpose of i) setting professional standards, ii) assessing clinical performances, iii) modifying clinical practice<sup>3</sup>.

Historically clinical audit were introduced by Ernest Hey Groves (1908) in Great Britain and Ernest Amory Codman (1910) in United States<sup>4</sup>. In 1987 the process of audit was reviewed and software on clinical data was designed to collect, verify and report audit data, resulting in the relatively unobtrusive incorporation of audit in practices into the routines of busy medical wards. The audit system was adopted for a range of medical cases and continuing modifications were made and the ability to analyse very large data bases are available<sup>5</sup>.

Effective clinical audit is important for health professionals, health service managers, patients and

the public. It can support health professionals in ensuring that their patients are receiving the best possible care. It can also inform health managers about new investments that may be needed to support health professionals in their practice<sup>6</sup>.

### MATERIAL AND METHOD

This retrospective audit was conducted in the Department of Medicine, Hassan Institute of Medical Sciences, and Hassan from January 2009 to December 2011. Includes admission to emergency and general wards. This tertiary care hospital draining not only from Hassan district but also from adjacent parts of the district like Chikkamagalur , Mudigere , K R pete , K R nagar , Somavarapete, Tiptur , kadur , Hosadurga taluks .Details of all medical patients admitted during this period was recorded from register maintained by paramedical staff. It records patient’s demographic data, date of admission and discharge along with the primary diagnosis and any medical procedures for pleural effusion, ascetic fluid, empyema, mechanical ventilation performed. This record is then submitted to the main hospital record section for maintaining the records .Details of medical procedures and any complications were recorded in the patient charts submitted to staff nurse at the time of discharge. Mortality register is maintained separately with date and cause of death by paramedical staff. Statistical analysis was done based on the proportions.

### RESULTS

Total number of patients admitted were 30240, out of which 17804 patients (58.95%) were males and 12436 patients (41.05%) were females (Figure-1). Most of the study population was in between 30-65 years (Table-2). Out of total patients, 14633 (48.39%) were admitted in general ward and 15607 (51.61%) were admitted to emergency ward (Figure- 2).

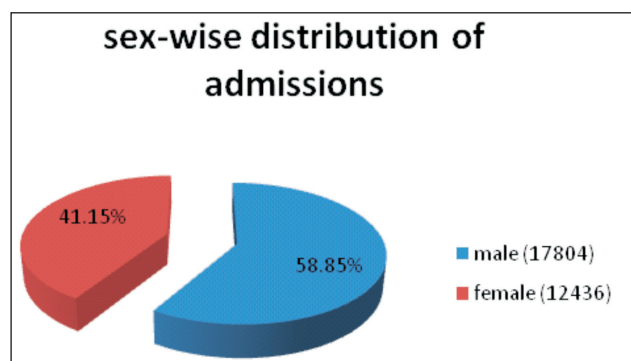


Fig. 1. Sex wise distribution of admissions.

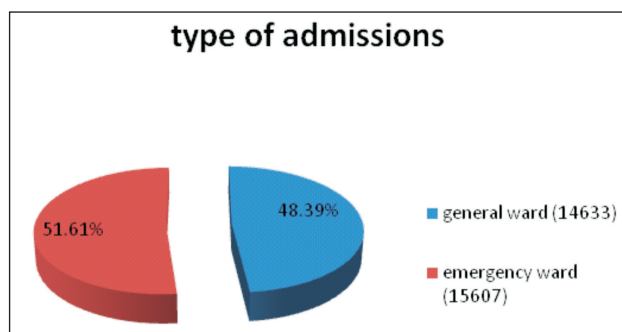


Fig. 2. Type of admissions

Table 1: Month-wise admissions.

Month	General Ward Admissions	Emergency Admissions	Total
January	1312 (4.34%)	1214 (4.02%)	2526 (8.36%)
February	1337 (4.42%)	1217 (4.03%)	2554 (8.45%)
March	1318 (4.36%)	1601 (5.30%)	2919 (9.66%)
April	1643 (5.43%)	1544 (5.11%)	3187 (10.54%)
May	1233 (4.08%)	1504 (4.98%)	2737 (9.06%)
June	1372 (4.54%)	1403 (4.64%)	2775 (9.18%)
July	1430 (4.73%)	1377 (4.56%)	2807 (9.29%)
August	941 (3.11%)	1311 (4.34%)	2252 (7.45%)
September	1019 (3.37%)	1130 (3.74%)	2149 (7.11%)
October	1101 (3.64%)	1093 (3.62%)	2194 (7.26%)
November	974 (3.22%)	1079 (3.57%)	2053 (6.79%)
December	953 (3.15%)	1134 (3.75%)	2087 (6.90%)
Total	14633 (48.39%)	15607 (51.61%)	30240 (100%)

Table 2: General and Emergency ward cases in Age Groups

Age group	No of patients		Total
	General ward	Emergency ward	
15 -30 years	2857 (9.44%)	1274 (4.22%)	4131 (13.66%)
30-65 years	11913 (39.39%)	9261 (30.63%)	21174 (70.02%)
65-90 years	3026 (10%)	1909 (6.32%)	4935 (16.32%)

Among all admissions 3987 patients were (13.18%) admitted in ICU. The pleural aspiration was performed in 487 cases (1.61%) ascetic tap was done in 1329(4.39%) patients ,bone marrow biopsy 87(0.29%) cases , liver biopsy 53(0.18%) lumbar puncture was done in 376(1.24%) patients , intercostals drainage was done in 123(0.40%) cases, mechanical ventilation assistance was given to 2593 (8.57%) patients , all of these patients were managed by qualified physicians, where as emergency surgery cases like acute abdomen ( acute cholecystitis, acute peritonitis , acute appendicitis etc) were referred to surgeons after appropriate examination and investigations .ENT cases and ophthalmological cases , gynaecological cases , psychiatric cases were also examined in detail in next

day morning and referred to respective departments .These different department cases admitted as medical case inadvertently were not included in the study .patients who discharged against advice were not included in the study .The major decision taking person regarding the cases management and referral were to be unit chief .

During the period of study, 540 patients (1.78%) were either referred to higher centre for lack of facility in our hospital and also some cases were referred to other hospital for lack of beds.

The most common medical cases were fever cases, COPD/ Asthma ,Poisoning ,Acute gastroenteritis ,Myocardial infarction, Stroke, Bee sting/Snake bite, Renal failure, Hepatic failure, Epilepsy, Others (thyroid diseases, bleeding disorders, autoimmune diseases, alcoholic intoxication).

The most common emergency medical cases were Poisoning, Asthma/COPD, Myocardial infarction, acute gastroenteritis with shock, stroke, and Snake bite/Bee sting (Table-4).

Average duration of hospital stay was 2–8 days for simple cases and 4–19 days in patients' who underwent procedures/complicated cases. The overall mortality rate was higher in emergency admission patients like OP Poisoning ,Myocardial infarction, Multi system disorders .The overall mortality rate during this period was 3.9% .

**Table 3: Category of treating Doctors**

Treating doctors	General ward	Emergency ward	Total
Associate professor	7881 (26.06%)	2640 (8.73%)	10521(34.79%)
Assistant professor	8594 (28.42%)	5516 (18.24%)	14110(46.66%)
Junior resident	1321 (4.37%)	4288 (14.18%)	5609 (18.55%)
Total	17796(58.85%)	12444 (41.15%)	30240 (100%)

**Table 4: Diagnosis and Number of Cases**

Diagnosis	Number of cases	Percentage of cases
Fever cases	5471	18.09%
COPD /Asthma	3384	11.19%
Poisoning	5320	17.59%
Acute gastroenteritis	3066	10.14%
Stroke	2422	8.01%
Myocardial infarction	2196	7.26%
HIV with co- infection	1859	6.15%
Snake bite & Bee sting	1196	3.95%
Renal failure & Hepatic failure	982	3.25%
Diabetes mellitus	1306	4.32%
Hypertensive emergencies	635	2.1%
Epilepsy	610	2.02%
Others	1793	5.93%
Total	30240	100%

**Table 5: Outcome after admission**

Outcome	Number (%)
Discharged	28520 (94.31%)
Referred to other hospital	540(1.78%)
Death	1180 (3.90%)
Total	30240 (100%)

## DISCUSSION

Medical audit has become an important part of the modern practice and an integral requirement for the physicians, continuing professional development and commitment by further analysis thereby resulting in improved practice habits<sup>7,8</sup> .In developed world a very successful national system for audit and comparative audit services are available. Recently windows software for audit has become available and are updated using various computerized programs<sup>9, 10, 11</sup> .Audit is not only data collection; it is a continuous education and commitment for further analysis. In India much work has been done in this regard but the concept of Clinical Audit is only practiced in few institutions.

Hence this is the first clinical audit carried out to review and improve our clinical practice in our medical college, Hospital. Retrospective audit helps to substantiate the diagnosis and the presence or absence of complications or other conditions which influence treatment and prognosis, document that the expected clinical results were achieved in each patient<sup>12</sup>.

Patients were diagnosed using clinical examination/ cross consultations ECG, X RAY, ultra sound scanning, CT scan & available blood investigation. The overall total mortality was 3.9% in 3 years study period and the most common cause of mortality in Medical emergency cases was found to be Respiratory failure secondary to COPD, OP poisoning . No case fatality in leptospirosis and dengue fever. Myocardial infarction mortality is around 8% in our study whereas it was 6% in a study done by Sjoerd T et al<sup>13</sup>.

Highest number of patient admission was recorded in the summer compared to winter season i.e. in the months of January to June(Table-1) .Mass cases were admitted due to outbreak of acute gastroenteritis and food poisoning in the months of April to May .Many procedures were done including ascitic tapping, pleural aspiration and lumbar puncture under aseptic precautions . In icu ward many cases 2593( 8.57%) were put on mechanical ventilation who were in respiratory failure.



This study shows a higher number of admissions to emergency ward (51.61%) compared to general ward (48.39%) because our hospital is the only tertiary care centre in radius of 80Kms and availability of ambulance service(108). In our hospital associate professors were the unit in-charge, they had seen 7881(26.06%) cases in general ward, 2640(8.73%) cases in emergency ward, total cases seen by them were 10521(34.79%)(Table-3). Assistant professors were doing night duties also with pod duty, they had seen 8594(28.42%) cases in general ward, 5516(18.24%) cases in emergency ward, total cases seen by them were 14110(46.66%). In our study mortality rate was 3.90% accounting 1180 deaths in 3 year audit (Table-5). Most of the deaths were in emergency ward and ICU wards mainly due to respiratory failure due to COPD, acute Myocardial infarction, poisoning and strokes. In our study the cases referred were 540(1.78%), the causes for referral were due to lack of beds in ICU and emergency ward and for higher centres for cardiac surgeries (angioplasty, CABG) and renal transplants.

Respiratory emergency cases like Acute Asthma, COPD with exacerbation, hypoventilation, OP poisoning with respiratory failure, cobra bite with respiratory failure and also MI with cardiogenic shock remain the serious clinical problems in everyday clinical practise as number of cases were more and also they require mechanical ventilation or medical ICU.

In western set up most serious emergency cases may result from cardiovascular disorders and cancer. Since India is an agriculture predominant country and land of Snakes (Snakes are worshipped in our country). Snake bites (3.95%) were common, OP poisoning related emergency cases were also maximum (8.6%). Respiratory distress is not uncommon with OP poisoning because of late presentation. According to study conducted by Srinivas Rao et al, mortality rate in pesticide poisoning was 22%<sup>14</sup>. But in our study mortality rate was 4%. Since op poisoning with monocrotophos (4 cases) and Malathion (8 cases) were less in our study. Snake bite mortality was 4% in our study where as it was 5.1% in a study done by Syed Moied Ahmed et al<sup>15</sup>.

Water born diseases like Acute Gastroenteritis (10.14%) were also common in our country due to lack of personnel hygiene, poor sanitation, portable water scarcity especially in summer months. Paraquat poisoning requiring haemodialysis were also managed in our hospital, which is a life saving procedure. The most common mode of suicide is OP poisoning,

because it is easily available in every house hold of agricultural family.

Tracheostomy is a life saving procedure and total of about 41 cases of tracheostomy were done for respiratory failure. In 3 years study, there were about 5842 cases of respiratory cases treated and no case has been referred to higher centres till date.

Rat poisoning (4.10%) either homicidal or suicidal is not very uncommon in this district. Twenty six cases of death were recorded due to aluminium phosphate (rat paste).

Majority of our admissions required 2 to 3 days hospital stay. Few cases needs hospital stay more than 12 days especially those patients who are on ventilator, HIV with tuberculosis and COPD, multi organ dysfunction.

Today, quality assurance increasingly means a near-guarantee to every patient of appropriate treatment and fewest possible complications. Maintenance of the public trust rests on a firm commitment of the medical staff and board to this principle, implemented through an organized program of quality assurance. Under these conditions, medical audit and CME can effectively improve care by improving physician performance. Our observations clearly showed the importance of medical colleges especially government medical colleges as maximum number of patients admitted to government hospital are poor, ignorant, uneducated. Medical colleges are fulfilling the health needs of local population at risk. People in rural part of Hassan are satisfied, as they need not travel long to consult specialist doctors as they are available in the government medical college. Similarly, our supporting staff striving hard to bring down the mortality and morbidity of the patients in the emergency ward. This may be the reason for decreased mortality along with doctors and infrastructure in all the medical cases admitted as inpatient.

This study was done to demonstrate the usefulness of clinical audit in a government medical college. In our hospital, not much work has been done regarding medical audit and audit remains a neglected issue and its concept is still in infancy compared to Western world. Majority of medical institution including tertiary care hospitals like our government medical college hospital do not have proper audit programs and audit committees that links the medical outcomes of various hospitals and different medical units in same hospital.

Medical audit data base can assist peer review, answer queries from clinical management, determine medical workloads, monitor trainees of post graduates and evaluate overall performance. Simple written methods may still be appropriate and once the basic clinical data is recorded, then it is to be transferred to computer<sup>16, 17</sup>.

Despite facing many difficulties like non availability of staff specifically dedicated to the procedure of audit, incomplete documentation of files by trainees and staff, limited financial resources and a proper audit system, we still found many benefits from conducting this study.

This medical audit is a systematic, critical analysis of the quality of medical care provided, with the aims of improving quality of care, continuing education for medical fraternity and guiding appropriate use of health resources. Emergency service is an integral part of any discipline of clinical medicine and it is considered, as an indicator of quality of health care system.

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2. Regarding conflict of Interest nothing is involved.
3. There is no funding in this study.
4. Ethical Clearance obtained from Institute Ethical Committee.

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# Acute Puerperal Inversion of the Uterus in Punjab - Case Reports

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## ABSTRACT

The main cause of acute puerperal inversion is mismanagement of third stage of labour. Only immediate diagnosis and treatment can decrease mortality. Since majority of Indians live in resource poor settings where traditional birth attendants (TBAs) provide basic obstetrics care. Mismanagement of third stage of labour in such settings may not be unusual with the attendant complications.

This study reports three cases of acute uterine inversion managed at a tertiary care centre. Their labour was managed by TBAs and a nurse; one died while the others were successfully managed. Hence, prevalence of uterine inversion may not be rare in resource poor areas of India. Therefore, there is an urgent need for re-training of TBA's and primary health care nurses, in the act of labour management so as to prevent uterine inversion and other life threatening complications.

**Keywords:** *Acute Inversion of Uterus, Post Partum Hemorrhage, Management of Third Stage, Manual Reposition of Uterus, O' Sullivan's Hydrostatic Method*

## INTRODUCTION

Acute puerperal inversion of uterus is a life threatening and unpredictable obstetrical emergency leading to profuse post partum hemorrhage and neurogenic shock and even death<sup>1</sup>. The incidence varies from 1 in 2000 to 1 in 50000 deliveries<sup>2</sup>. Incidence in India is around 1 in 8500<sup>3</sup>, which suggest that the disorder is rare but this may not be the case in the Punjab state of India. We report three cases of acute uterine inversion referred from periphery to tertiary care centre within four months period from January 2010 to April 2010.

## CASE HISTORY

### Case 1

A 20 years old primipara was referred to the emergency department of the hospital, about five hours after a vaginal delivery of a live female baby.

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The delivery of the baby and placenta were conducted at her home by a traditional birth attendant (TBA). On examination she was in shock with thready pulse, unrecordable blood pressure and severe pallor. The uterus was not felt and there were no other significant findings on abdominal examination. A dark-reddish convex mass was visible in the vagina and a tight rim of cervix was felt around it. There was minimal bleeding per vaginum. Placenta and membranes were not attached to the mass. A diagnosis of acute inversion of uterus was made. Resuscitation of patient was initiated. Manual repositioning of the uterus was planned but the patient died while being transferred to the operation theatre.

### Case 2

A 20years old primipara was referred to the emergency department of the hospital, four hours after vaginal delivery of a live male baby. The delivery was conducted at primary health centre by a nursing staff and oxytocics were given after the delivery. The patient presented with post partum hemorrhage. She had marked pallor with feeble pulse of 120/min and blood pressure of 90/50 mmHg. The uterus was not felt on abdominal examination. A convex rough inner surface of uterine fundus was felt in the vagina and cervical rim was felt around it with moderate bleeding. Placenta and membranes were not attached to the

mass. A diagnosis of uterine inversion was made and patient was resuscitated and taken to operation theatre. Manual reposition of the uterus was successfully done under general anaesthesia. Oxytocin drip was given at the rate of 40 mIU/min alongwith intravenous ergometrine and prostaglandins and were continued for 24 hours. Simultaneous gentle bimanual massage was done. 4 blood transfusions were given. Patient was discharged in satisfactory condition on fourth day and counseled for subsequent hospital deliveries. .

### Case 3

A 33 years old multipara with 3 live births was referred to the emergency department of the hospital six hours after vaginal delivery of a live female baby from periphery with post partum hemorrhage. The delivery was conducted by a traditional birth attendant. She had severe pallor with feeble pulse and blood pressure was 90/60 mm Hg. The uterine fundus was not palpable on abdominal examination. A convex rough inner surface of the uterus was lying in the vagina and the tight rim of cervix was felt all around it. There was minimal vaginal bleeding. Placenta and membranes were not attached to the mass. Prompt diagnosis of acute puerperal uterine inversion was made and patient was resuscitated and transferred to operation theatre. Under general anesthesia manual reposition was tried but failed and finally the reposition was done with O' Sullivan's hydrostatic method. Simultaneously oxytocin at the rate of 40 mIU/min., ergometrine and prostaglandins were given and continued for 24 hours. Bimanual massage was done. 2 blood transfusions were given and patient discharged on 5<sup>th</sup> day after counselling for tubal ligation..

### DISCUSSION

Acute puerperal inversion of uterus is postulated to be caused by mismanagement of third stage of labour<sup>4</sup>, mainly because of premature traction of umbilical cord and Credes fundal pressure during delivery by untrained personnel<sup>5,8</sup>. Other factors implicated are fundal implantation of placenta, placenta accreta, short cord, congenital weakness or anomalies of uterus, improper use of oxytocins.

Mismanagement of 3<sup>rd</sup> stage of labour was responsible for uterine inversion in 75% of cases<sup>1,6</sup>. Incidence of inversion as a cause of post partum hemorrhage is 10% in our institution and it contributes to 12% of the cases of maternal mortality which is

similar to the study of Lewin JS and Bryan PJ where the maternal mortality due to puerperal inversion has been reported to be 15%<sup>9</sup>. This is also similar to the study of Dali SM, Rajbandhari S, Shristha S where the maternal mortality is 9.5%<sup>10</sup>. Proper education and training regarding placental delivery, diagnosis and management of uterine inversion must be imparted to the maternity care providers especially to traditional birth attendants and family physicians to prevent the potentially life threatening condition<sup>1</sup>.

Treatment options vary depending upon the individual circumstances. Different options available include manual reposition under general anesthesia. If it fails then O'Sullivan's hydrostatic method can be tried in which reposition can be achieved by instilling around 2 litres of warm normal saline intravaginally by keeping the nozzle in the posterior fornix via douche can raised 1 metre above the level of vagina and plugging the introitus by hand. Where above methods fail then abdominal surgery using Haultain's or Spinelli's Operation<sup>4</sup> can be done. For chronic inversion Huntington's technique<sup>5</sup> can be used. Laparoscopic reduction<sup>7</sup> can be tried by expert laparoscopic surgeon. Abdominal<sup>1</sup> or Vaginal Hysterectomy are the last resort to save the patient. Oxytocin, Ergometrine and Prostaglandins are given to trigger contractions and retraction and to stop the uterus from inverting again.

Emergency management consists of vigorous fluid replacement, blood transfusion and resuscitation.

### CONCLUSION

Uterine inversion is a potentially life threatening complication. The maternal survival rate is 85% where prompt diagnosis and immediate treatment is done. Because majority of cases occur due to mismanagement of third stage of labour so proper education and training of the maternity care providers and traditional birth attendants should be done. The old adage of unexplained shock must make an obstetrician suspect this possibility. Prompt reposition is the key to success.

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# An Insight into the Undergraduate Medical Research in India

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## ABSTRACT

Relevant health research has contributed to the increase of life expectancy in India over past 60 years and is essential to investigate health problems and to implement solutions. Recognizing the importance of research, few medical colleges in developed countries have initiated student research programmes. In India, Undergraduate medical research is far from satisfactory and is worsened with mushrooming of large number of ill equipped medical colleges. This fact is proved by a study which reports that the 70% of medical students expressed the unawareness about research. Though there are few student research programmes in India awareness to them is required. We aim to address significance of undergraduate medical research. Research projects can help the students to develop critical analysis, thinking and also enhances their skills in searching literature and independent writing. Students should recognize the role of medical research in their practice. Undergraduate students are encouraged to take up short term projects. Research projects should be considered in post graduate examination like in abroad and funding should be allotted for undergraduate student research. In conclusion there is a need to emphasise the importance of research among the undergraduate medical students and also encouragement and proper guidance should be made available to the students.

*Keywords:* Research, Undergraduate Students, Medical Research

## INTRODUCTION

Research can be defined as a process of searching the knowledge by systematic investigation and to establish novel facts by scientific methods. Otherwise it can be said as searching the new in the existing. Medical research has lot of importance and is much needed for the betterment of the society. To understand the problems of human population the medical research is very much essential. It can be achieved by various methods of research ranging from drug trials to community surveys and from trend in the past years to unusual cases in the hospital. All these will assist to the addition of knowledge and thereby to improve the health care. The medical research gains all the more importance and makes more sense to our day to day

activities when it is carried out in collaboration with the other specialities like physics, basic sciences etc.,. The specialities like translational medical research is dependent on the interaction between these disciplines and other health care providers under taking patient and disease focused research [1,2]. With this background an attempt is made in this paper to discuss the various modalities available for undergraduate medical research, advantages and an attempt to create the awareness regarding the research among the medical students.

## MEDICAL RESEARCH IN INDIA

Even though wide range of approaches is available for medical research, the scenario in India is pathetic. When the medical research itself is biting the dust the undergraduate medical research is still more a rare phenomenon and it will be right to say that it is too much to expect the research at the undergraduate level. But the situation of the global undergraduate medical research is different and is not matching with our system. Developed countries introduced research programmes for medical students recognising its

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importance. United States runs successfully UCSD (University of California, San Diego) associate research programme to associate undergraduate medical students with emergency medicine [3]. An urban medical school in United States made compulsory to design and implement research project by medical students during their clinical years of study [4]. So our students also need to involve in research if they want to compete globally. With this in mind, the Medical council of India is focusing more on the improvement of medical research and emphasising the same. As an academican one should appreciate and thank the apex body for its efforts.

As mentioned earlier, in India medical research is in a pathetic state and it is worsened with mushrooming of ill equipped new medical colleges every year. With time constrains of MBBS syllabus, students are least motivated to take up research projects. Though, every year about 35000 students join in a medical college only a few motivated students of about 2-5% are interested in research. These students are crucial in the generation of new knowledge. The admissions to medical colleges are based on merit and it is considered that best of the best students join the course. In spite of the best being admitted the quantity and quality of research is lacking. The reasons for this are plenty like lack of interest, motivation, less benefits (their thinking), lack of infrastructure, time, guidance etc.



Fig. 1. Indicating the various factors as hurdles to no/less research.

Recent study from south India on undergraduate medical research has shown that nearly 70% of undergraduate students are unaware of research though their level of awareness varied[5].

### Special research programmes for MBBS students

In India funding is a big issue as most of Universities cannot fund ad-hoc research projects undertaken by undergraduate medical students. But the things are improving as some of the Universities are allocating their budget to research. Apart from this certain apex bodies are encouraging undergraduate medical research.

### ICMR Short Term Studentship (STS)

ICMR STS is most popular among medical students. It gives an opportunity to work in interested research areas. This programme enables the recipients to work on a project for two months and another month in writing report after which they receive certificate and stipend upon approval of report. Focus should be made to strengthen this programme and more awareness regarding the same is needed. From 2010 ICMR has doubled the stipend. This should encourage the undergraduate as this is a good monetary benefit. Here student should realise the effort made by ICMR to create the research attitude among undergraduates and at the same time it is honouring them monetarily. Reports do mention the need to conduct short 3-4 day workshops on research methodologies including bio statistics and medical ethics to improve the performance of STS recipients[6]. In 2010 about 4250 students applied for studentship among them only 790(18.3%) students got selected, of them 654(82.7%) students were able to submit their report ontime [7]. Focus should be on the 11.3% who could not submit the report and concerned people should take interest to avoid this failure.

### KVPY (Kishore Vaigyanik Protsahan Yojana)

This programme was started in the year 1999 by Department of Science and Technology, Government of India with an aim to identify and encourage the students with aptitude for research in basic science, engineering and medicine. Generous scholarship and contingency grant is provided to selected students. Though it is a good initiative it is not attracting medical students and it requires more publicity. The reason for less number from medical field in this particular scholarship is because of lack of awareness about the programme and also medical fraternity should accept the fact with bitterness that the quality of research going on is not on par with other fields. But the scenario is different in case of basic science and engineering categories. This has enabled the engineering and basic science people to qualify for the programme as their

standards are better. This programme allows only first and second year medical students to apply[8].

### **Other programmes**

Though undergraduate medical students are eligible to apply for Indian Academy of Sciences Summer research fellowship programme(SRFP) and Centre for Cellular and Molecular biology(CCMB) Summer research training programme and TIFR's VSRP (Visiting Students' Research Programme) very few students are opting as it requires complete two months to spend on project which is very difficult for medical student ignoring their clinicals. Actually the best students should cash on this and make their intelligence to benefit the scientific community by interacting and working with scientists of international reputation.

### **Conferences for medical students**

It is very important in any research to make the presentation of the work and the new finding. The emphasis should be laid to motivate the student to present their work. The presentation will boost their confidence and also provide chance to enhance their thinking in many ways. Student research conferences are the venues for research exchange and interaction. Recently, regional/zonal medical conferences for ICMR and KVPY recipients organised by Padmasri Dr.Deo of Moving Academy of Medical Sciences has got over helming response.

Medicon is a national level research conference exclusively for undergraduate medical students organised by Indian forum of medical research (INFORMER) encouraging young medicos to show case their work. It should be publicised that the undergraduate students can present their work in various regional/ national/ international conferences. The undergraduate students should be encouraged by the faculty to present their work in various regional/ national conferences. This is done only by a handful of people. This aspect should be encouraged and the experienced medical fraternity should focus on this which will help to improve the situation thereby creating future doctors with research attitude.

Though there are international medical student conferences like The International Student Congress of Medical Sciences (ISCOMS) very few medical students from India present their work as undergraduate cannot get international travel support to attend the international conferences. In this regard

we would like to enlighten that if the work is of good quality and if it is endorsed by the Head of the institution the organisers of the conference may provide the financial assistance. What is needed is the will power and persistent attitude to achieve the goal.

First of all there is little research that is happening, added to this those who are doing it are ending their research as soon as they receive certificate and monetary benefit. The faculty are also not emphasising and forcing the students to present and publish their work. This is evidenced by the poor attendance of ICMR STS awardees (only 30%) at the national medical conference in the year 2007[9]. This not only terminates the research attitude in the students but also makes the process of learning incomplete. The students can work like a technician but will not be trained to present and write the scientific data by interpreting in a scientific way.

### **Students Medical Journal**

As mentioned earlier presentation of the work in conferences is important, equally important is the publication in various journals. This exposes the student to the art of writing additional to executing the work guided by the guide and presenting the work. Once the research is conducted, evidence is generated and is disseminated through the scientific publications. Without publication students work will be unrecognised and their potential will go waste[10].

Journal of Young Investigators, McGill Journal of Medicine, Student BMJ, Student Lancet, PLOS Medicine are the international medical journals encouraging the undergraduate medical students to publish their work. Recently in India, Indian Journal of Medical Research and Indian Journal of Postgraduate Medicine have introduced students section and importantly, The Indian Journal of Medical Specialities gives special preference to the articles submitted by Undergraduate medical students whether they are original articles or reviews or case reports.

Research experience can enhance the skills of the student in searching and critically analysing literature and improves independent thinking[11]. Research and academics are complimentary to each other. They stimulate the interests in each other and doing research does not affect the academics. Medical students research projects (MSRP) has found to be helpful in teaching students to evaluate literature and guiding them to write for peer reviewed journals for

publication and improves student-faculty contact[12]. Study conducted by Solomon et.al. has shown that students interest in research during academic career has stimulated for additional research after MRSP[13]. Apart from gaining the knowledge - the research experience, paper presentation and publication will have an additional advantage in getting residency through USMLE (United States Medical Licensing Examination). Having a publication in a peer reviewed journal and preferably Medline indexed journal increases the chance of getting residency in US.

### **Research career - Senior Research Fellowship (SRF)**

MBBS students are eligible to SRF to work on a research project for three years and can extend the work by registering to PhD[14]. It is offered by ICMR, CSIR, and UGC.

### **PhD**

MBBS-PhD would be a great combination for those who want take up research as career. AIIMS, Delhi and NIMHANS, Bengaluru provide excellent research opportunities to MBBS students by offering PhD programme. Entry to this programme is based on entrance examination and interview. NIMHANS is offering five year PhD course in clinical neurosciences sponsored by ICMR and this programme is offering a very attractive stipend.

### **MD/MS-PhD programme**

In India ICMR sponsored MD/MS-PhD programme (ICMR MD/MS-PhD Talent search programme) is offered in SRM University Chennai and in King George Medical University, Lucknow and in NIMHANS, Bengaluru (PhD clinical neurosciences) to nourish the research temperament among medical students[15]. National Centre for Biological Sciences (NCBS), Bengaluru is aiming to start MD-PhD programme which will provide a platform for applying fundamental biology to clinicals[16]. All these programmes are of dual advantage to the medical graduates.

In India, opportunities to medical students for research are limited and the situation is worsened because it is not an integrated part of medical curriculum. Organisations should conduct various awareness programmes to improve the situation. Recent study has shown that the undergraduate medical students are engaged in research to pursue

further research[17]. Sensitizing the undergraduate medical students to various research methodologies and on ethical principles of animal experimentation will expose the students to reduce live animals during experimentation and at the same time create the awareness to use the software as an alternative[18]. Exposing the undergraduate medical student to research from early stage of medical college not only improves knowledge and attitude towards research but also enhances their skills in searching literature and independent writing[19]. Student who opts for doing research from undergraduate level has bright future for which it needs strong guidance from faculty. Lack of motivation in the faculty in general and lack of reorganization of their work impedes the encouragement of UG medical students who has approached them. Doing research without proper guidance is like attempting a distinction without attending a single lecture, motivated research students must be mentored by highly motivated faculty[20]. Actively involved faculty members can serve as powerful 'role model' to research motivated young medicos. Providing proper guidance to undergraduates at very early stage will generate the future researchers[21]. Publications and research projects carried out at the undergraduate level should be considered for admission to postgraduate courses. Giving preference and additional consideration will definitely ignite the young minds and also motivate them to carry out the research which will place the medical research of the country in the forefront globally. Workshops on research methodologies should be organised at various levels to enhance awareness and appraise the students about the various intricacies of research. Focus should be made on integration of specific research skills in MBBS curriculum and students should be encouraged to publish their research findings. Funding for research should be increased and research facilities should be strengthened and funding agencies should recognise the importance of undergraduate medical research. In conclusion, we would like say that research is a storehouse of fascinating opportunities to the undergraduate medical students.

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# Study of Burn Injuries During Pregnancy Admitted in Tertiary Care Hospitals in South India

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## ABSTRACT

Burn injuries during pregnancy bring about significant maternal and fetal morbidity and mortality in developing countries even to this day. The objectives of the study were to assess demographic, socio-cultural factors, causes and outcome of burn injuries during pregnancy. This prospective epidemiological study of all pregnant burn injury patients admitted in two tertiary care hospitals in South India was conducted during the year 2009. Ethical clearance was obtained from Institutional Ethics Committee. The data was obtained after informed consent by inter personal communication with the patients or their relatives and recorded on a predesigned and pretested proforma. The data was analysed using percentages. Out of 114 married women admitted with burn injuries during the study period, 10(8.77 %) were pregnant. Majority (80 %) were between 20 - 24 years of age. Maximum numbers (50 %) were primigravida and 80 % were married for less than 5 years and 50 % were in the first trimester of pregnancy. Synthetic sarees were worn by 90% of the victims at the time of the incident. Mortality was 40%. Results of this study clearly highlight the specific epidemiological features of burn injuries during pregnancy in the area and this information can provide necessary measures to develop adequate burn prevention programmes.

*Keywords: Burn Injuries, Pregnancy*

## INTRODUCTION

Burn injuries during pregnancy bring about significant maternal and fetal morbidity and mortality in developing countries even to this day.<sup>[1]</sup> Burn injury is a peculiar example of the harmful effects of external physical factors on health. The consequences of burns are protean and in most cases devastating for the injured, Patients with extensive burns frequently die, and for those with lesser injury, recovery is slow and painful. In addition to their dramatic physical effects, burn injuries frequently cause deleterious psychological complications. They lead to severe medical emergencies requiring costly medical care and are an extremely stressful experience for both the married woman as well as the families concerned.<sup>[2]</sup> It is a serious unexpected tragedy and destroys many hopes and dreams forever. There is no computer in the world which can compute the pain, misery and

the shattered dreams of the pregnant women. As the etiologic factors of burn injuries during pregnancy vary considerably in different communities, careful analysis of the epidemiological features in every community is needed before a sound prevention program can be planned and implemented.

## MATERIAL AND METHOD

A one year prospective epidemiological study of burn injuries in pregnant women hospitalized in 2 tertiary care hospitals in South India was conducted in 2009 to know the etiologic factors and outcome. For the purpose of the study, the term burn injury was defined as a body lesion due to an external cause, either intentional (homicidal or suicidal) or unintentional (accidental) resulting from a sudden exposure to energy (mechanical, electrical, thermal, chemical, or radiant) generated by agent host interaction.

After Ethical clearance and obtaining an informed consent, the data regarding demographic and socio cultural variables; types, modes, causes, risk factors; and factors affecting outcome was collected using a pre-designed and pre-tested proforma from all the pregnant women admitted with burn injuries in the two hospitals during the study period by inter personal communication with the patients or their relatives and analysed by percentages.

## RESULTS

Out of 114 married women admitted with burn injuries during the study period, 10(8.77 %) were pregnant. Majority (80 %) were between 20 – 24 years of age. Maximum number (50%) was primigravida and 80 % were married for less than 5 years and 50 % were in the first trimester of pregnancy. Majority (70%) was educated upto Grade 8-10 and was house wives (90%). Maximum number (90%) sustained burn injuries in the kitchen. There was an equal urban and rural distribution of the cases. It was observed that 60% of the victims were from nuclear families. Out of the total injuries, 40% occurred between 6 am to 12 noon and another 40% between 6 pm to 12 midnight. Synthetic sarees were worn by 90% of the victims. Majority (70%) of the burn injuries were allegedly accidental followed by 20% homicidal and 10% suicidal. Flame contributed to 90 % of the injuries and Kerosene Stove was the source of burn in 40% cases and kerosene in another 40%. The cause in 40% of the injured was ignition of their clothes worn at the time of the incident and dowry was the cause in 20% of the cases. It was noted that 60% were doused with water after the incident.

Mortality was 40% and another 40% were discharged against medical advice. Total burn surface area was > 40% in 70% of the victims. It was observed that in the mortality cases, 2 had a still birth and 1 had an abortion. The cause of death was inhalation injury and septicemia (50% each).

## DISCUSSION

India is moving forward globally in all spheres of life but still our women are exposed to hazards in their own kitchen by using cheap unstable cooking equipment. They wear long loose flowing garments

like synthetic sarees at home which flare up and increase the total burn surface area which is the strongest predictor of morbidity and mortality .<sup>(3-5)</sup> They become vulnerable in nuclear families due to inexperience in cooking. It is recommended that non-flammable clothes should be worn at home. As most burn injuries in pregnancy are unintentional,<sup>(6,7)</sup> there is clearly an opportunity for prevention by Health Education in antenatal care clinics regarding burn risk factors and self protection measures.

The horror of dowry is still prevalent and rampant in our society where married women are harassed to bring honour money from their parents. Women should be taught to stand up for themselves and not tolerate this evil custom. Stricter legislation to punish the offenders should be implemented to safeguard our innocent and vulnerable women.

## CONCLUSION

Burn injuries are a serious public health problem with alarmingly high mortality and morbidity. They are preventable injuries. Epidemiological studies such as ours help in understanding the role of various factors in causation of burn injuries.

### Limitations of the study

- A few patients could not be interviewed personally and in private because of the gravity of the situation and their death soon after admission to the hospital. Also a few patients left immediately after admission against medical advice. For these cases available information was retrieved from the Medical Record Department of both the Hospitals.
- The exact truth of the mode of burn will never be known in suspicious cases because of the sensitivity of the issue and the reluctance of the victims and their relatives to reveal the truth because of medico legal problems.

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# Pig Bites: An Under- Reported Public Health Menace

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## ABSTRACT

Indian pig population is rising. Pigs share a common domestic environment with rural and urban population. Pigs pose public health threat by serving as vector, causing bites potential of rabies and road traffic accidents. Not many pig bites have been reported. This study describes the epidemiological profile of pig bites reported at secondary & tertiary health care centres. Regulations governing pig rearing, proper community garbage disposal, closed drain systems and vaccinating pigs against rabies may help to bring down pig borne public health perils.

**Keywords:** Pigs, Pig Bites, Piggeries, Pork

## INTRODUCTION

Indian pig populations are on the rise<sup>1</sup> across the country. Along with the other domestic animals, pigs share a common environment with humans in rural and urban settings in many parts of the country. Domestic pigs can be either stray pigs or freely roaming pigs from unorganised piggeries. Pig herds are seen more in towns and villages where closed-drainage and garbage collection systems have not been established, where they survive on debris. Pigs have potential for public health threat by helping the spread of diseases like Japanese Encephalitis, Swine influenza virus and *Taenia solium* apart from host of parasitic infestations. Pigs also have a potential for injuries and rabies, through bites and by precipitating road traffic accidents while freely wandering in the streets. Pigs are next only to dogs and cats with a significant potential for biting<sup>2</sup>. Dog bites draw considerable attention both in management of the cases and literary reporting, Not many pig bites have been reported in literature in spite of increasing pig attacks<sup>3,4,5</sup> with rising pig population<sup>1</sup> in India. An attempt is made to assess the pig bite menace in urban, rural and tribal settings.

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## AIMS

To describe the epidemiological profile of pig bites reported at secondary & tertiary health care centres.

### Settings and Design

Descriptive study of the pig bite cases reported at Secondary & Tertiary Health Centres in four districts of Andhra Pradesh. Only cases admitted for inpatient treatment are included as records are retrievable.

## METHOD AND MATERIAL

Area hospitals and Medical college Hospitals of four districts in north part of Andhra Pradesh state are included. These districts have wide representation of rural, urban and tribal population. A total of 35 secondary level hospitals including District Hospitals, Community Health Centres and Area Hospitals and 5 Medical Colleges are included. Active Case Search of inpatient registers in Paediatric, Medical, Orthopaedic, Surgical and casualty wards is conducted. Every case diagnosed as "Pig Bite" in the IP registers between January and December 2011 is identified. Where ever available, patient's demographic and relevant clinical details are recorded. Private health care centres and primary health centres are excluded as data is not available in retrievable form.

Statistical analysis: Rates, Ratios and Percentages are used to represent discrete variables. Incidence per one lakh population is derived from number of cases identified with census population as denominator.

Mean, Median and Standard deviation are used to represent continuous variable with 95% confidence limits. MS Excel 2003 is used for data analysis

## FINDINGS

A total of 126 pig bites are registered with a derived incidence of 1.03 per 1,00,000 population. More cases are reported in first half of the year (76; 60.3%). More males are bitten by pigs than females (male to female ratio of 3.34:1). Victims' age ranged from 4 to 67 (mean 30.16 +/- SD 22.44, median 33). Maximum Pig Bites occurred in semi-urban/sub-urban environment (54; 42.9%) followed by urban (31; 24.6%), Tribal (21; 16.7%) and Rural environment (20; 15.9%). Among the four districts, highest number of pig bites occurred in southern most of the four districts (55; 43.7%) which was predominantly urban. Lowest number of bites are registered in northern most (21; 16.7%) district which is predominantly tribal.

Clinical details are retrievable in only 88 cases. Lower Limbs are more commonly bitten (50; 56.8%) followed by Upper Limbs (19; 21.6%) and other sites (19; 21.6%). The following medical procedures are performed: wound management and antibiotic use in 85(96.6%) cases, rabies vaccine (4; 4.5%), and tetanus vaccine (85; 96.6%).

## DISCUSSION

Studies in Brazil have reported an incidence rate of 1.5 pig bites per 1,00,000 population<sup>6</sup> which is higher than the derived incidence of 1.03 pig bites per lakh population in the current scenario. A wider sample from private and traditional health care sectors could add-up to the incidence rate. Media in India has often reported pig bites and deaths due to rabid pig bites<sup>3,4,5</sup>. Outbreaks of rabies in Pigs have been reported in China<sup>7</sup>. Pig bite injuries are also reported as occupational hazard in those working in piggeries and pig catchers apart from those who keep pigs as pet animals. Injuries, often on extremities, commonly occur during the capture, transport, or immobilization of the pig<sup>8,9,10</sup>. Human wound infections after a pig bite have been reported in a few case reports and series<sup>10,11,12</sup>. While the present study found lower extremities as a common site of bite, studies and articles have reported isolated cases of pig bite with or without infection of extremities<sup>6</sup> face<sup>13</sup>, genitals<sup>4</sup> and prolapsed rectum<sup>14</sup>.

Sub urban/ semi urban localities having higher pig bite cases and considerable differences that exist between districts, are points of interest. It may reflect the menace of urbanization and sanitary conditions thereof, as increasing filth and lack of sanitary regulations make environment congenial for pigs to breed.

Above the existing menace of stray pigs, unorganised piggeries are cropping to meet the demands of growing meat industry. Pigs are left on streets to feed on debris and open drain canals and hence unlike other livestock, feeding pigs is economical. Culturally, across religions in India, pork has not been a choice of meat consumption except for few sections of society. But with acculturation pigs are being increasingly accepted source of meat and so is pig rearing. As yet dog control measures have not completely succeeded in stopping the dog bite peril. Increasing pig population could be posing added threats of bite related trauma, road traffic accidents and rabies. While some municipalities and states have tried to regulate pig menace by killing them with country made guns or poisoning, issues related to animal rights might pose problem in implementing such regulations. Manual hunting and killing stray pigs may expose the workers to pig biting. Regulations governing pig rearing, proper community garbage disposal, prevention of open air defecation, closed drain systems and vaccinating pigs against rabies could be some means to bring down pig borne public health menace.

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# Evaluation of a School based Health Education Model on Malaria: A Randomized Control Trial

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## ABSTRACT

**Introduction:** Malaria has always been significant health problem in India as 95% of the people in the country reside in Malaria endemic areas. Of the 305,000 deaths due to malaria in 2010 globally, 85,000 occurred in children less than 15 years of age. Moreover the complications are severe in children due to inadequate immunity, malnutrition and anaemia leading to cerebral malaria, severe, behavioural changes and permanent neurological deficit. Health education has been an important component in any disease control programme, hence innovative preventive approaches must be developed in order to control malaria.

**Objectives:** The objectives of this study were to develop a malaria health education model and to evaluate its effectiveness in changing knowledge, attitudes and behaviour among high school children.

**Methodology:** Six high schools were chosen and paired for evaluation of the health education model. One school of each pair was subjected to the health education model in three sessions over 3 consecutive days. Post-test evaluation was done to assess the changes in the knowledge and attitude of the children towards malaria using a structured questionnaire.

**Results:** The mean test score in the intervention group before and after the intervention were 7.42±1.93 and 12.29±2.5 (d=4.85), the results showed clearly significant improvement in knowledge and attitude and scores in the intervention group. The children could easily recall and associate causes and symptoms of malaria, however no immediate behavioural changes were seen in the children.

**Conclusion:** This simple and practical model is aimed at improving the knowledge about malaria in school children thereby bringing about a behavioural change in the children. This study will also attempt to prove that the simple 3 hour sessions added in the children's curriculum can improve the children's understanding of the disease and aid in the prevention of the disease.

**Keywords:** Malaria, Health Education, School

## INTRODUCTION

To millions of people in the world, a single bite of a mosquito can still have fatal consequences. More than hundred years after the discovery of malarial parasite in India by Sir Ronald Ross<sup>5</sup>, Malaria still continues to be a burden in the country. The case load due to malaria though showing decline since 2002 from 2 million to 1.5 million in 2010<sup>7</sup>, the reduction is not significant considering that the disease has been eradicated in many countries. The actual estimated number is supposed to be 2.5 million cases with around 4000 deaths<sup>3,7,16</sup>. India contributes 73% of the incidence and

50% of the mortality due to malaria in the South-east Asian regions<sup>3,6</sup> and Karnataka contributes 7-10% of India's annual malaria burden.<sup>8</sup>

Significant progress has been made in the field of vaccine development. The RTS, S vaccine is in its Phase III of the trials in Africa and it will be complete by 2014-15. The phase II trials showed 40-60% protection against malaria in the follow up of the cases<sup>9,13,15</sup>. Though the results look promising, the vaccine is not as efficacious as some of the other vaccines say Measles, which is expected to be at least 90% efficacious. Moreover prevention and cure is further

threatened by insecticide and drug resistance. Even after eradication of the disease in 1949 by the USA, they annually report 1500 cases of malaria<sup>6</sup>, probably due to immigrants and tourism. This obviously implies that the disease will continue to be a burden even after immunization and its complete eradication

Malaria prevents children from going to school and farmers to the fields leading them onto a vicious cycle of poverty and disease. It is responsible for loss of 2.3 to 2.5 million Disability Adjusted Life Years (DALYs)<sup>3</sup> among the working population. It also deters investment and tourism in the endemic countries due to the lack of immunization and the tragedy is that it is entirely preventable disease with cost effective measures and knowing about these measures in invaluable. Malaria is not only a major cause of disease and death in school children, it also has consequences on health and education and there is no formal health education activity directed at school children. With already higher prevalence of anaemia and low birth weight in children the complications are more severe in them. Children who survive cerebral malaria, 7% of them are left with permanent neurological problems, weakness, spasticity, speech problems and epilepsy later in their life<sup>28</sup>.

S. Matta *et al.*<sup>11</sup> have shown that the knowledge about the symptoms, breeding places and prevention in malaria is inadequate in India and there is always a delay in diagnosis and seeking treatment. In the study done by Ettling *et al*<sup>17</sup> the importance of presenting early to a health facility for treatment when ill has

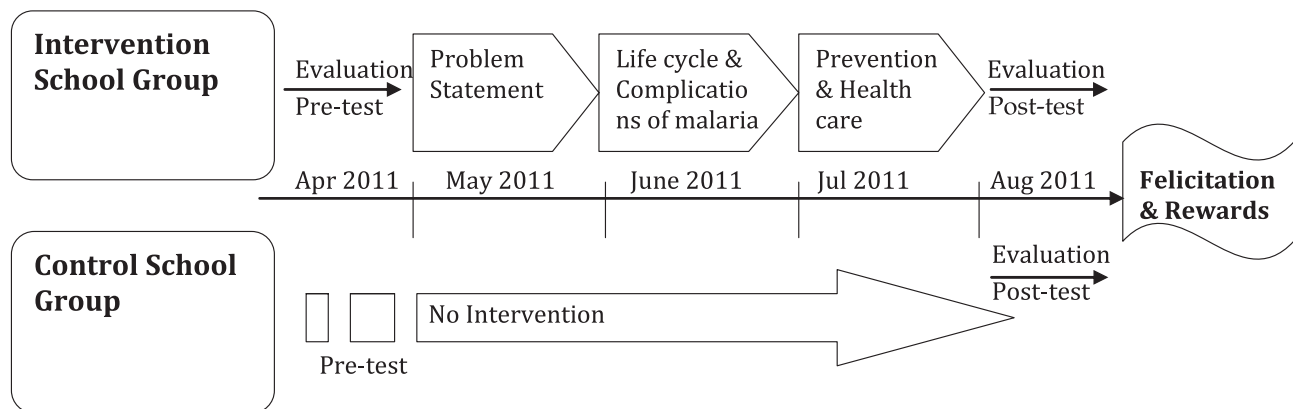
already been highlighted. Various other studies have also highlighted that for successful control of malaria, proper health education about the disease and personal protection as a preventive measure is essential.

The W.H.O. under its Roll Back Malaria Initiative 2010<sup>16</sup> has recognized the need for health education and community participation in the prevention and control of malaria. With ever shrinking financial resource, cost effective measures like these can prove to be most effective.

### MATERIALS AND METHOD

**Design:** In this study the effect of education on the knowledge and attitude towards malaria was assessed by using a pre and post test questionnaire. The intervention group was subjected to a classroom based health education model for malaria by their respective class teachers. The class teachers were trained earlier on all the aspects of the disease.

**Population:** The study subjects were the high school children, aged between 12-16 years, of six high schools in Macche, Belgaum. Of the 18 high schools in Macche area, six were selected based on the distant geographical location, socio-economic status and the medium of instruction of the schools and the strength of each school so as to prevent contamination and bias. They were divided into three pairs and one school in each pair was randomly allocated to intervention and one to the control group.



**Health education Model:** The contents of the malaria health education model for the schoolchildren were divided into three modules presented in three sessions over 3 consecutive days.

- The first module focused on orientation to the problem, water stagnation risks and practices.
- The second module was directed to the identification of the life cycle, symptoms and complications of malaria.

- The third module stressed the importance of healthy behavior and of seeking medical care when necessary and prevention.

**Statistical Analysis**

SPSS version 18 (trial version). The t-test and chi-square test were used respectively to compare the means and percentages in between the groups. Statistical significance was considered if  $p < 0.005$

**FINDINGS**

The baseline characters of the children including the medium of instruction, gender, standard of studying, parents occupation and education are elaborated in Table 1. It is evident that the distribution of the baseline characters was nearly similar in the intervention and the control group. 68.6% of the children in intervention group and 52.19% in the control group had open canals and potential mosquito breeding places around their houses.

Of the 360 children in the intervention group, 28 (7.7%) were lost in the follow up due to failure to attend all three sessions and absenteeism and 18 (5.3%) in the control groups.

Among those children who were exposed to the health education model, 76% found it to be useful, 21% beneficial to some extent and 3% considered it not beneficial. The mean score in the intervention group before and after the intervention were 7.42+1.93 and 12.29+2.5(d=4.85) respectively. The results showed clearly significant improvement in knowledge, attitude

and behaviour scores in the intervention group, than in the control groups (Table: 5  $p < 0.0001$ ), indicating the potential of the developed model.

In the intervention group post test scores, 89% of the students identified mosquitoes as the cause of malaria, 5% as contaminated water, 4% as malnutrition and 3% as Unhygienic living conditions. 96% of the students rightly identified fever with chills; headache and body ache as symptoms of malaria, where as the rest responded as cough, convulsions and diarrhoea as symptoms of malaria.

The students were also questioned about the availability of malaria treatment facilities in their locality. Most common response included doctors at the Primary health centre; however the responses in the post test scores showed significant improvement in the awareness about the Village health workers, community health workers and availability of the treatment at the sub-centre level.

When the knowledge and the behaviour scores were separately assessed, there was a significant improvement in the knowledge scores in the post test, (Table:6) but the behaviour scores continued to remain poor. About 92% of the students responded that mosquito control and personal protection as methods of malaria control, however when the behaviour scores were assessed removal of water stagnation, elimination of potential mosquito breeding places, destruction of bushes or personal protection measures like use of mosquito nets, mosquito repellents and sprays or creams their use was poor even in the post test scores.

**Table 1:General Characteristics of the study groups**

	Intervention Group (n=360)	Control Group (n=339)
<b>Gender</b>		
Male	238	218
Female	122	121
Chi-Square	0.25	
P value	0.61	
<b>Medium of Instruction</b>		
Kannada	267	248
Marathi	93	91
Chi-square	0.09	
P value	0.76	
Class – VII	134	118
IX	126	119
X	100	102
Chi-square	0.61	
P value	0.73	

Table 1: General Characteristics of the study groups

	Intervention Group (n=360)	Control Group (n=339)
<b>Fathers Education</b>		
Illiterate	250	229
Literate	110	110
Chi-square	0.05	
P value	0.68	
<b>Mothers Education</b>		
Illiterate	271	257
Literate	82	78
Chi-square	0.03	
P value	0.87	

Table 2: Comparison of scores between the sexes

Group		Pre-test	Post-test	p-value
Males	Mean	7.38	10.07	0.0041
	N	456	426	
	Std. Deviation	1.82	3.35	
Females	Mean	7.4	9.7	0.051
	N	243	233	
	Std. Deviation	2.05	3.26	

Table 3: Comparison of pre and post-test scores based on the standard of children

Class		Pre-Test	Post-Test	d	p-value
<b>INTERVENTION</b>					
VII	Mean	7.43	12.22	4.8	<0.0001
	N	134	134	134	
	Std. Deviation(+)	1.89	2.5	2.67	
IX	Mean	7.45	12.27	4.83	<0.0001
	N	126	126	126	
	Std. Deviation(+)	1.98	2.21	2.89	
X	Mean	7.52	12.47	4.98	<0.0001
	N	100	79	79	
	Std. Deviation(+)	1.95	2.95	3.09	
Total	Mean	7.46	12.3	4.85	<0.0001
	N	360	339	339	
	Std. Deviation(+)	1.93	2.51	2.85	
<b>CONTROL</b>					
VII	Mean	7.38	7.54	0.16	0.68
	N	118	118	118	
	Std. Deviation(+)	1.96	2.23	1.16	
IX	Mean	7.35	7.39	0.025	0.89
	N	119	119	119	
	Std. Deviation(+)	1.85	1.58	1.12	
X	Mean	7.17	7.4	0.23	0.82
	N	102	83	83	
	Std. Deviation(+)	1.79	2.06	1.09	



**Table 4: Comparison of pre and post-test scores based on the medium of instruction**

Medium of Instruction		Pre-test	Post-Test	p-value
Kan.	Mean	7.20	10.40	<0.0001
	N	515	487	
	Std. Deviation	1.84	3.34	
Mar.	Mean	7.93	8.67	0.0418
	N	184	172	
	Std. Deviation	1.97	2.90	

**Table 5: Comparison of pre and post-test scores in Intervention and Control groups**

Group		Pre-test	Post-test	p-value
Int.	Mean	7.46	12.32	<0.0001
	N	360	339	
	Std. Deviation	1.93	2.51	
Control	Mean	7.30	7.44	0.61
	N	339	320	
	Std. Deviation	1.86	1.96	

**Table 6: Comparison of pre and post-test knowledge and behavior scores in the intervention group**

Medium of Instruction		Pre-test	Post-Test	p-value
Knowledgescores	Mean	8.20	12.40	<0.001
	SD	1.91	3.66	
Behavior scores	Mean	3.64	5.48	0.72
	SD	1.94	2.88	

### CONCLUSION

Health education has especially proved to be effective for some of the other diseases like HIV/AIDS, diarrheal diseases and dental caries<sup>19,20</sup>. The results of this study suggest that school based intervention can definitely improve the knowledge and behaviour towards malaria and thus help in the control of the disease. In contrast with other studies by Lora et. al; Tyagi et. al.<sup>4,11,13</sup> the basic knowledge regarding malaria was good. The Children could easily associate mosquito with malaria and fever as the most common symptom of malaria. However the knowledge about the transmission and mosquito breeding places was poor. Similarly the knowledge about the medical and diagnostic facilities and preventive and personal protective measures was also poor suggesting the need to fill this knowledge gap.

Behaviour change was the most difficult to bring about. Identification of potential mosquito breeding places and eliminating them, use of bed nets and mosquito repellents and approach to health care

facilities would be most difficult; however it would be naive to expect that such a change within one session. It would require continuous efforts in the direction, however small net changes in the favourable direction were seen among the children.

Cost effective ways like this are necessary<sup>10,17</sup>, especially in India where the government is looking for public-private partnership, schools with a well established platform of children can help to deliver the message of prevention and reduce health burden. What we need is administrative support and long term evaluations for scaling up of the interventions and policy decisions regarding implementation of school health program. Even though the teachers were already overburdened with their curriculum and teaching, at the end of the study it was found to be acceptable to the school teachers, administrators, parents and most importantly the children.

It is rightly quoted by Webber R in the book Communicable Disease Epidemiology and Control, U.K; that “multiplicities of simple methods, carried out

by many people are likely to be more successful in the long term than more complex methods. It will be the community who will finally control malaria, but health authorities must advise and assist them in the ways of achieving them”

Finally to conclude, since the children of today are the citizens of tomorrow, a school based health education model will basically have three important roles in community participation firstly a better understanding of the disease and concepts to the children and also to their families, secondly it enforces positive health attitude among the children and finally it changes positively their health behaviors towards one of the significant health problems of the country.

### RECOMMENDATIONS

This study shows that it is possible to address one of the national burdens of the country like malaria through schools and these findings could be a starting point of future school based health education programmes. It shows that a simple addition of a three hour session in the children extracurricular activity can be greatly beneficial in the future. Integration of such a activity would require development from the Ministry of education and inculcate this as an extracurricular activity in schools.

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**Conflicts of Interest:** None

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# A Study of Oxidative Stress and Altered Endothelial Cell Function in Preeclampsia

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## ABSTRACT

Preeclampsia is a complex multisystem disorder characterized by hypertension and proteinuria. It is one of the most common and potentially fatal complications of pregnancy. A case control study was carried out to assess the levels of homocysteine, lipid peroxidation and antioxidant status in patients with preeclampsia. Fasting venous samples were collected during antepartum period and serum levels of homocysteine (Hcy), malondialdehyde (MDA), ascorbic acid (vitamin C) and uric acid were measured. In the preeclamptic group, Hcy and MDA levels were significantly raised while antioxidant ascorbic acid level was significantly reduced ( $p < 0.01$ ) and uric acid concentration was increased significantly ( $p < 0.01$ ). These findings suggest that Hcy and lipid peroxidation are associated with preeclampsia. In preeclampsia, antioxidants are extensively utilized to counter act the cellular changes and endothelial dysfunction mediated by oxidative stress. Placental oxidative stress which results from the ischemic reperfusion injury is reported to be involved in the etiopathogenesis of preeclampsia.

**Keywords:** Preeclampsia, Homocysteine, Lipid Peroxidation, Antioxidants

## INTRODUCTION

Preeclampsia is a pregnancy specific disorder which complicates 7-10% of all gestation<sup>1</sup>. This common disorder, which is more prevalent in first pregnancies, is associated with approximately 10-15% of maternal and fetal morbidity and mortality, with serious outcomes occurring in developing countries<sup>2</sup>.

Preeclampsia is a triad of oedema, hypertension and proteinuria occurring primarily after the 20<sup>th</sup> gestational week and most frequently near term<sup>3</sup>.

It is associated with defective placentation, in which the dislodging of extravillous trophoblast plugs in the maternal spiral arteries. This leads to the onset of blood flow into the intervillous space, causing an oxidative burst that generates reactive oxygen species (ROS)<sup>4</sup>. Also, the reduced uteroplacental perfusion due to the aberrant placentation leads to ischemic reperfusion injury to the placenta<sup>5</sup>.

Preeclampsia is characterized as a state of oxidative stress resulting from increased generation of free radicals and decreased levels of antioxidants<sup>6</sup>.

The free radicals thus, generated are capable of exerting mediating processes such as tissue remodeling, hormone signaling oocyte maturation, folliculogenesis, tubal function, ovarian steroidogenesis and germ cell function. Its increased levels can inflict significant damage to cell structure<sup>7</sup>.

Oxidative stress has been proposed as a promoter of endothelial cell dysfunction and lipid peroxidation<sup>8</sup> which results in production of lipid peroxidation products i.e. malondialdehyde (MDA) and lipid hydroperoxides<sup>9</sup>. Homocysteine is a sulfur containing amino acid derived from the metabolic demethylation of methionine<sup>10</sup>.

Homocysteine by autooxidation generates superoxide and hydrogen peroxide, both of which damage the arterial endothelial lining, causing endothelial dysfunction<sup>11</sup>.

Recently, homocysteine has been observed as an independent risk factor for vascular endothelial cell injury in cardiovascular factor disease and common obstetric problems i.e. preeclampsia<sup>12</sup>.

It is observed that oxidative stress leads to focal collagen damage in the fetal membranes and results in preterm labour<sup>13</sup>.

Significantly decrease levels of antioxidants i.e. vitamin C, vitamin E and uric acid have been reported in patients with preeclampsia<sup>14</sup>.

In this context, the present study has been undertaken determine the changes in serum levels of total homocysteine, lipid peroxidation product, MDA and antioxidant levels with vitamin C and uric acid.

### MATERIALS AND METHOD

A case control study was conducted in Department of Biochemistry, Santosh Medical College and Hospital, Ghaziabad. Fifty severe eclamptic patients (criteria of severe preeclampsia: systolic blood pressure of 160 mmHg or more and diastolic blood pressure of 110 mmHg or more, persistent proteinuria of atleast 2+ by dipstick or 24 hour urinary excretion of 2 g or more, persistent headache, oligouria, nausea, vomiting, epigastric pain, pulmonary oedema, thrombocytopenia) and fifty normotensive healthy pregnant controls.

Subjects free from pre-existing hypertension, cardiovascular disease, cerebrovascular disease, diabetes mellitus, renal disease, liver disease and hypothyroidism were included in the study.

Study subjects of both groups were matched with respect to maternal age, gestational age and BMI. Sociodemographic features of subjects are given in Table I.

Ethical clearance for the study was taken from the concerned authorities. Informed written consent was taken from the subjects.

With all aseptic precautions morning blood samples from all the study subjects were collected before any medication was given. Samples were centrifuged at 3000 rpm; serum was separated and stored at -70°C.

Serum homocysteine concentration was analysed by fluorescence polarization immunoassay (FPIA) method by Abbot's Ax SYM system.

Serum MDA levels were measured by Thiobarbituric acid reactive substances assay (TBARS) at 532 nm wavelength by spectrophotometer.

Ascorbic acid concentration was measured by Dinitrophenyl Hydrazine (DNPH) method at 520 nm wavelength by spectrophotometer and uric acid concentration was measured by Uricase method using Erba Mannheim Diagnostics kit at 550 nm.

Statistical analysis was performed using Mann Whitney U test and Spearman Correlation analysis.

### RESULTS

Regardless of the preeclampsia none of the subjects had any chronic disease or pregnancy complications. No significant difference was found between the clinical features of the preeclamptics and the normotensive pregnant controls other than hypertension and proteinuria Table I.

Table I. Sociodemographic features of the subjects

S. No.	Parameters	Cases (n±50) Mean ± SD	Controls (n ±50) (mean ± SD)	p-Value
1	Age	25.30± 2.59	26.75 ±2.12	>0.05
2.	Gestational age (days)	235 ±13	226 ±14	>0.05
3.	Pregnancy (Number)	4.3 ±1.9	4.6 ±2.2	>0.05
4.	Blood pressure (mmHg)SystoleDiastole	164 ± 12114 ±6	116 ±1176 ±4	<0.05*
5.	Proteinuria (mg/24 hours)	5300 ±1250	54 ±24	<0.05*

Serum homocysteine MDA and antioxidant status concentrations of preeclamptics and normotensive pregnant controls were given in Table II.

Serum homocysteine concentrations of preeclamptics were higher than those of controls (p<0.05). Likewise, MDA levels were also higher in preeclamptics patients (p<0.05).

There is significant decrease in ascorbic acid levels (p<0.01) in cases as compared to controls and on the other hand, there is significant elevation of uric acid (p<0.01) in cases as comparison to the controls.



**Table II. Biochemical parameters to assess Homocysteine, lipid peroxidation and antioxidant status of the subjects.**

S. No.	Parameters	Cases (n±50) Mean ± SD	Controls (n ±50) (mean ± SD)	p-Value
1	Homocysteine (µmol/l)	18.78 ±6.71	12.59 ±5.06	<0.05*
2.	Malondialdehyde (nmol/l)	5.46 ±0.20	3.46 ±0.18	<0.05*
3.	Ascorbic acid (mg/dl)	0.72 ±0.21	0.98 ±0.17	<0.01*
4.	Uric acid (mg/dl)	8.16 ±1.68	4.72±0.91	<0.01*

(\*: significant)

## DISCUSSION

Preeclampsia is one of the leading causes of maternal and perinatal mortality in the developing countries. It affects as many as 8,370,000 cases worldwide per year. Though the etiopathogenesis of preeclampsia is largely not understood, oxidative stress and a generalized inflammatory state forms the principle factors contributing to preeclampsia<sup>15</sup>.

Our study suggests that Hcy and a marker of free radical, MDA were significantly increased in patients of preeclampsia.

Preeclampsia has been proposed as a two stage disorder. In the first stage, the placenta produces a cytotoxic factor and in the second stages the increased mitochondrial activity of the placenta results in increased generation of ROS<sup>16</sup>.

Abnormal placenta in preeclampsia results in the placental ischemia<sup>17</sup>. The ischemia reperfusion injury to the placenta leads to generation of placental oxidative stress and hence, increased synthesis of ROS. Increased superoxide ion generation in the placenta has been detected with the direct electron paramagnetic spin resonance technique<sup>18</sup>.

The deleterious effects of free radicals include the initiation of lipid peroxidation, cellular dysfunction and leukocyte activation leading to endothelial dysfunction<sup>19</sup>.

Numerous independent studies demonstrating a significant association between preeclampsia and the levels of various biomarkers of oxidative stress have strengthened our evidence for lipid peroxidation in preeclamptic patients<sup>20, 21</sup>.

Serum concentrations of Hcy decrease in normal pregnancy either due to physiological response to pregnancy, increase in estrogen or hemodilution<sup>22</sup>.

Our study demonstrates an increase in the Hcy levels in the patients with preeclampsia along with a

positive correlation in between MDA and Hcy in these patients<sup>23</sup>.

In a study conducted it was shown that hyperhomocysteinemia decreases total vessel surface and disrupts placental perfusion in preeclamptics<sup>24</sup>.

It is also seen that vascular damage in maternal uteroplacental circulation is present in endothelial dysfunction and smooth muscle cell proliferation, both of which are characteristic features of preeclampsia<sup>25</sup>.

Along with these findings it is corroborated that there is decreased endothelial nitric oxide (NO) synthesis and activity due to effect of increased Hcy levels<sup>26</sup>.

In consistent with present findings, Vandergit et al<sup>27</sup> and Rajkovic et al<sup>28</sup> also found Hcy concentration to be raised in preeclamptic patients.

Preeclampsia is associated with increased utilization of the antioxidants. Several studies have demonstrated presence of decrease serum levels of ascorbic acid as compared to normal pregnant women<sup>29, 30</sup> and same findings were found in the present study.

There is a significant increase in the serum uric acid levels in the present study. It implicates antioxidative response related to the pathogenesis of preeclampsia<sup>31</sup>.

Hence, in conclusion, preeclampsia predisposes the vascular endothelium to oxidative stress and elevated Hcy levels. There is increase in total oxidant and decrease in antioxidant activities of these patients leading to endothelial injury and vasospasm. There is need to further evaluate the Hcy lowering effect of vitamin B<sub>6</sub>, vitamin B<sub>12</sub> and folate supplementation. Also, the results of ongoing trials using vitamin C and E supplementation may be able to delineate the role of oxidative stress in the pathophysiology of preeclampsia.

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# A Cross Sectional Study on Sickle Cell Disease among Backward Communities of Gadchiroli, Maharashtra, India

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## ABSTRACT

**Aim of the study:** To assess the prevalence of sickle cell disease among various backward communities of Gadchiroli district.

**Methodology:** The study is based on Solubility test, a laboratory investigation method used for the diagnosis of sickle cell disease. The tests were conducted in a stall opened at Agrotech-2011 on Dec 27-29, a state level agrotech festival.

**Observation and Discussion:** The total sample used for the study was 560, out of which 75.89% are male and 24.10% are female. Category wise populations in the study are OBC-40.53%, SC-25.35%, ST-20%, Open-2.67%, SBC-2.14%, and NT-8.75%. Among 560 samples tested using solubility test 69 (12.32%) samples are found positive out of which 28.98% are female and 71.01% are male. The caste wise distribution of solubility test confirmed samples are SC-36.23%, ST-26.08%, OBC-24.63%, NT-13.04%, SBC-0, Open-0.

**Conclusion and Recommendation:** The study concludes that the prevalence of sickle cell disease among backward classes in Gadchiroli district is more in comparison to general or open category. The district is rich in tribal and other related backward communities, so prevention, control and management of sickle cell disease should be a priority of the health department. Endogamy and consanguineous marriage is one of the important factors for the perpetuation of the disease among tribal communities. Proper IEC activities need to be implemented to address this issue.

**Keywords:** Sickle Cell Disease, Solubility Test, Backward Communities And Selective Pressure

## INTRODUCTION

Sickle cell disease is a generic term for a group of genetic disorders characterized by predominance of hemoglobin S (Hb S). These disorders include sickle cell anemia, sickle beta thalassaemia syndromes, and hemoglobinopathies in which Hb S is in association with another abnormal hemoglobin that not only can participate in the formation of hemoglobin polymers but also is present in sufficient concentration to enable the red cells to sickle<sup>7</sup>. Normal hemoglobin is called hemoglobin A, but people with sickle cell disease have only hemoglobin S, which turns normal round red blood cells in to abnormally curved (sickle) shapes. Normally a person inherits two copies of the gene that produce beta-globin, protein needed to produce normal hemoglobin (hemoglobin A, genotype AA). A person with sickle cell trait inherits one normal gene

and one abnormal gene encoding hemoglobin S (hemoglobin genotype AS).

Sickle cell disease prevalence is highest in West Africa (25% of the population). However it is very infrequently appears in Mediterranean countries such as Italy, Greece and Spain.<sup>12</sup> Talking about various types of haemoglobinopathies in India Sickle cell gene is commonly found in certain tribes of MadhyaPradesh, Maharashtra, Orissa, Gujrat and Kerala.<sup>9</sup> The sickle cell disease has been found in 72 districts of central, western and southern India<sup>4,11</sup>. The situation is very panic in India because more than 50% of world's sickle cell cases are found in India<sup>1</sup>. The prevalence of sickle cell disorder in India ranges from 9.4 to 22.1% in endemic areas. The prevalence of sickle cell disorder among various tribes in Maharashtra is shown in the following tables- (S. L. Kate and D. P. Lingojar, IJHG-2002)<sup>1</sup>

**Table 1. Prevalence of sickle cell disorder among various tribes in Maharashtra.**

Name of the Tribe	District	Prevalence %
Otkar	Gadchiroli	35
Pardhan	Gadchiroli, Chandrapur, Yewatmal	32
Pawara	Nandurbar, Jalgoan	25
Madia	Gadchiroli	20
Bhill	Nandurbar	20
Halbi	Gadchiroli	13
Rajgond	Gadchiroli	11
Korku	Amravati	10
Kolam	Yewatmal	09
Warli	Thane	09
Katkari	Pune, Raigarh	07
Kokana	Nasik	04
Andha	Nanded	02
Mahadeo Koli	Pune, Nasik	01
Thakar	Pune, Raigarh	01
Pradhi	Solapur	00

**Table 2. Prevalence of sickle cell disorder (Carrier) among Scheduled Caste population (State of Maharashtra)**

Name of the District	Prevalence
Chandrapur	24
Gadchiroli	23
Nagpur	22
Bhandara	18
Gondia	15
Thane	12
Wrdha	07
Whasim	07
Aurangabad	07
Nandurbar	05
Pune	04

**Table 3. Prevalence of sickle cell disorder (Carrier) among OBC groups (State of Maharashtra)**

Groups	Districts	Prevalence
Teli	Gadchiroli	12
Teli	Nagpur	10
Kunbi	Gadchiroli	10
Kunbi	Nagpur	04
Banjara	Nanded, Yewatmal, Osmanabad	05

## OBJECTIVE

### The objectives of the study are

1. To assess the prevalence of sickle cell disease among various backward castes of Gadchiroli district.

2. Sickle cell disorder is very common in tribal and backward caste, so a study of this kind will help the public health department to tailor-made the sickle cell disease control and prevention programme in the district.
3. This will again help the department in informing and educating the affected group which will on the other hand help to prevent the further spread of the disease.

## METHODOLOGY

The study is based on "Solubility test" used for the detection of sickle cell disease. This was conducted in a fair, Agrotech-2011, a state level agro-festival. The organizing committee of Agrotech-2011 invited a proposal to open a stall in the festival to disseminate the message about various health programmes to a larger population. At this occasion the public health department decided to hold a camp to test the visitors freely attending fair for sickle cell disease using "Solubility test" with NRHM fund. For this purpose though no written "Informed Consent" was taken but verbally they were informed about the purpose of conducting the test and the visitors who volunteered to get tested were only tested. The stall did a multifaceted job of disseminating the message for various health programmes and holding counseling for the visitors who found positive on solubility test. The sickle cell coordinator herself held counseling sessions for the positive ones.

### Observation and discussion

The total sample used for the study is 560 out of which 75.89% are male and 24.10% are female, OBC-40.53%, SC-25.35%, ST-20%, Open-2.67%, SBC-2.14%, and NT-8.75%. Out of 560 samples tested using Solubility test to detect sickle cell disease 69 are found positive. Out of total positive cases 28.98% are female and 71.01% are male. Similarly out of total positive cases SC-36.23%, ST-26.08%, OBC-24.63%, NT-13.04%, SBC-0, Open-0. This study clearly shows that the backward communities of Gadchiroli district are seriously affected by sickle cell disease. Out of six different castes taken in the study the Schedule caste is found to be the most affected group in the community and next to it are the ST, OBC and NT in a descending order. This study again shows that not a single person is affected by sickle cell disease from Open category/General category.



Another point of discussion is "Selective Pressure". Gadchiroli district is also endemic to Malaria. This has contributed greatly to the endemic of sickle cell disease in the district. The malaria parasite can exert selective pressure on population. This pressure leads to natural selection of erythrocytes carrying the sickle cell gene

mutation, Hb-S causing sickle cell anemia. This condition is prevalent in many parts of the globe where malaria is major health concern like Mediterranean countries such as Italy, Greece, and Spain etc and selectively protects from malaria. So is the case in Gadchiroli.

**Table 4. Caste wise and Gender wise distribution of sickle cell disease**

Caste-	SC		OBC		ST		NT		SBC		Open	
	M	F	M	F	M	F	M	F	M	F	M	F
Cases-	20	5	12	5	9	9	8	1	0	0	0	0

### CONCLUSION

The study clearly shows that the prevalence of sickle cell disease is more common in backward communities than the open or general category castes. The study concludes that Schedule caste community is at the highest risk (prevalence is 36.23%) of the disease next to it is the ST and OBC in a descending order. The study also shows that the male are more affected than the female.

Solubility test has certain limitations that it normally helps in differentiating sickling and non-sickling hemoglobin but does not quantitate the amount of sickling and non-sickling hemoglobin and therefore it does not differentiate the heterozygous from the homozygous condition. Hemoglobin type must be further differentiated by electrophoresis or other method.<sup>8</sup>

The study was conducted with a limited sample size. Similar studies can be repeated with large sample size to assess the prevalence of sickle cell disease among various subtypes too. Similar studies can also be conducted in malaria endemic areas to find out the relation between malaria and sickle cell disease or to know more about selective pressure.

### RECOMMENDATIONS

Gadchiroli district is rich in tribal community. The district always struggles with lot of public health problems with its tribal community and sickle cell disease is one of them. One of the priorities of the district public health department should also be directed towards the control and prevention of sickle cell disease. Certain tailore made programmes should be designed taking the tribal population in to consideration. IEC activities should be strengthened to addresses this issue. As malaria is also a major public

health concern and it selectively put pressure on the community for sickle cell disease so the malaria control programme should also be strengthened.

### ACKNOWLEDGEMENT

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# Phenotypic and Genotypic Characterization of *Vibrio Cholerae* O1 Isolated from an Outbreak in Hyderabad

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## ABSTRACT

Cholera is an acute diarrhoeal disease caused by *Vibrio cholerae*, of the 206 serogroups of *Vibrio cholerae* only O1 and O139 which produce CTX are known to cause epidemics. New variants of Eltor biotype exhibiting characters of classical biotype has been reported from different counter parts of the world since 2002. The present study was conducted to determine biotypes, serotypes and phage types of *Vibrio cholerae* prevalent in Hyderabad and to determine the antibiotic susceptibility pattern of the isolates.

**Keywords:** *Vibrio Cholerae*, Serotype, Biotype, Phage Type, Eltor Variant, MAMA PCR, *Ctxb* Gene

## INTRODUCTION

Cholera is an acute diarrhoeal disease caused by *Vibrio cholerae*. Outbreaks are a regular feature in our country. Epidemiological studies have shown that cholera is responsible for 5-10% of all acute diarrhoea cases in non epidemic situation. According to Epidemiological report of WHO (2005) 1, 31,943 cholera cases including 2272 deaths were reported. As much as 1, 20,000 deaths were estimated to occur each year from cholera<sup>[1]</sup>. Of the 206 serogroups of *Vibrio cholerae* only O1 and O139 which produce CTX are known to cause epidemics. New variants of Eltor biotype exhibiting characters of classical biotype have been reported from different counter parts of the world since 2002. In this study we report the isolation of Eltor variant carrying *ctxB* gene.<sup>[2, 3]</sup>

## MATERIALS AND METHOD

A prospective study was conducted during an outbreak that occurred from May 3<sup>rd</sup> to 25<sup>th</sup> 2009 at

Bholakhpur. During this study period 85 clinically suspected cases of cholera were admitted to Gandhi hospital. Specimens were collected in sterile bottles before starting antibiotics and transported to the laboratory for processing. Specimens were cultured directly on MacConkey's agar, Nutrient agar, Thiosulphate citrate bile salt sucrose agar (TCBS) and xylose lysine deoxycholate agar (XLD), in addition to direct plating, specimens were also subcultured on MacConkey agar and TCBS agar after enrichment with alkaline peptone water. Plates were examined after overnight incubation at 37°C.

The Colonies suggestive of *Vibrio cholerae* were identified by standard biochemical tests<sup>[4]</sup> and confirmed by serotyping (using high titre sera obtained from King Institute of Preventive Medicine, Guindy, Chennai). O385 (classical) and N16961 (Eltor) were used as control strains.

Biotyping was done by conventional methods such as chick cell agglutination, Voges Proskauer test, Polymyxin B sensitivity, sheep RBC hemolysis.<sup>[4]</sup> Phage typing was done by new and old methods and susceptibility to phage IV and phage V for biotyping was done at Vibrio Phage Reference Laboratory, NICED (National Institute of Cholera and Enteric Diseases, Belegata, Kolkata, India). MAMA PCR was used for differentiation of *ctxB* classical and *ctxB* Eltor. MAMA PCR detects the sequence on nucleotide at

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position 203 of the *ctxB* gene, for this a conserved forward primer (FW- Com) and two allele specific primers Rv-cla and Rv-clt were used.

*Escherichia coli* were isolated from 11 outbreak stool samples of children under 5 years of age group. Three colonies from each sample were sent to NICED (National Institute of Cholera and Enteric Diseases, Belegghata, Kolkata, India). Diarrhoeogenic *E. coli* were identified by multiplex PCR.

Water samples collected from the area of outbreak from household municipal taps, stored water in the houses and reservoir of the area were analyzed by the Institute of Preventive Medicine (IPM), during and preceding the outbreak.

**RESULTS**

Outbreak started on 3<sup>rd</sup> May 2009 as common source outbreak with admission of 8 children. Adults presented later on 05/05/2009. Acute rise in cases, with maximum number of cases were admitted on 06/05/09 with a fall on 11/05/2009 and ended on 25/05/2009 (fig.1)

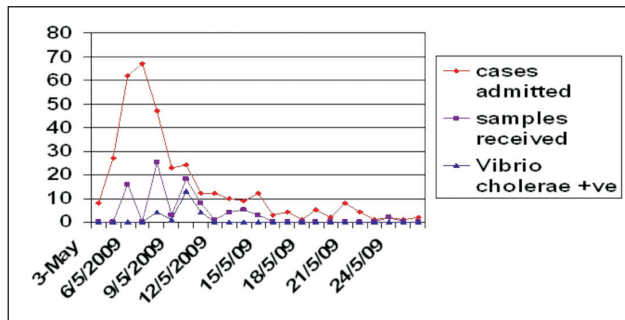


Fig. 1. Distribution of clinical and confirmed cases

Children under 5 years were found to be more susceptible (50%). (Fig: 2) Males and females were equally susceptible. Mean duration of hospitalization in children was 2-3 days (fig: 2).

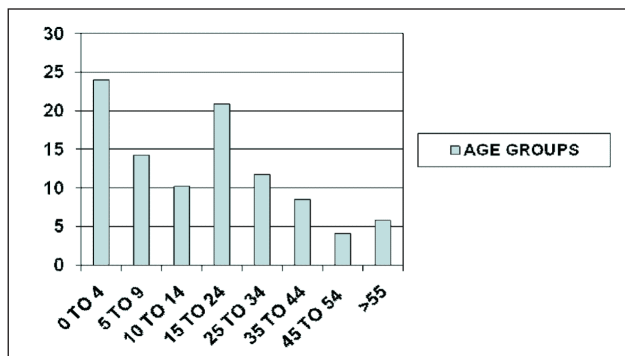


Fig. 2. Age wise distribution of cases

Complications like severe dehydration, fever, renal failure was seen among outbreak cases. Mortality rate was 0.22% during the outbreak with one death each among children and adults (fig 3).

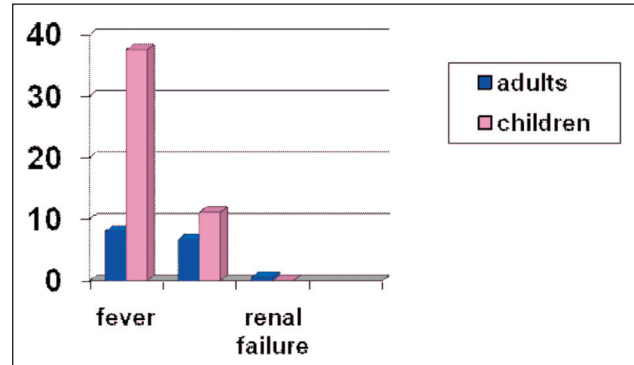


Fig. 3. Frequency of complications among outbreak cases

Of the 85 outbreak stool specimens processed, *Vibrio cholerae* was the major isolate followed by *Escherichia coli*, *Klebsiella species*, *Campylobacter*, *Staphylococcus aureus* and Others(*Coagulase Negative Staphylococcus & Enterococcus*) (table 1).

Organism	Outbreak Strains Number	Percentage
<i>Vibrio cholerae</i>	22	25.8
<i>Escherichia coli</i>	20	23.5
<i>Klebsiella species</i>	15	17.6
<i>Campylobacter</i>	2	2.3
<i>Pseudomonas</i>	5	5.8
<i>Staphylococcus aureus</i>	5	5.8
Others(CONS & Enterococcus)	16	18

All the strains of *Vibrio cholerae* isolated were Eltor Ogawa. T27 was the most prevalent phage type and 40% of the outbreak strains were untypable. MAMA PCR showed all the strains carried *ctxB* gene of Classical type. All the strains were resistant to Amoxicillin and Cotrimoxazole (100%).

Antibiotic susceptibility testing was performed by Kirby Bauer’s method. The following commercial Antibiotic disks (Himedia) were used: Tetracycline (30ig) Ampicillin (10ig), Ciprofloxacin (5ig), Cotrimoxazole (25ig), Amikacin (30ig), Cefotaxime (30ig).

The plates were read after 16 to 18 hours of incubation at 37°C. The zone of inhibition for each antibiotic was interpreted as per CLSI guidelines. All the 22 *Vibrio cholerae* positive samples belonged to serogroup O1, Biotype – Eltor, serotype – Ogawa.

All the 11 *Escherichia coli* strains isolated from children were sent to NICED (National Institute of Cholera and Enteric Diseases, Belegghata, Kolkata, India) for pathotyping, of which 2 were found to be enterotoxigenic type and 1 was entero aggregative type. Water analysis report from IPM also showed faecal contamination due to *E.coli*. As there was sewage contamination, multiple organisms were isolated.

Phage typing was done at Vibrio phage reference laboratory, Kolkata. A total of 20 outbreak strains were phage typed. Phage typing was done by Basu & Mukherjee method and new method. Only 60% of outbreak strains were typable and 40% were untypable. T2 was the predominant phage type. Even with the new method 40% of outbreak strains were untypable. Among the typable strains, T27 was the predominant phage type and other phage types i.e. T13, T7 were also reported (fig: 4).

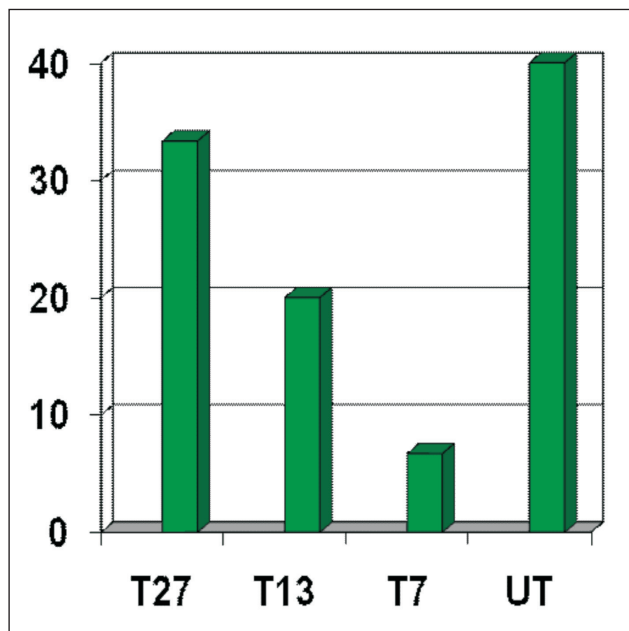


Fig 4: New phage typing method

All the strains showed uniform sensitivity to Amikacin, Cefotaxime and Ciprofloxacin and 100% resistance to Cotrimoxazole and Amoxicillin (fig: 5). MAMA PCR differentiates *ctxB* classical and *ctxB* Eltor. Of the 22 strains subjected to MAMA PCR, 21 were toxigenic and all toxigenic Eltor strains carried classical toxin gene.

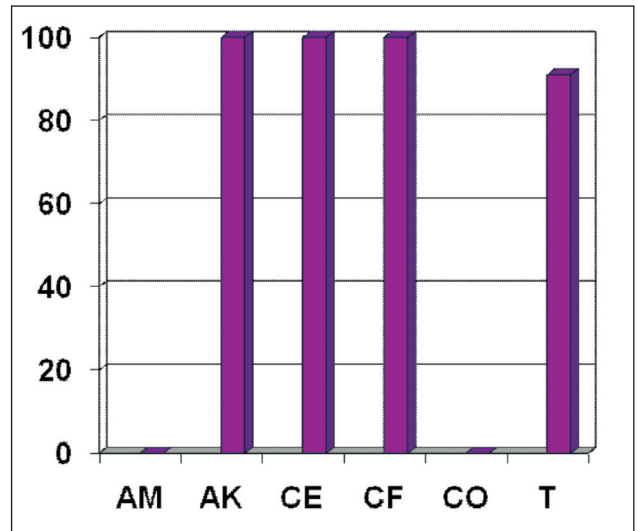


Fig: 5: Antibiotic sensitivity pattern

### DISCUSSION

An annual outbreak of cholera is a regular feature in our country. A high population density along with open drains & poor sanitation provides an optimal niche for survival, sustenance & transmission of *Vibrio cholerae*. The seasonal outbreaks are reminder of endemicity of the illness & its emergence as an important pathogen of acute watery diarrhoea<sup>[5]</sup> More discriminatory procedures & molecular biological techniques are now assisting the epidemiologists in understanding the evolution & spread of *Vibrio cholerae* clones & emergence of new variants.<sup>[8]</sup> Children under 5 years were more susceptible (50%), which correlates with similar study conducted by Singh *et.al.* 1998 and Amin *et.al* 1995 who showed 65% susceptibility<sup>[6,7]</sup>.

In this study all the 22 *Vibrio cholerae* isolates belongs to serogroup O1, Eltor biotype and Ogawa serotype. Eltor biotype was reported for the first time from Andhra Pradesh in Visakhapatnam in the year 1965 by Bhaskaran and spread to other parts of the state and completely replaced classical biotype in the later half of 1965<sup>[9]</sup> O139 was reported for the first time in Chennai, later it was reported from various other places. However O139 was reported from Hyderabad in 1993. It continued to coexist with Eltor till 2004 and in 2005, Eltor had completely replaced O139. In our study O139 was not detected.

22 *Vibrio cholerae* strains were subjected to MAMA PCR, except for one strain all were found to be toxigenic and all the toxigenic strains carried Classical



toxin gene (ctx B). Since these strains phenotypically exhibited Eltor characteristics and genotypically showed Classical toxin these were categorized as Eltor variants. Eltor variants were reported for the first time from Bangladesh in 2002<sup>[10]</sup>. Analysis of *Vibrio cholerae* strains isolated in Kolkata from 1989-2005 showed the appearance of Eltor variants in 1995 and total replacement of Eltor biotype in 1999<sup>[10]</sup>. A study conducted in Chandigarh in 2005 showed 80% of the *Vibrio cholerae* strains isolated were found to harbor both ctxB of classical Eltor genes<sup>[12]</sup>.

Phage typing for *Vibrio cholerae* is one of the best established tool & marker for epidemiological characterization of the isolates.<sup>[8]</sup> Phage typing was done by old & new methods. Basu & Mukherjee classified in to 6 groups using 5 phages. According to new typing method 100% of the strains are typable.

According to old phage typing method our study showed T2 as the predominant phage type which correlated with various other studies<sup>[13, 14]</sup>. Some studies conducted in India reported T4 as the predominant phage type<sup>[15-17]</sup> while a few studies from South India reported T2 and T4 phage types<sup>[18,19]</sup>. With the new phage typing method our study showed T27 as the predominant phage type which correlated with various other studies<sup>[13-20]</sup>. In our study other phage types T13 and T7 were also seen which was in contrast to other studies who reported T26, T23, T21, T25 phage types<sup>[15,17,20]</sup>

There was high degree of resistance to Cotrimoxazole (100%) & amoxicillin (100%) exhibited by *Vibrio cholerae* in our study. A study conducted in Delhi also showed similar findings<sup>[5]</sup>, while a study from Maharashtra reported 65% sensitivity to Cotrimoxazole<sup>[8]</sup>.

### CONCLUSION

The present study emphasizes the emerging infections with Eltor variants, reported from an outbreak in Hyderabad. Accurate microbiological vigilance and advanced molecular biological techniques are crucial in identifying such unusual Eltor variants. All strains showed 100% resistance to Amoxicillin and Cotrimoxazole. 40% of the outbreak strains were untypable even with the new phage typing method. Epidemiological studies should be undertaken in hospital settings to monitor the source of outbreak and to formulate accurate diagnostic and treatment procedures.

**Conflicts of Interest:** Nil

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# Life Style Interventions to Prevent and Control Type 2 Diabetes

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## ABSTRACT

**Background :** At global level, presently 150 million people are detected to be diabetic and this number is predicted to double by 2025. In India, the prevalence of diabetes in adults varies from 2.4 % in rural area to 11.6 % in urban dwellers, with further expected rise in prevalence in the coming decades.

**Objectives:** To conduct a literature review of lifestyle interventions - dietary modifications, physical activity and yoga therapy- intended to prevent or delay Type 2 diabetes and to control known diabetes.

**Method:** The literature review design was a search for databases for publications in 1990- 2006 that identified reports on lifestyle interventions designed to prevent or modify risk factors and to control type 2 diabetes.

**Results:** Studies, conducted in diverse countries, settings, and populations, confirm that effective lifestyle intervention can prevent or delay the progression to type 2 diabetes in groups at high risk, such as overweight people with impaired glucose tolerance, maintenance of modest weight loss and reduced risk of diabetes ( $P < 0.001$ ).

**Conclusion:** Adoption of healthy lifestyles (dietary modifications, physical activity and yoga) are important for primordial prevention and treatment of type 2 diabetes.

**Keywords:** *Life Style Intervention, Type 2 Diabetes, Physical Activity, Diet, Yoga*

## INTRODUCTION

Diabetes is a disease with iceberg phenomenon. A study conducted by ICMR Task Force on Diabetes (2002) reported the prevalence of diabetes 2.1% in urban subjects and 1.5% in rural populations.<sup>3</sup> Type 2 diabetes is a major health problem in the U.S., affecting about 15 million people and costing over \$90 billion/year<sup>4</sup> In the next 50 years, diagnosed diabetes is predicted to increase by 165% in the United States, with the largest relative increases seen among African Americans, American Indians, Alaska Natives, Asian and Pacific Islanders, and Hispanic/Latino persons<sup>5</sup>. However, the greatest increases in diabetes are projected to occur in India, China, Pakistan, and Indonesia: By 2025, each of these countries is expected to have larger increases than the United States in the number of diabetic people.<sup>6</sup>

Onset of type 2 diabetes results from a complex interaction between genetic and environmental factors that have been researched extensively. The natural history for people at risk of developing type 2 diabetes is weight gain and deterioration in glucose tolerance.<sup>7</sup>

The literature describes an array of services and programs that target change in lifestyle behaviour, although integration and evaluation of such interventions delivered at the primary level remains "limited and piecemeal."<sup>8</sup> Efficacy research has been described as examining interventions under optimal conditions, and results of such studies might not generalize to real-world settings having less motivated patients, busy physicians, and scarce resources<sup>9</sup> that are typical of family practices in many countries.

Lifestyle factors related to obesity, eating behavior, and physical activity play a major role in the prevention and treatment of type 2 diabetes<sup>4</sup>. There has been progress in the development of behavioral strategies to modify these lifestyle behaviors<sup>4</sup>. The compelling evidence for success in preventing or postponing type 2 diabetes should be viewed as a catalyst for promoting lifestyle modifications across the society. Undoubtedly, population based public health efforts need to be encouraged and supported healthy lifestyles. Such societal approaches are

complementary to a clinical approach of targeting and treating people who have pre-diabetes.<sup>10</sup>

This paper aimed to review the evidence identifying physical activity and diet as key areas and yoga as supportive evidence for lifestyle intervention, to prevent or delay Type 2 diabetes and to control known diabetes.

## MATERIALS AND METHOD

Literature review design consisted of Search from Medline, the Educational Resources Information Center, and the Combined Health Information Database for publications in 1990- 2006 that identified reports on lifestyle interventions designed to prevent or modify risk factors and to control type 2 diabetes. Through an electronic search, 97 studies were identified. During this search, the studies having strict inclusion criteria for meta-analysis with RCT design and the behavioral research were considered for dietary modifications and physical activity

For dietary modifications and physical activity- 20 studies of 2 hours plasma glucose, 11 studies with Weight reduction and 14 studies having both criteria were considered

For yoga therapy, 15 studies were identified.

## FINDINGS

Effective lifestyle intervention can prevent or delay the progression to type 2 diabetes in groups at high risk, such as overweight people with impaired glucose tolerance (glucose concentration 7.8-11.1 mmol/l, two hours after a 75 g loading).<sup>11</sup> A large number of epidemiological studies show that obesity and a sedentary lifestyle are independently related to the chances of developing diabetes<sup>4</sup>. Lowest risk of diabetes occurs in individuals who have a BMI <21, with increasing prevalence seen as obesity levels increase<sup>12,13</sup> There is a dose-response relationship between physical activity and risk of diabetes<sup>14,15</sup>, equivalent energy expenditure from walking and vigorous activity lead to reduction in risk of diabetes<sup>18</sup>

Few studies<sup>4,17,18</sup> showed that the combination of diet plus exercise promote better maintenance of weight loss than diet alone. Exercise may prevent the loss of lean body mass with weight loss, representing another potential benefit to this type of intervention<sup>19,20</sup>.

Randomized, controlled trials from 3 countries<sup>11,21</sup> highlighted that maintenance of modest weight loss (3 to 5 kg [7 to 10 lb]) through sustained lifestyle interventions that include diet and physical activity reduces the incidence of type 2 diabetes in high-risk persons by 40% to 60% over 3 to 4 years. U. S. Diabetes Prevention programme demonstrated the efficacy of lifestyle intervention to prevent type 2 diabetes<sup>21</sup>.

ICAN(Improving Control with Activity & Nutrition) Study<sup>22</sup> - One yr RCT of 147 obese type 2 diabetics divided into 2 groups – life style case management & usual care. Case management resulted in greater weight loss ( $P < 0.001$ ), reduced waist circumference ( $P < 0.001$ ), reduced HbA<sub>1c</sub> level ( $P = 0.02$ ), less use of prescription medications ( $P = 0.03$ ), and improved health-related quality of life ( $P < 0.001$ ) compared with usual care<sup>22</sup>. Several intervention studies<sup>11,23,24,25,26</sup> have suggested that weight loss and increased physical activity may help to prevent or to delay the development of type 2 diabetes in those at high risk for this disease. Weight loss and exercise have both been shown to decrease insulin resistance, and to improve glycemic control<sup>27,28</sup>.

Behavioral research on physical activity started more recently and has taken a more community-oriented, less clinic-based approach<sup>29,30</sup> Several studies have also documented the impact that physicians can have by recommending and “prescribing” exercise to their patients<sup>31,32,33,34</sup>. Emphasis has gradually shifted to home-based, rather than clinic-based, physical activity interventions<sup>35,36</sup>. and the accumulation of 150 min/week of moderate-intensity physical activity through multiple short bouts of exercise<sup>37</sup> and/or incorporation of lifestyle activity within one’s daily routine<sup>38</sup>.

Yoga Lifestyle is most suitable for prevention and treatment for diabetes and obesity. The Yoga principle on Healthy Diet and the practice of the Asanas will help balance the endocrine system, tone the abdominal organs, stimulate both the Nervous and Circulatory System and reduce stress. Yoga also helps one to gain a better understanding of ones self, leading to acceptance and appreciation which will help eliminate the psychological reasons for Obesity. The practice of Yoga deals with all the aspects of an individual: the mind, body and spirit, giving a person control over his mind and body and making the effect is more permanent than other techniques<sup>39</sup>.



### How Yoga works? (Possible mechanisms)<sup>40</sup> :

- Glucagons secretion is enhanced by stress. Yoga effectively reduces stress, thus reducing glucagons and possibly improving insulin action.
- Weight loss induced by yoga is a well accepted mechanism.
- Muscular relaxation, development and improved blood supply to muscles might enhance insulin receptor expression on muscles causing increased glucose uptake by muscles and thus reducing blood sugar.
- Blood pressure plays a great role in development of diabetic and related complications, which is proven to be benefited by yoga. The same holds true for increased cholesterol levels.
- Yoga reduces adrenaline, noradrenalin and cortisol in blood, which are termed as stress hormones. This is a likely mechanism of improvement in insulin action.
- Many yogic postures do produce stretch on the pancreas, which is likely to stimulate the pancreatic function.

Asanas and pranayamas effective for diabetes, should be learned with proper guidance, before putting them into practice<sup>40</sup>:

Many studies<sup>41-47,48,49</sup> have reported the beneficial effect of the practice of yoga on diabetes by direct influence on pancreatic secretion by rejuvenation of the pancreatic cells, through alternate abdominal contractions and relaxation, during asanas and breathing exercises and reduction in blood sugar due to muscular exercise involved in the asanas. Some studies<sup>42,44,46,49</sup> have mentioned up to 65 percent beneficial effect of yogic therapy for diabetes.

Yoga asanas was found to have better glycemic control and pulmonary functions in NIDDM cases with yoga asanas<sup>50</sup> and improve nerve function in mild to moderate Type 2 diabetes with sub-clinical neuropathy<sup>51</sup>.

### CONCLUSION

The literature has clearly identified the efficacy and relevance of lifestyle intervention in prevention and management of type 2 diabetes. As this chronic condition is usually managed by family physicians,

these findings apply directly to primary health care. If family physicians are to manage type 2 diabetes more effectively by "pairing aggressive clinical interventions with equally aggressive community action fundamental to broad lifestyle change,"<sup>52</sup> can primary health care foster sustained lifestyle behaviour change?

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# HIV in Gujarat: An Exploration of Religious Coping Strategies and Quality of Life

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## ABSTRACT

The present study investigated the relationships between religious coping strategies (positive and negative) and six quality of life domains (physical, psychological, independence, social, environment, and spiritual) in 160 HIV-infected patients in Gujarat, India. Data were collected from patient interviews at a public, university-based hospital in Surat. Participants with lower annual incomes used religious coping more often ( $\leq 0.01$ ). Positive religious coping subscribers (34.4%) were more likely to have been infected recently (OR, 3.07; 95% CI, 1.19-7.95). After controlling for associated variables, all religious coping strategies were associated with a better quality of life in the following domains: physical, psychological, independence and environment ( $p < 0.05$ ). Only negative religious coping was associated with a better physical quality of life ( $\leq 0.001$ ). Religious coping was not associated with a better spiritual quality of life ( $p > 0.05$ ). These results have implications for designing future religious coping interventions and for helping healthcare professionals assess religious coping in HIV/AIDS patients.

**Keywords:** HIV, Religious Coping, Quality of Life, Intervention, Gujarat

## INTRODUCTION

The HIV epidemic in India poses unique challenges to those infected. The social conditions of widespread poverty, gender inequality, and illiteracy amplify the adverse effects of infection.<sup>8</sup> The pervasiveness of social stigma further complicates issues such as disclosing one's HIV status, seeking social support, and maintaining personal relationships.<sup>16</sup> To confront their own limitations in trying to deal with a chronic illness or an impending death, HIV-infected individuals oftentimes look to religion as a way to cope, to help reframe their lives, and to bring a sense of meaning and purpose to their lives.<sup>2-3,8</sup>

Regarding markers of HIV infection, positive RC – a belief in life's larger meaning and a sense of spiritual connectedness with others – has been associated with greater increases in CD4 cell counts and lower HIV viral loads over a four-year period.<sup>4</sup> Psychologically, HIV-infected persons who subscribe to positive RC strategies have been shown to express less distress, less pain, greater energy, less depression, better mental

well-being, better cognitive and social functioning, and fewer HIV symptoms.<sup>13,15</sup> Negative RC – conflict, question, and doubt regarding matters of faith, God, and religious relationships – has been associated with faster declines in CD4 cell counts and greater increases in HIV viral load over a four-year period.<sup>4</sup> Additionally, higher levels of depression, loneliness, lower self-esteem, and less optimism have been reported in subscribers of negative RC.<sup>2,5,17</sup>

The objective of the present study was to specifically describe the RC strategies used by HIV-infected subgroups in Gujarat. Other aims were to measure the associations between individual RC strategies and quality of life (QoL) domains.

## MATERIALS AND METHOD

### Procedure

Between December 2010 and April 2011, 160 HIV-positive adult patients were recruited during their routine clinic visits at an HIV/AIDS clinic located in a

public university-based hospital in Surat, Gujarat. The institutional review board of the associated academic institution and the Gujarat State AIDS Control Society (GSACS) approved the study and all participants provided written, informed consent.

## MEASUREMENTS

### Religious coping

Religious coping among participants was quantified using the Hindu Religious Coping Scale (HRCS).<sup>15</sup> The HRCS includes 15 items scored on a five-level Likert scale. The scale is divided into three subscales: (1) five items that reflect a focus on God as the source and solution to problems ("God-focused,"  $\alpha = .85$ ); (2) five items that highlight ways of coping that focus on spirituality without reference to a specific deity ("spirituality-focused,"  $\alpha = .83$ ); and (3) five items that reflect expressions of religious guilt, anger, and passivity in relation to God ("GAP-focused,"  $\alpha = .69$ ).

### Quality of life

Quality of life among participants was quantified by using the World Health Organization Quality of Life (WHOQoL)-HIV BREF.<sup>19</sup> The scale consists of 31 items, including 29 items for six domains, which were physical (4 items), psychological (5 items), independence (4 items), social (4 items), environment (8 items), and spiritual domains (4 items); and one item each for overall QoL and general health perception. Individual items are scored on a five-level Likert scale.

### Demographic/Clinical Variables

Participants were asked questions regarding their socio-demographics including: age, gender, education, annual income, and marital status. Participants were also asked questions regarding their HIV history; these included: year of infection, transmission route, and clinical stage.

### Statistical Analyses

Data were analyzed using SPSS version 18.0 (SPSS, Inc. Chicago, Illinois, USA). First, we calculated the frequency of demographic/clinical variable subgroups and calculated the mean and standard deviation (SD) of RC and QoL scores across these variables. Second, we performed chi-square tests to measure the associations between demographic/clinical variables and overall scores on both the RC and QoL measurements. Third, we calculated odd ratios of positive and negative RC to measure the strength of

associated variables. Finally, we performed linear regression analyses between RC and QoL. Comparisons for which p-values were below 0.05 were considered significant.

## RESULTS

### Descriptive Characteristics

A total of 160 HIV-positive adults enrolled into the study. The mean age of participants was 36 years (SD 9.3, range 20-66) and the majority were male (74.4%) and married (87.5%). The frequencies across demographic/clinical variables are summarized in Table 1. Of note, 132 (82.5%) participants never graduated high school and 87 (54.3%) participants earn an annual income less than Rs.10,000 (\$223). Regarding patients for whom route of infection were known, heterosexual transmission was highest (38.5%), followed by IVDU (35.6%), and then blood products (26.0%).

### Relationships among Variables

The relationships between demographic/clinical variable subgroups and RC and QoL scores were analyzed by chi-square tests. Table 1 summarizes these findings. Annual income ( $\leq 0.001$ ) and year of infection ( $p=0.002$ ) were both significantly associated with overall RC scores. Education ( $p=0.006$ ) and year of infection ( $p=0.035$ ) were both significantly associated with overall QoL scores. These demographic/clinical variables were retained as control variables in all subsequent analyses. Mean RC scores among associated demographic/clinical variable subgroups were then analyzed by one-way ANOVA and Welch's test. Only differences in RC scores ( $F(3,28)=4.242$ ,  $p=0.018$ ) and QoL scores ( $F(3,123)=14.520$ ,  $\leq 0.001$ ) among income subgroups were found to be statistically significant. However, after Bonferroni correction for multiple comparisons differences in RC scores among income subgroups were no longer significant ( $\geq 0.0125$ ).

Variables associated with RC (income and year of infection) were further analyzed to determine whether subjects within these variable subgroups were more likely to subscribe to a positive or negative RC strategy. Participants having higher mean scores in God-focused and spirituality-focused subscales than in the GAP-focused subscale were defined as subscribers of positive RC. Positive RC was attributed to 55 (34.4%) participants. Regarding level of income, all subgroups were more likely to subscribe to positive RC except those earning Rs.10,000-25,000 (\$223-558) annually



(OR, 0.49; 95% CI, 0.21-1.17); although the lower limits of confidence intervals were all below one. Participants infected with HIV after 2005 were more likely to subscribe to positive RC than those infected prior to 2005 (OR, 3.07; 95% CI, 1.19-7.95).

Results of linear regression analyses between RC and QoL subscales are summarized in Table 2. All RC subscales were significantly correlated with overall QoL ( $\leq 0.01$ ). Furthermore, all RC subscales were significantly correlated with psychological, independence, and environment QoL domains ( $p < 0.05$ ). Only overall RC ( $\beta = .24, \leq 0.01$ ) and GAP-focused RC ( $\beta = .27, \leq 0.001$ ) were significantly

associated with the physical QoL domain. All RC subscales were negatively correlated with the social QoL domain; although, these associations were not statistically significant. Correlations between RC subscales and the spiritual QoL domain were not found to be statistically significant. Participants with lower annual incomes were more likely to use God-focused ( $\beta = -.31, \leq 0.001$ ) and GAP-focused ( $\beta = -.36, p < 0.05$ ) RC strategies. A more recent year of infection was associated with higher overall QoL ( $\beta = .22, p < 0.05$ ). In addition, participants having lower levels of education affirmed a higher physical QoL ( $\beta = -.19, p < 0.05$ ) and a higher spiritual QoL ( $\beta = -.32, \leq 0.001$ ).

**Table 1. Measurement scores across subgroups of HIV patients in Surat, Gujarat (n=160).**

Profile variable	Frequency		RC score (range 15-60)			QoL score (range 24-120)		
	N	%	Mean	SD	$\chi^2$ (P value)	Mean	SD	$\chi^2$ (P value)
<b>Socio-demographics</b>								
<b>Age (years)</b>								
< 30	36	22.5	41.1	7.1	106.0 (0.228)	62	6.6	261.6 (0.679)
30-40	84	52.5	44	7		63.9	5.8	
41-50	27	16.9	41.6	6.9		62.9	7.4	
>50	13	8.1	39.5	9.4		64	7.9	
<b>Sex</b>								
Male	119	74.4	42.7	7.5	43.0 (0.980)	63.3	6.6	192.9 (0.311)
Female	41	25.6	41.9	7.1		63.2	6.3	
<b>Education</b>								
Never graduated high school	132	82.5	42.7	7.4	99.2 (0.917)	63.9	6.6	421.5 (0.006)
High school graduate	13	8.1	44	6.9		63.3	6.3	
Some college education or trade school	10	6.3	47.6	6.8		63.8	6	
College graduate	5	3.3	48.8	3.6		58	5.5	
<b>Annual income (rupees)</b>								
< 10,000	87	54.3	46	4.5	131.1 (0.001) <sup>A</sup>	66.3	5	255.9 (0.472) <sup>B</sup>
10,000 – 25,000	35	21.7	41.8	7		59.3	5.2	
25,001 – 40,000	25	15.5	42.3	7.5		63	7.2	
> 40,000	13	8.3	42.6	9.9		59.4	4.8	
<b>Relationship status</b>								
Married	140	87.5	42.6	7.7	85.5 (0.832)	63.1	6.5	251.9 (0.876)
Single	16	10.3	42.9	5.3		64.2	6.8	
Widowed	4	2.6	42.5	7.8		63.8	7.3	
<b>HIV history</b>								
<b>Year of infection</b>								
< 2000	3	1.9	45	11.5	105.1 (0.002)	60.6	2.2	222.4 (0.035)
2000-2005	39	24.4	42.3	9.2		62.9	5.9	
>2005	118	73.8	42.7	6.8		63.2	6.8	
<b>Transmission route</b>								
Heterosexual	40	25	44.3	7.7	126.2 (0.627)	64.1	5.9	404.3 (0.093)
Homosexual	0	0						
IVDU	37	23.1	42.7	8.1		64.7	6.9	
Blood products	27	16.7	42	7.4		62.3	6	
Unknown	56	35.3	41.9	7.1		62.1	6.7	
<b>Clinical stage</b>								
Asymptomatic	156	97.5	42.4	7.6	24.7 (0.850)	62.9	6.4	102.2 (0.127)
Symptomatic	4	2.5	44.8	8.5		64.8	5.9	
AIDS	0	0						
Overall			42.7	7.4		63.2	6.6	

RC, religious coping ; QoL, quality of life ; SD, standard deviation ; IVDU, intravenous drug user.

<sup>A</sup> Differences in mean RC scores between income subgroups were statistically significant by one-way ANOVA ( $F(3,28) = 4.242, p = 0.018$ ).

<sup>B</sup> Differences in mean QoL scores between income subgroups were statistically significant by Welch's t-test ( $F(3,123) = 14.520, p < 0.001$ ).



**Table 2. Simple bivariate correlations between measurement subscales in a sample of HIV patients in Surat, Gujarat (n=160).**

Variable	Overall QoL	Physical	Psychological	Independence	Social	Environment	Spiritual
Overall RC	.39***	.24**	.43***	.26***	-0.11	.47***	0.08
God-focused	.23**	0.15	.25**	.17*	-0.12	.31***	0.07
Spirituality-focused	.27**	0.11	.37***	.16*	-0.06	.37***	0.03
GAP-focused	.38***	.27***	.37***	.25***	-0.08	.40***	0.07

RC, religious coping ; QoL, quality of life ; GAP, guilt, anger, and passivity.

\*p < 0.05 ; \*\* p d" 0.01 ; \*\*\* p d" 0.001

## DISCUSSION

Religious coping by individuals with HIV/AIDS has not been previously studied in India. This study is novel in that it investigates the relationship between specific RC subscales and various indices of QoL in a sample of HIV-infected Indians. Analyses showed that RC was associated with positive outcomes including: better scores on physical, psychological, independence, and environment QoL domains. Of note, only negative RC (GAP-focused) was associated with better physical QoL. Subscribers of negative RC (e.g. I try to make sense of the situation without relying on God) may rely on the opinion of their healthcare professionals more than subscribers of positive RC (e.g. I do what I can and place the rest in God's hands). We hypothesize that these individuals may be more adherent to their treatment regimens and their medical appointments, thus increasing their overall physical QoL. Other than this finding, and in contrast to many previous studies, there wasn't a significant difference in QoL outcomes between subscribers of positive and negative RC strategies.<sup>8-10,12</sup> In addition, only 55 (34.4%) participants were more likely to use positive rather than negative RC strategies. Previous studies conducted in the U.S. have reported a higher rate of positive RC than that reported here.<sup>17-18</sup>

Analyses showed that being younger, earning a higher annual income, being highly educated, and being HIV asymptomatic was not associated with a better overall QoL. In fact, education and QoL were inversely associated: participants with lower levels of education reported better physical and spiritual QoL. One possible interpretation is that participants with lower levels of education are more likely to work in more physically intensive careers and be less skeptical of the tenets put forth by their religious institutions.

There are inherent limitations to the present study. First, despite the fact that there is no reason to expect that the attributes of the participants should differ from

those of non-participants, the convenience sample was not representative of all HIV-infected patients at our study site, so these findings cannot be generalized to all HIV-infected patients in Gujarat. Second, data were collected from a single site, limiting generalizability to other regions of the state. Third, the cross-sectional design of the study could not establish causality between RC and QoL variables.

Religious coping may have both beneficial and detrimental outcomes in HIV-infected persons in India. First, this study attests that assessing the character of religious coping an HIV-infected individual utilizes is important. Furthermore, physicians and other healthcare professionals should be willing to incorporate RC techniques into a patient's treatment. Appropriate interventions may include discussing with the patient their religious/spiritual beliefs, referring to their priest or counselor, or referring for psychotherapy.<sup>18</sup> Second, the study results suggest that psycho-spiritual techniques that promote beneficial aspects of religious coping may positively impact the QoL of patients. However, prior research on such interventions is still in its infancy and additional research is needed.<sup>11,16</sup>

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# Histopathological Varieties of Upper Gastro Intestinal Malignancies with Prior Endoscopic Examination Followed by Biopsy

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## ABSTRACT

**Background:** Human gastrointestinal tract is long and tortuous. Endoscopy has evoked interest in combined approach- examination, cytology and biopsy. Present study reveals morphologic spectrum of malignancies diagnosed by endoscopic examination followed by biopsy from Jan 2004 to Dec 2006.

**Aims:** 1) To study age and sex distribution. 2) Endoscopic appearances and types of upper gastrointestinal malignancies. 3) Comparison with Indian and Western literature.

**Setting and Design:** This is partly prospective and partly retrospective study.

**Materials and Method:** Out of 701 endoscopic upper gastro-intestinal biopsies received with prior meticulous endoscopic examination, 241 were malignant. Biopsies were routinely processed and stained with haematoxylin and eosin.

**Results and conclusion:** Majority of cases were from esophagus and peaked in 40-70 years age group, males outnumbering females except in common bile duct malignancy. Interesting cases seen were; 1) oesophageal: basaloid carcinoma, basosquamous carcinoma, small cell carcinoma 2) gastric: mucinous carcinoma and papillary adenocarcinoma.

**Keywords:** Endoscopic Examination And Biopsy, Upper Gastro Intestinal Malignancies

## INTRODUCTION

Endoscopy is important landmark in management of gastrointestinal lesions. Rigid endoscopy provided visualization of proximal 40cms and distal 25cms.<sup>1</sup> Modern endoscopic instruments enable diagnostic cytology and biopsy under direct vision being safe, convenient and accurate. Basil I. Hirschowitz invented fiberoptic endoscope which was first constructed at Ann Arbor in 1957.<sup>2</sup>

## MATERIALS AND METHOD

Present study was observational over 3 years (Jan 2004-Dec 2006). Study groups were: symptomatic

patients (dysphagia, vomiting, hematemesis, abdominal lump, early satiety, weight loss, appetite loss), peptic ulcer cases and post-surgical (upper gastro intestinal) follow up. They were subjected to endoscopy and followed by biopsy. Material received was routinely processed and stained by hematoxylin and eosin.

## FINDINGS

Of 701 upper gastrointestinal biopsies received, 241 were malignant histopathologically with prior endoscopic visualization. It was observed that maximum cases occurred in 40-70 years age group. M: F ratio was 2.2: 1

**Table 1. Age distribution**

Age	Esophagus	Stomach	Duodenum	Anastomotic site
11 – 20	0	0	0	0
21 – 30	1	1	0	0
31 – 40	11	5	0	0
41 – 50	29	18	2	2
51 – 60	46	24	1	0
61 – 70	38	19	0	1
71 – 80	11	18	1	0
81 – 90	2	0	0	0
Total	138(60%)	85(37%)	4(2%)	3(1%)

**Table 2. Sex distribution**

Malignanc Site	Males		Females	
	No.	%	No	%
Esophagus	99	71.8	39	28.2
Stomach	53	62.3	32	37.7
Duodenum	2	50	2	50
Anastomotic site	3	100	0	0

**Table 3. Endoscopic Appearance**

Sites	Proliferative		Ulcerative		Ultero proliferative		Stricture or stenosis		Mucosal irregularity		Findings not mentioned	
	No.	%	No	%	No	%	No	%	No	%	No	%
Esophagus	83	62.4	2	1.5	18	13	10	7.5	2	1.5	23	17.3
Stomach	42	49.4	19	22.3	7	8.2	0	0	2	2.3	15	17.6
Duodenum	3	75	1	25	0	0	0	0	0	0	0	0
Anastom site	2	100	0	0	0	0	0	0	0	0	0	0

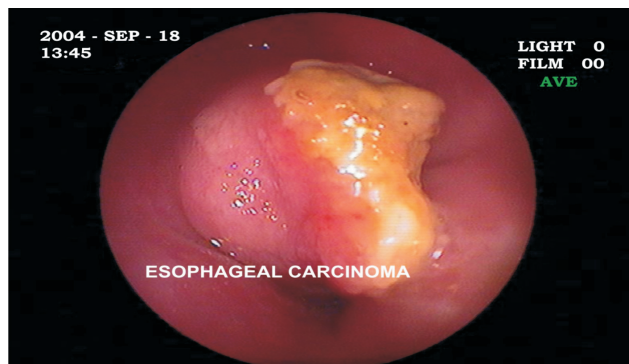


Fig. 1. Endoscopic view

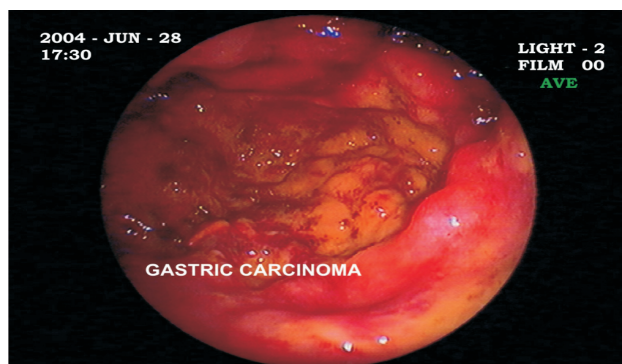


Fig. 2. Endoscopic view

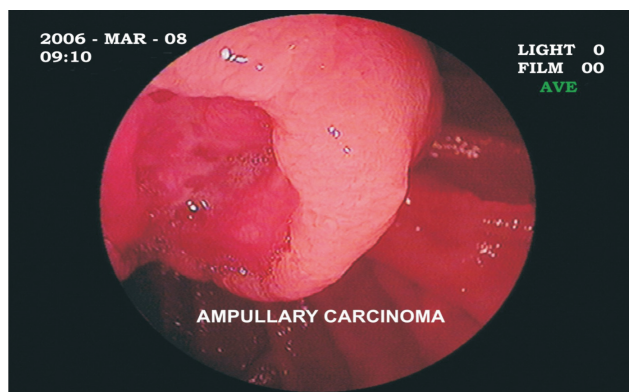


Fig. 3. Endoscopic view

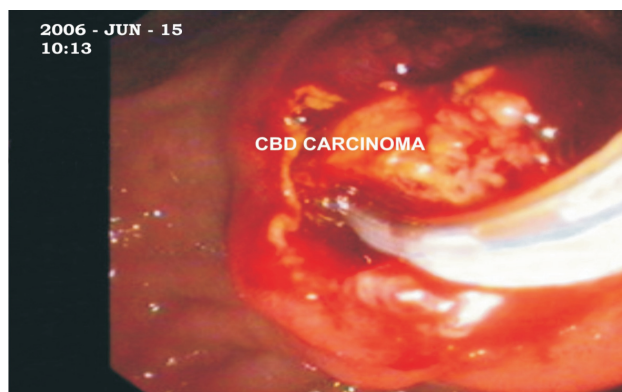
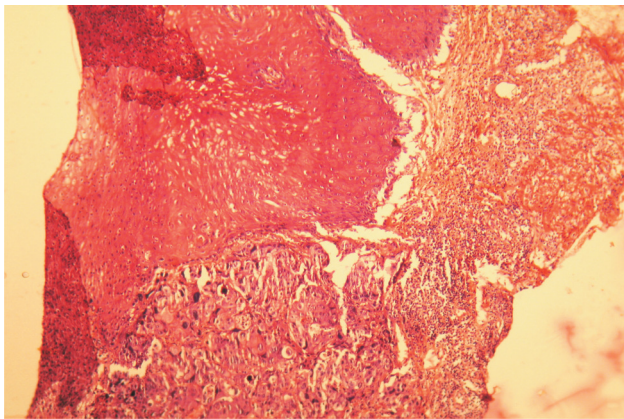


Fig. 4. Endoscopic view



**Table 4. Esophageal malignancies**

Histology	Number	Percentage
Squamous cell carcinoma	107	77.5%
Basaloid carcinoma	1	0.7%
Basosquamous carcinoma	1	0.7%
Carcinoma with few signet ring cells	1	0.7%
Poorly differentiated carcinoma	10	7.3%
Small cell carcinoma	1	0.7%
Adenocarcinoma infiltrating esophagus	14	10.2%
Papillary adenocarcinoma infiltrating esophagus	2	1.5%
Mucinous adenocarcinoma infiltrating esophagus	1	0.7%
Total 138 100%		

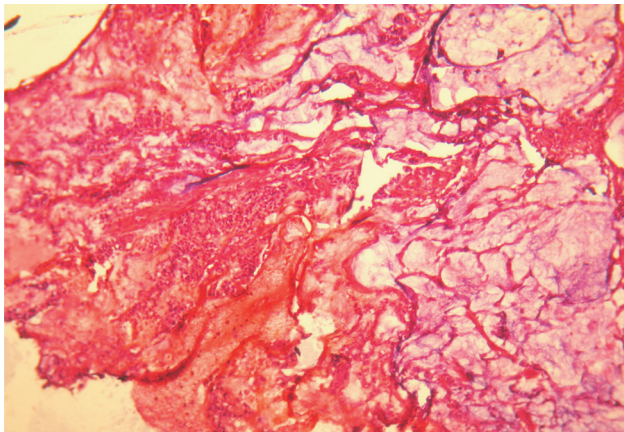


**Fig. 5. Squamous cell carcinoma esophagus**

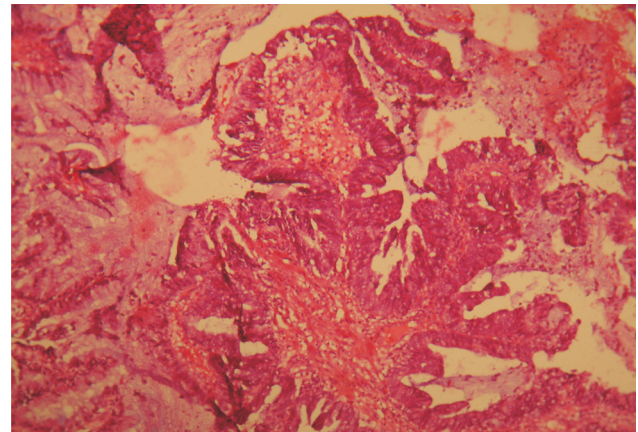
Oesophageal malignancies were observed as:33.3%(upper third), 34.5%(middle third) and 32.2%(lower third).Squamous cell carcinoma was commonest with superadded bacterial and candidal infection in two cases. We encountered three interesting cases- papillary adenocarcinoma, mucinous carcinoma infiltrating esophagus and primary small cell carcinoma. Differential diagnosis of Non-Hodgkin’s lymphoma and malignant melanoma was offered to latter: diagnosis was confirmed immunohistochemically.

**Table 5. Gastric malignancies**

Type	Number	Percentage
Early gastric carcinoma	1	1.2%
Intestinal	33	38.6%
Diffuse	40	47%
Mucinous carcinoma	3	3.6%
Papillary adenocarcinoma	2	2.4%
Non Hodgkin’s lymphoma(NHL)	2	2.4%
Squamous cell carcinoma infiltrating stomach	4	4.8%
Total	85	100%



**Fig. 6. Mucinous carcinoma stomach**



**Fig. 7. Papillary adenocarcinoma stomach**



Pylorus and antrum (50%) were most commonly involved by malignancy followed by cardia (40%), fundus (5%) and body (5%)-none revealed H.pylori. Unique variants reported were: papillary adenocarcinoma and mucinous carcinoma. Four duodenal malignancies were received-all were adenocarcinomas. Few patients gave history of upper gastro-intestinal surgery 10-15 years back for peptic ulcer or carcinoma, now coming with dysphagia or heart burn or loss of appetite. Three cases of anastomotic site malignancy were obtained on biopsy - adenocarcinomas (gastrostomy site-1 and gastrojejunostomy site-2).

Endoscopy has been a subject of rising interest. With the advent of fibre-optic endoscopy, there has been an alarming awareness and practice of procedures like brushing, washing, lavage, intralesional FNAC and biopsy-singly or in combination. The histopathologic distinction is of prime importance in deciding the further management. Bane et al<sup>3</sup> conducted study on upper gastro-intestinal tumours and found that males(67.7%)are more commonly affected than females(39.3%)-M:F=1.5:1. Mean age group being 40-50 years whereas Durrani et al<sup>4</sup> observed more commonly in 50-60 years. Our study is thus consistent.

**Table 6. Comparison table**

Site	Present study	Durrani et al <sup>4</sup>
Oesophageal		
upper third	33.3%	33%
middle third	34.5%	32%
lower third	32.2%	35%
Gastric		
cardia	40%	20%
Fundus	5%	0%
Body	5%	7%
Pylorus and antrum	50%	53%
Lesser curvature	0%	20%

**Table 7. Endoscopic appearance**

Oesophageal	Present study	Sidney Winawer et al (1975) <sup>5</sup>	K Vidyavathi et al <sup>7</sup>
1) Proliferative	60%	53.3%	95.7%
2) Ulcerative	1.4%	0%	4.3%
3) Ulcero proliferative	13%	0%	-
4) Stricture	7.2%	46.7%	-
Gastric	Present study	Sidney Winawer et al (1975) <sup>6</sup>	
1) Proliferative	49.4%	52%	77%
2) Ulcerative	22.3%	0%	23%
3) Ulcero proliferative	8.2%	0%	-
4) Mucosal irregularity	2.3%	0%	-
5) Infiltrating	0%	48%	-

Endoscopy-biopsy correlation was 90% in a study by Bane et al<sup>3</sup>, whereas we achieved 100% correlation. He also found squamous cell carcinoma as commonest oesophageal malignancy. Vidyavathi et al<sup>7</sup> also found the same on endoscopic oesophageal biopsy: squamous cell carcinoma 88.9%, adenocarcinoma 5.1% and adenosquamous carcinoma 6%.

Basaloid squamous cell carcinoma was first described by Wain et al in 1986. In esophagus; it is relatively new because it is confused with adenoid cystic carcinoma. Small cell carcinoma is differential diagnosis.<sup>8</sup> Mc Keown(1952) described 2 cases of primary esophagus small cell carcinoma which was first recognized as distinct clinicopathologic entity by Tateishi et al(1976).<sup>9</sup> Differential diagnosis were – poorly differentiated squamous cell carcinoma, lymphoma and carcinoid. Syed A Hoda et al<sup>10</sup> reviewed 4 cases -cellular moulding was observed focally. We report one case. Primary esophageal lymphoma is rare. 8 cases were reported in literature before 1993, 2 were reported by B G Taal et al<sup>11</sup> The reports of Ranieri and Spiegelberg represent the only occurrences of malignant melanoma metastasis in esophagus. Allen emphasised junctional naevus changes at periphery of lesion as histological criteria for primary malignant melanoma.<sup>12</sup> Garlock said -if on endoscopy and biopsy, an esophageal growth is adenocarcinoma, then that growth no matter at what level, has originated in stomach and spread proximally. Lewis stressed that adenocarcinoma may arise extremely rarely in esophageal glands. Smithers found that they constitute 8% of esophageal carcinomas. We reported incidence of adenocarcinoma infiltrating esophagus as 10.2%. J.G Azopardy separated esophageal adenocarcinoma into -histology similar to that seen in stomach, histology unusual in gastric carcinoma and type not found in stomach viz adenoid cystic carcinoma.<sup>13</sup> Muhammed S Shurbaji et al reported 15 cases of esophageal primary adenocarcinoma.<sup>14</sup> It was not seen in our cases. Masaki Mori et al studied 21 cases of early gastric cancer of cardia and found that endoscopically elevated and histopathologically well-differentiated types were more common here.<sup>15</sup>

**Table 8. Comparison table**

	Present study	Jaynul Islam et al <sup>16</sup> 2009
1) Early gastric carcinoma	1.2%	-
2) Adenocarcinoma	88.4%	26%
3) Mucinous carcinoma	3.6%	16%
4) Poorly differentiated adenocarcinoma	-	56%
5) NHL	2.4%	2%
6) Squamous cell carcinoma infiltrating stomach	4.8%	-

Present study recorded a lower incidence of early gastric carcinoma (1.1%) compared to Kawai et al (3.3%).<sup>17</sup> Our case was located in cardia, consistent with other studies. We got a lower I:D ratio (33:40=0.82%) compared to Sipponen et al (121:104=1.16%).<sup>18</sup> Munoz et al<sup>19</sup> were the first to report that intestinal type is more common in high risk areas whereas diffuse type is more common in low risk areas. India is low risk area.<sup>16</sup> Thus our results are consistent. In this series, higher percentage of antral malignancies (50.94%) was obtained compared to L. Witzel et al (maximum were from fundus and body-40.3% followed by antrum-38.5%).<sup>20</sup> We reported lower incidence (1.1%) of gastric lymphoma compared to studies by Dunn et al (7%) and Morrissey et al (8%).<sup>17</sup> It could be due to increases usage of antacids. Gastric primary T cell lymphoma was first described by Weis et al.<sup>21</sup> Maureen J. O'Sullivan et al analysed lymphoid lesions of gastro intestinal tract. Morphological features to diagnose lymphoma included: 1) Mucosal expansion with widening of inter glandular spaces. 2) Splaying of the muscularis mucosae by lymphoid infiltrates. 3) Permeation of epithelial crypts. 4) Additional features: follicle formation with poorly developed or absent mantle zones and absence of inter follicular plasma cells. Lesions demonstrating at least 3 of above - malignant. Those showing 1 or 2 - intermediate. Cases manifesting none - benign.<sup>22</sup> Both gastric NHL in our study showed first three features. In 1922, Balfour first described adenocarcinoma of gastric stump and defined it as: primary carcinoma arising from gastric remnant 5 or more years after surgery for benign peptic disease.<sup>23</sup> Christer Stael von Holstein et al followed up patients with gastric stumps by routine endoscopies and biopsies and concluded that -1) with persistent low or moderate grade dysplasia, yearly endoscopy for 2 years and biannually thereafter should be done. 2) severe dysplasia is an indication for close follow up. Endoscopy should be done every third month the first year and yearly thereafter.<sup>24</sup>

John Whiting et al<sup>25</sup> found single case in their study where patient underwent partial gastrectomy 17 years back. They concluded its incidence as 0.44% compared to 0.1% of general population. Rocco Orlando et al<sup>26</sup> presented 17 cases of post-gastroenterostomy gastric carcinoma about 18 years later. They found that they originated from gastric mucosa near stroma. Alkaline bile reflux, achlorhydria and bacterial colonization are possible causes. Hence they recommend endoscopy and biopsy of anastomotic site 10 years after partial

gastrectomy. Duodenal villous tumours are rare. Richard A Komorowski and Elsa B Cohen studied endoscopic biopsies of 4 patients with villous tumour showing adenocarcinoma and observed - secondary gland formation is a useful criteria of malignancy.<sup>27</sup> In our study, all were villous and 1 was from ampulla. Rolf Jorde et al observed the diagnostic accuracy for carcinoma detection through specimens obtained endoscopically as 86%. Hatfield et al have shown that the yield in ulcer slough is as high as from the rim. Methods to obtain tissue from common bile duct, during ERCP are preferable. Others being bile or pancreatic juice cytology, scrape cytology, Wire guided brush cytology, endobiliary or endopancreatic brushings and forceps biopsy. Cholangiocarcinoma is an uncommon malignancy in India compared to that of gall bladder.<sup>28</sup> Initial series emphasized disoriented or crowded cells in 3 dimensional groups, extreme nuclear enlargement and nuclear contour irregularity, but recently following criteria are devised.<sup>29</sup>

Lowa's criteria (1995): Nuclear moulding, chromatin clumping, and increased nuclear: cytoplasmic ratio

Japan criteria (Nakajima T et al 1994) : 3 or more of following: Loss of honey combing, enlarged nuclei, loss of polarity, bloody background, flat nuclei, cell-in-cell arrangement

Boston's criteria : Chromatin clumping, loss of polarity, nuclear molding

Overall assessment based on degree of atypia (Layfield et al 1995): Sufficient atypia to warrant a diagnosis of malignancy.

There are few limitations to arrive at final diagnosis like: representative site not targeted, difficult sites like gastric fundus, or antrum behind incisura, ulcer/fibrinous exudates, strictures/stenosis, early carcinoma. Cytological techniques are combined with biopsy because smears are prepared immediately and cells are well preserved, saves time, brushings can sample epithelial cells with reduced inter cellular cohesion (dysplasia and malignancy).<sup>30</sup>

## CONCLUSION

We received 701 endoscopic upper gastro-intestinal biopsy. 241 were malignant on histopathology. They peaked in 40-70 years age group, being more common in males. Only CBD malignancies were found in females. Most common endoscopic appearance of

malignancies was proliferative and highest number of cases were from esophagus. We reported some interesting esophageal malignancies like basosquamous carcinoma, basaloid squamous carcinoma and small cell carcinoma. Gastric malignancies were more common in pyloric antrum. Intestinal: Diffuse carcinoma ratio was 0.82. Uncommon gastric malignancies encountered were: mucinous carcinoma and papillary adenocarcinoma. We reported 4 cases of duodenal malignancies on endoscopic biopsy: all were adenocarcinomas. Diagnostic accuracy 100%. Our findings are in concordance with Indian and Western studies. Modern endoscopic procedures are useful in diagnosing cases which is challenging and fascinating. Also histopathologic distinction has therapeutic implication, thereby reducing unnecessary surgeries in many situations.

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# Study of Isolation of Acinetobacter Species from Urine Sample in Cases of Urinary Tract Infection

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## ABSTRACT

**Background:** Members of the genus *Acinetobacter* are ubiquitous in the environment. For long, this organism was considered to be non-pathogenic. In recent years, organisms of the genus *Acinetobacter* have increasingly been associated with hospital infection.

**Objectives:** To isolate and identify *Acinetobacter* species from cases suffering from urinary tract infection. To study the susceptibility of *Acinetobacter calcoaceticus* to various antibiotics

**Method:** Study included microscopic examination, Gram stain study, culture and biochemical analysis of urine samples obtained from 200 patients admitted in the hospital, with clinically suspected urinary tract infection.

**Results:** *Acinetobacter* was isolated from 5 (2.5%) urine samples from patients with urinary tract infection. Out of five isolates of *Acinetobacter calcoaceticus*, three were of var *boumanni* and two were of var *lwoffii*.

**Conclusion:** *Acinetobacter* should be considered an important etiological agent for urinary tract infection. Special effort may be needed for isolation and identification of this organism. But it is worthwhile, considering its ubiquitous distribution, multiple portals of entry and tendency to develop multi-drug resistance.

**Keywords:** *Urinary Tract Infection, Acinetobacter, Urine Culture, Antibiotic Sensitivity*

## INTRODUCTION

Members of the genus *Acinetobacter* are ubiquitous in the environment and can be found in the soil, water, food and sewage<sup>1,2</sup>. Numerous bacteria are present on the human skin, but *Acinetobacter* is the only Gram negative genus. *Acinetobacter* species can account for up to 30% of bacteria isolated from human skin<sup>3</sup>.

*Acinetobacter anitratum* has been found in the throats of about 7% of healthy, non-hospital personnel who have not received recent antibiotic therapy<sup>4</sup>.

Hospital environment and paraphernalia are also sources of this organism with 18% of environmental

cultures growing the organism<sup>5</sup>. In recent years, organisms of the genus *Acinetobacter* have increasingly been associated with hospital infection<sup>6</sup>.

For long, this organism was considered to be non-pathogenic, but Richard H Glew et al in 1977<sup>7</sup> reported that the organism caused variety of infections including septicemia, endocarditis, meningitis, brain abscess, lung abscess, urinary tract infections and post operative wound infections. Infections caused by *Acinetobacter calcoaceticus* are nosocomial. Catheterization and repeated instrumentation serve as portals of entry for this organism into the urinary tract. Obstruction to urinary tract acts as a predisposing factor. The usual clinical manifestations are urethritis, cystitis, acute or chronic pyelonephritis and septicemia.

*Acinetobacter* species are reported to be most often resistant to multiple antibiotics<sup>8</sup> which may be attributed to plasmids and transposons. Thus, the genus as a whole serves as a reservoir of the drug-resistant gene pool.

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In a general hospital set up where a large number of patients are admitted, it was thought worthwhile to see whether the problem of infection due to *Acinetobacter* exists or not. Therefore, the present study was conducted to study the incidence of infection due to *Acinetobacter* in the cases of urinary tract infection.

### AIMS AND OBJECTIVE

1. To isolate and identify *Acinetobacter* species from cases suffering from urinary tract infection
2. To determine the incidence of *Acinetobacter* infection in the cases of urinary tract infection
3. To see the age and sex wise occurrence of *Acinetobacter calcoaceticus* infection in the cases of urinary tract infection
4. To study the antibiotic susceptibility of *Acinetobacter calcoaceticus* to various antibiotics.

### MATERIALS AND METHOD

Study included microscopic examination, Gram stain study, culture and biochemical analysis of urine samples obtained from 200 patients admitted in the hospital, with clinically suspected urinary tract infection (symptoms like frequency and burning micturition).

Mid-stream urine samples were collected by proper instruction to the patients. Samples were transported to the laboratory immediately and subjected to various tests.

Microscopic examination of air dried drop of uncentrifuged sample followed by microscopic examination of Gram stained centrifuged sample was done to ascertain significant bacteruria<sup>9,10</sup>.

Samples were plated on blood agar and MacConkey's agar as per standard procedure and incubated at 37°C. significant bacteriuria was confirmed by colony count and the isolates were further identified using biochemical reactions as described by Gradwohl's clinical laboratory methods and diagnosis 1980<sup>11</sup>.

Colonies which appeared small, grey, smooth, opaque and non-haemolytic on blood agar were picked

up. Only non-lactose fermenting colonies were followed from MacConkey's agar.

Organisms which were Gram negative, capsulated diplococci on Gram staining were subjected to various tests.

Tests used for identification of *Acinetobacter* included motility, Gram stain, capsule staining, M.R test, fermentation of 1% glucose, 1% lactose, 1% mannitol, 1% sucrose, indol production, H<sub>2</sub>S production, oxidation of 10% lactose (agar slopes) and 1% glucose (Hugh-Leifson's medium), urease production, citrate utilization, oxidase, catalase, nitrate reduction test, triple sugar iron agar. Attempts were made to differentiate *Acinetobacter boumanni* from *Acinetobacter lwoffii* on the basis of 1% glucose oxidation.

Antibiotic susceptibility testing was carried out on isolates of *Acinetobacter boumanni* and *Acinetobacter lwoffii* by Kirby-Bauer disc diffusion method<sup>12</sup>.

### RESULTS AND OBSERVATION

**Table 1: Distribution of cases from which *Acinetobacter* species were isolated**

Age group(years)	No of cases studied	No. of cases which yielded <i>Acinetobacter</i> species (%)
21-30	65	1 (3.07%)
31-40	85	3 (3.52%)
41-50	50	1 (2.00%)
Total	200	5 (2.50%)

2.5% of the total cases of urinary tract infection could be attributed to *Acinetobacter* species, with predilection towards age group of 31-40 years.

**Table 2: Sex wise distribution of cases from which *Acinetobacter* species were isolated**

Sex	No. of cases studied	No. of cases which yielded <i>Acinetobacter</i> species (%)
Male	112	3 (2.67%)
Female	88	2 (2.27%)
Total	200	5 (2.50%)

In the present study, infection with *Acinetobacter* species was more common in males than in females.

**Table 3: Results of various tests performed on isolates of *Acinetobacter calcoaceticus***

Sl. No.	Name of the test	Acinetobacter calcoaceticus	
		Var boumanni	Var lwoffii
1.	Gram staining	Gram negative	Gram negative
2.	Capsule staining	Capsulated	Capsulated
3.	Motility	Non-motile	Non-motile
4.	MR test	- ve	- ve
5.	Fermentation of 1% glucose	- ve	- ve
6.	Fermentation of 1% lactose	- ve	- ve
7.	Fermentation of 1% mannitol	- ve	- ve
8.	Fermentation of 1% sucrose	- ve	- ve
9.	Oxidation of 1% glucose	+ve	- ve
10.	Oxidation of 10% lactose	- ve	- ve
11.	Indole production	- ve	- ve
12.	H <sub>2</sub> S production	- ve	- ve
13.	Urease production	Variable	- ve
14.	Citrate utilization	+ve	- ve
15.	Oxidase	- ve	- ve
16.	Catalase	+ve	+ve
17.	Nitrate reduction	- ve	- ve
18.	Triple sugar iron agar Alkaline slant/ neutral butt	+/+	+/+

Organism was isolated as a single isolate in 4 cases and one isolate recovered in association with *E. coli*. Colony count was proportionally more for *Acinetobacter calcoaceticus*

Urinary tract infections with *Acinetobacter calcoaceticus* were of mild nature. All the patients were febrile and were deemed to have cystitis without upper tract involvement. Urinary tract infection was the only demonstrable cause of fever.

All the 5 patients had undergone surgery and had in-dwelling catheters prior to the onset of infection.

Out of five isolates of *Acinetobacter calcoaceticus*, three were of var boumanni (formerly designated as anitratus) and two were of var lwoffii.

**Table 4: Antibiotic sensitivity of *Acinetobacter boumanni***

Sl. No.	Antibiotic	Sensitive	Resistant
1.	Amikacin	1 (33.3%)	2 (66.6%)
2.	Ampicillin	1 (33.3%)	2 (66.6%)
3.	cephotaxime	2 (66.6%)	1 (33.3%)
4.	Ciprofloxacin	2 (66.6%)	1 (33.3%)
5.	Gentamycin	2 (66.6%)	1 (33.3%)
6.	Norfloxacin	1 (33.3%)	2 (66.6%)
7.	Nitrofurantoin	3 (100%)	-
8.	Nalidixic acid	1 (33.3%)	2 (66.6%)

**Table 5: Antibiotic sensitivity of *Acinetobacter lwoffii***

Sl. No.	Antibiotic	Sensitive	Resistant
1.	Amikacin	-	2
2.	Ampicillin	-	2
3.	cephotaxime	2	-
4.	Ciprofloxacin	1	1
5.	Gentamycin	2	-
6.	Norfloxacin	1	1
7.	Nitrofurantoin	2	-
8.	Nalidixic acid	1	1

From the above tables, it is evident that 66.6% isolates of *A. boumanni* were sensitive to cephotaxime, ciprofloxacin, gentamycin and all isolates were sensitive to nitrofurantoin. 66.6% isolates were resistant to amikacin, ampicillin, norfloxacin and nalidixic acid.

Both isolates of *A. lwoffii* were sensitive to cephotaxime, gentamycin and nitrofurantoin. One isolate was sensitive to norfloxacin and ciprofloxacin. Both the isolates were resistant to amikacin and ampicillin.

## DISCUSSION

The ubiquitous organisms *Acinetobacter boumanni* and *Acinetobacter lwoffii* were considered as saprophytes usually found in soil and water. They were also found in hospitals in areas where there is moisture<sup>13</sup>. It has been well documented that saprophytic bacteria become opportunistic pathogens in debilitated patients. Commensal *Acinetobacter* causes endogenous infection when normal host defenses are lowered or patients may become exogenously infected after exposure to contaminated hospital environment. In hospitalized patients, infections may arise from several portals of entry, such as urinary tract, respiratory tract, skin, operating room, urinary catheters and numerous other sources.

To establish the etiological role of *Acinetobacter*, it is necessary to correlate the clinical findings, with isolation of the organism in its pure culture of isolation in large numbers in mixed growth and also in repeated samples.

In the present study, the organism was found to be Gram negative diplococcus, capsulated, non-motile, oxidase negative, and giving other biochemical reactions as already presented in the results section. The organism grew well on MacConkey's agar and blood agar. The colonies on MacConkey's agar were

non-lactose fermenting. There was no haemolysis on blood agar. In the present study, the morphology, growth on media and biochemical reactions were similar to those seen in studies by Gardner P<sup>14</sup>, Thong ML<sup>15</sup> and Ajay Bal et al<sup>16</sup>.

In the present study, infection occurred more in the age group of 31 to 40 years. Males accounted for 60% cases. Reuben Ramphal et al<sup>17</sup> found that average age of patient infected by *Acinetobacter* was 33 years and male:female ratio was 2.7:1.

In the present study rate of isolation of *Acinetobacter* from urine in cases of urinary tract infection was 2.5%. Harry R Elston<sup>18</sup> isolated 13 cultures of *Acinetobacter boumanni* in 1232 urine samples from cases of urinary tract infection. MM Pederson et al<sup>19</sup> isolated 16 strains of *Acinetobacter boumanni* and 8 strains of *Acinetobacter lwoffii* from urine samples over a period of two years.

Richard H Glew et al<sup>7</sup> showed that *Acinetobacter* was implicated in urinary tract infection in 5 patients over a period of two years. Three of the five patients had in dwelling urinary catheters prior to the onset of infection.

Steen Hoffmann et al<sup>20</sup> found *Acinetobacter* in 4% of patients with significant bacteriuria. Ampicillin, cephalosporin, chloramphenicol, erythromycin and streptomycin reported to be ineffective against *Acinetobacter*. DJB Ashley<sup>21</sup> reported that most strains of *Acinetobacter boumanni* (then called *Acinetobacter anitratus*) were resistant to sulphonamides, penicillins and chloramphenicol. Lt Col M R Rao et al<sup>22</sup> obtained 20 isolates of *Acinetobacter* from urine samples over a period of three years. All these isolates were multi drug resistant to varying extent.

Mishra et al<sup>23</sup> reported 8 strains of non-fermenting Gram negative bacteria from urine samples during one year of study of which five (6.7%) were *Acinetobacter boumanni* and three (11.5%) were *Acinetobacter lwoffii*. Most of these organisms showed multi-drug resistance pattern. It was found that *Acinetobacter boumanni* strains were mostly sensitive to tobramycin and gentamycin while *Acinetobacter lwoffii* was sensitive to tetracycline. Ajay Bal et al<sup>16</sup> reported 90% strains of *Acinetobacter* were sensitive to gentamycin, nalidixic acid and tetracycline.

In the present study, 80% isolates were sensitive to cephalexin and gentamycin and all isolates were

sensitive to nitrofurantoin. 80% isolates were resistant to norfloxacin and nalidixic acid.

The high rate of resistance to multiple drugs in environmental or commensal bacteria like *Acinetobacter* indicates R-plasmid acquired resistance<sup>24</sup>.

## SUMMARY AND CONCLUSION

In our study, *Acinetobacter* was isolated from considerable number of urine samples from patients with urinary tract infection. *Acinetobacter* should be considered an important etiological agent for urinary tract infection. Special effort may be needed for isolation and identification of this organism, in view of its non-fermenting nature. But it is worthwhile, considering its ubiquitous distribution, multiple portals of entry and tendency to develop multi-drug resistance. If laboratory personnel are aware of the causative role of *Acinetobacter* in urinary tract infection, and if they make little extra effort to isolate it, many cases of *Acinetobacter* infections are likely to be detected.

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# Estimation of Health Expectancy for Prevalence of Chronic Diseases in Silchar Town, Assam

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## ABSTRACT

**Back Ground:** Due to "epidemiological" transition in recent days, the burden of diseases has been shifted from infectious and injuries towards mostly non- communicable diseases, thus it becomes necessary to develop an estimator for the health status of the people that put equal importance to mortality as well as morbidity. Health expectancy is one such estimator. This phenomena lead us to estimate health expectancy for the period 2002-06 for non communicable diseases among the resident of Silchar town.

**Method:** Sullivan method is used for the of estimation of health expectancy by using life table and disease prevalence rate.

**Results:** The estimations revealed that in all ages females' health expectancies for chronic diseases altogether are higher than their male counter- part and these values are increases marginally more than the life expectancies. For diabetes, it is noted that males' health expectancies in all ages are lower than their female counterparts, where as for hypertension, except age at birth and above 65 years male health expectancies are lower than female counterpart.

**Conclusion:** The findings of this study will serve as guide lines for health workers and social scientists of this region to adopt different health development programmes for people.

**Keywords:** Epidemiology, Non-Communicable Diseases, Health Expectancy, Sullivan Method

## INTRODUCTION

As burden of diseases has been shifted from infectious diseases and injuries towards mostly non-communicable diseases, it becomes necessary to develop an estimator for the health status of the people that put equal importance to mortality and morbidity. Health expectancy is one such indicator which gives more emphasis on morbidity than on mortality thus changes in "epidemiology" of diseases have been reflected on the health expectancy. The concept of health expectancies as health indicators was proposed<sup>(14)</sup> and the first example was published in a report of the US Department of Health Education and Welfare<sup>(15)</sup>. Health expectancies measure both the quality and quantity of life. Instead of using life expectancy (LE) as the sole measure of health status, health expectancy partitions total life expectancy into years in good health and years in ill health. Falling death rates and projected increases in the number of people at older ages have becomes an important consideration both for individuals and in government

policies for the provision of social and health services for the elderly people. Healthy life expectancy (HE) is defined as expected years of life either in good or fairly good health or free from long standing illness. In most of countries, today, health expectancy has been used as the central summary indicator of population health status<sup>(3)</sup>. Health expectancy (or healthy life expectancy) is preferred to life expectancy as an indicator for population health status because it is based not just on mortality, but also on morbidity<sup>(1)</sup>. So health expectancy as an indicator of health status find due its importance.

Further it has been observed that, in this part of the world, we consider life expectancy as an indicator of health status of the population rather than health expectancy. Till now, no analytical study concerning the health expectancy of chronic diseases has been done in Assam in general and urban areas of Assam in particular. Study revealed that the expectation of life at birth for male and female of urban Assam are 58.9 years and 60.9 years respectively<sup>(13)</sup>. It is also



learnt from different studies that as expectation of at birth increases beyond 55 years then the chronic diseases like cancers, cardiovascular diseases and diabetes becomes prevalent and frequent <sup>(11)</sup> and <sup>(4)</sup>.

With the above discussions in view, here we intend to study health expectancy in response to the epidemiology of chronic diseases prevalent among the resident of Silchar town and which may provide relevant information to health workers for devising different health development programme for the people of this part of Assam.

Thus considering the importance of health expectancy as an indicator a lot of researchers has attracted towards its study and which include <sup>(10)</sup>, <sup>(17)</sup>, <sup>(7)</sup>, and <sup>(12)</sup> etc.

Silchar is an important town of South Assam. It is surrounded by hills in all sides. Manipur, Tripura and Mizoram are the neighbouring states. The structure of the population in this town is cosmopolitan. Population of Silchar town was 1,44,921 (as per census 2001) and which had increased to 1,58,700 (estimated) in 2006 and thereby results an increase of 12% of population during these tenure. The town is the nerve centre of business and corporate houses, so people of neighbouring states viz Mizoram, Tripura and Manipur are coming here for service and business. The increase of population in the town is a threat to the socio-economic, demographic and mainly to environmental factors. Moreover population increase possibly is the main cause for unplanned and unhygienic construction of residential areas in and around the town by the destruction of natural habitats. Besides increase of population, corporate houses and business are responsible for the increase of traffic vehicles and small scale industries and which pose threat to the environment of the town and thereby it becomes not conducive for human health. As such there is every possibility of outbreak of various communicable and non-communicable diseases in and around the town.

**Motivated by the above discussion, we adopt the following objective**

**OBJECTIVES**

To estimate the health expectancies for all chronic diseases together and also for selective chronic diseases like diabetes and hypertension for Silchar town for the year 2002-06.

**DATA BASE**

Data for the calculation of health expectancy is primary one. Data collection was done through the house holds survey among the resident of Silchar town during the period 2008-09. The primary objectives of data collection was to note down prevalence of diseases as well as death among the resident of Silchar town. Silchar is an important town of south Assam. There are 28 wards under Silchar Municipally Broad and all the wards are seems to be homogenous within themselves with respect to socio-economic, demographic and cultural factors. Considering words as strata, using stratified random sampling method from each ward 38 numbers of households are selected by simple random sampling method. Availability of current voters list helped us in selecting the households from the wards. For the purpose of data collection schedules were prepared. These schedules were pre tested before data collection. The questions in the schedules were prepared in accordance with diseases prevalent in this town viz. communicable and non-communicable diseases. In the data altogether 4234 respondents were included, out of which 2188 were males 2046 females.

**METHODOGY**

From the collected data first of all life table for males and females are constructed for the period 2002-06 by Greville method <sup>(8)</sup> and also using SRS based life table for Assam urban 2001-05. With the help of these life tables, health expectancies are estimated using the prevalence rate (nPa) for chronic diseases computed from the collected data. Here <sup>(15)</sup> is used for the computation of health expectancy

If nPa is the age specific prevalence of unhealthiness (expressed in proportion) then the health expectancy (ha) can be calculated by using the formula <sup>(1)</sup>

**Where,**

$$\sum_{a=0}^{a_{max}-1} n_n l_a (1 - .5_n q_a) (1 - _n p_a) + _n l_{amx} e_{amx} (1 - _n p_{amx})$$

$$h_a = \frac{\sum_{a=0}^{a_{max}-1} n_n l_a (1 - .5_n q_a) (1 - _n p_a) + _n l_{amx} e_{amx} (1 - _n p_{amx})}{_n l_a} : n = 5$$

q<sub>a</sub> = probability of death at he beginning of the interval.

<sub>n</sub>l<sub>a</sub> = number of survivors entering age group n.

e<sub>max</sub> = expectation of life at the beginning of maximum age interval.

<sub>n</sub>l<sub>amx</sub> = number of survivors at the beginning of the maximum age interval.

## RESULTS AND ANALYSIS

From the life tables for 2002-06, we have observed that the expectation of life at birth for males and females are 66.94 years and 67.86 years respectively. On comparison we noticed that females' expectation of life at birth is higher than males but their difference is below 1 year. From table (1) we have observed that health expectancy at birth for males and females for 2002-06 are 57.47 years and 59.60 years respectively. Thus we noticed that females' health expectancy at birth is larger than male counter part and their difference is more than the differences of life expectancy at birth and which is above 2 years. These higher values of health expectancy at birth for females are possibly due to the fact that females are more health conscious while males have higher smoking rates and much less exercises <sup>(16)</sup>.

**Table 1: Health expectancy (HE) for males and females 2002-06 for chronic diseases**

Health expectancy (H.E)			
Age	Males	Females	Differences of H.E.
0	57.47	59.60	2.13
5	56.35	58.96	2.61
15	46.85	50.0	3.15
25	37.52	40.50	2.98
45	20.56	22.50	1.94
55	13.97	16.90	2.93
65	9.00	9.20	.20
70+	7.27	7.00	-.27

**Tables 2: Life expectancy (L.E.) and health expectancy (H.E.) and their percentage differences for chronic diseases by (Sullivan method) for males and females for year 2002-06**

Age	Males			Females		
	L.E.	H.E.	Percentage difference	L.E.	H.E.	Percentage difference
0	66.94	57.47	13.99	67.86	59.60	12.15
5	66.34	56.35	15.05	69.29	58.96	14.90
15	56.88	46.85	17.63	59.91	50.0	16.46
25	47.63	37.52	21.23	50.64	40.50	20.02
45	30.21	20.56	31.94	32.29	22.50	30.29
55	21.78	13.97	35.85	23.81	15.90	33.29
65	16.85	9.00	46.58	16.57	9.20	44.20
70+	14.54	7.27	50.00	13.47	7.0	48.15

In the table (3) for selective ages life as well as healthy life expectancies with their percentage of differences for the year 2002-06 are presented for chronic diseases as a whole. We have observed from the table that in all ages' males and females healthy expectancies are decreasing but percentage differences of life and health expectancies are increasing. On careful examination of the results, it is found that in

Table 2 presents for selective ages health expectancies for males and females along with their differences for chronic diseases for the year 2002-06. From table, we observe that health expectancies of females are higher than the male counterpart except in the age 70years and above. This is possibly happens due to the well established fact that there are gender difference in health and mortality <sup>(2)</sup>. Women generally live longer than their male counterparts <sup>(9)</sup>. Further it is found that difference of healthy expectancies of males and females are higher in the age group 15-20 yrs and 25-30 yrs as well as in the age group 55-60 yrs. These higher differences occur may be due to the lower values of male health expectancy than their female counter parts. The lower values of health expectancy of males in the age group 15-20yrs and 25-30yrs occurs possibly due to the reasons that young generation males of these age groups are not aware of ill affect of smoking etc. which leads to various type of respiratory diseases, tuberculosis and asthma. Similar result is reported by <sup>(5)</sup>. Besides, higher differences of health expectancy of males and females in the age group 55-60 occurs may be due to the fact that male's of this age group mostly suffer from various degenerative chronic diseases like diabetes, cardiovascular, hypertension etc.

all ages the differences of life and health expectancies for females are lower than their males counter parts. This indicates that health expectancies of males have not been increased as life expectancy whereas females' health expectancy increases marginally more than that of their male counterparts. This is possibly due to the fact that women live longer than their male counter parts. Similar observations were reported by <sup>(6),(9)</sup>.

**Table 3 Life expectancy (L.E.) and health expectancy (H.E) and their percentage differences for diabetes (by Sullivan method) for Males and Females for the year 2002-06**

Age	Males			Females		
	L.E.	H.E.	Percentage difference	L.E.	H.E.	Percentage difference
0	66.94	62.49	6.64	67.86	64.92	4.33
5	66.26	61.53	7.25	69.29	65.60	5.34
15	56.88	52.03	8.52	59.90	55.5	7.32
25	47.63	42.70	10.35	50.64	46.5	8.12
45	30.21	25.47	15.69	32.29	28.4	12.05
55	21.78	18.30	16.20	23.81	20.7	13.15
65	16.88	13.33	20.89	16.57	13.90	16.20
70+	14.54	11.20	22.70	13.47	10.90	19.30

In the table 4 and 5 life as well as health expectancies for males and females with their percentage differences for diabetes and hypertension for the year 2002-06 are presented. We observe that health expectancy at birth for diabetes and hypertension for males (females) are found to be 62.49years (64.92years) and 62.60years (62.1years)

respectively. Further for diabetes, it is noted that males' healthy expectancies in all ages are lower than their female counterparts. For hypertension, except age at birth and above 65 years, rests in all the selective ages males' healthy expectancies are lower than their female counterparts.

**Table 4: Life expectancy (L.E.) and health expectancy (H.E.) and their percentage differences for hypertension (by Sullivan Method) for males and females for 2002-06**

Age	Males			Females		
	L.E.	H.E.	Percentage difference	L.E.	H.E.	Percentage difference
0	66.94	62.60	6.55	67.86	62.1	8.55
5	66.26	60.9	8.22	69.29	61.84	10.75
15	56.88	51.2	10.02	59.90	52.38	12.55
25	47.63	41.90	12.13	50.64	43.01	15.06
45	30.21	24.10	20.12	32.29	24.19	25.08
55	21.78	17.1	21.30	23.81	17.77	25.36
65	16.88	12.9	20.89	16.57	12.0	27.31
70+	14.54	10.90	25.25	13.47	9.50	29.52

From table 4 also we noticed that for diabetes percentage differences of life and healthy expectancies both for males and females increases with age. Further from table it is found that percentage differences of life and health expectancies for males are more than their female counterparts. This higher differences in male appear possibly due to the fact that prevalence of diabetes among males is more than the females. This may happen perhaps due to lack of physical activities among males in comparison to the stress faced by them.

From table 5, we also observed that for hypertension percentage differences of life as well as healthy expectancies of females are higher than their male counter parts. This indicates that healthy

expectancies of females have not been increased as that of life expectancy. But from table it is found that in all ages males health expectancies due to hypertension are lower than female counterparts except age at birth and above 65years. These lower values of health expectancies among male occur perhaps due to the higher prevalence of hypertension in males than females.

### CONCLUSION

From the estimated values of health expectancies, we noticed that health expectancies of females are larger than their male counter parts, although in certain cases female's health expectancies do not increase as life expectancy. The demonstration of these

phenomenons with respect to different diseases serves as a guide line to social scientist, public health workers and demographer of this region in adopting different health awareness programmes for the people.

**Conflict of Interests:** There is no conflict of interests.

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# Comparison of Nutrition Knowledge and Snacking Habits of Children from Schools Affiliated to Sate Education Board and Central Board of Secondary Education

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## ABSTRACT

**Background:** Food choices made by adolescents are influenced by many factors including peer and media influence. Lack of nutrition knowledge is also one of the reasons wrong food choices are made. Schools are encouraging place for children to learn healthy eating habits. However not all curriculum devote enough time and space for nutrition related education. The present study compares the nutrition knowledge and snacking habits of children following State board and the Central board Education system.

**Method:** Two schools, one following the State syllabus and one following the central syllabus (CBSE) and catering to middle income group children were selected for the study. All the study participants were children from the eighth standard. A pre-tested questionnaire was used to assess nutrition knowledge and snacking behavior, of the children.

**Results:** Children from the CBSE stream had significantly better knowledge (72.4%) regarding Proteins (sources and functions), Fats and also Micronutrients compared to children from the state board school (35.3%). Knowledge about micronutrients deficiencies was also significantly higher among students from the CBSE affiliated school (81.3% knew the consequences of vitamin D deficiency) when compared to (43.5%) Sate Education Board School.

Snacking habits of children in terms of junk food( bakery products) was not significantly different in both schools. Consumption of fruits and nuts was significantly higher ( $p < 0.05$ ) among CBSE students compared to Sate Education Board School. There were no statistically significant differences in height or mean Body mass index among the students in the two schools.

**Conclusion:** Nutrition knowledge and consumption of fruits and nuts was better among students from the CSBE stream of education.

**Keywords:**

## INTRODUCTION

Healthy eating habits begin with knowledge of making healthy food choices. Promoting healthy eating habits in young children may prevent various chronic health disorders in childhood and adult life, including obesity, diabetes, hypertension, cardiovascular disease, cancer and dental caries (WHO, 2002; Lobstein, Bauer, Uauy, 2004). Processed food are now a part of the

family diet in homes with children and adolescents, they also seem to be replacing healthy options of fruits, greens, milk and vegetables (Harnack, Stang, Story, 1999; Ferrante, et al. 1995; Hanley, et al 2000). Many habits are formed early in life and many life-long practices begin in adolescence, studying the nutrition knowledge and behaviour of this group is therefore important (Harvey-Berino, Hood, Rourke, et al. 1997) to educate on healthy food options. Schools provide the most effective and efficient way to reach children and their families (Perez-Rodrigo and Javier, 2001). While School-based educative programme's greatly influence children's behaviour towards healthy living these programme's do not form a part of the curriculum. Special efforts are needed to sustain these

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programmes. These programmes are unlikely to work well if they are not part of the school curriculum (Stuart and Achterberg, 1995). Nutrition education in schools can be a continuous process if it is a part of the curriculum. Also integrating nutrition education into curricular areas helps to resolve the problem of not having time to teach nutrition (Lytle, 1994).

The education system in our country varies according to Board of affiliation of the school. And each system follows its own thrust with regard to nutrition education. Schools in Andhra Pradesh follow the State Education Board syllabus (which will issue the Secondary School Certificate (SSC) on passing the X class board examination). There are some schools affiliated to the Central Board for Secondary Education (CBSE) and some to the Indian Certificate of Secondary Education (ICSE) syllabus. Most of the schools are (all government schools and some private schools) are affiliated to the Andhra Pradesh State School Education Board, while some private schools are affiliated to the central boards of ICSE and CBSE. The ICSE has been designed to provide an examination in a course of general education, in accordance with the recommendations of the New Education Policy 1986 (India), through the medium of English. The curriculum for CBSE is set by National Council of Educational Research and Training (NCERT). And the text books for the state board schools are published by the Andhra Pradesh State Council for Education Research and Training (APSCERT). Comparison of content of science text books (Subbarao et al 2011) of NCERT and APSCERT showed, that at least one chapter was allotted to nutrition in classes I to VII in NCERT books. There is no specific chapter on nutrition in high school text books. In the APSCERT science text books, special chapters on nutrition appear only in classes IV and V. It was also found that NCERT text books have colour visuals and tables whereas AP State textbooks had simple black and white line drawings.

The present study is exploratory in nature and was undertaken to assess the nutrition knowledge and snacking habits of adolescent school children studying in schools affiliated CBSE and AP State Education Board, to examine the difference in knowledge and practice if any, given that their school curricula and focus nutrition education are different.

## MATERIALS AND METHOD

Two schools of Hyderabad, one affiliated to CBSE and one following the State Education Board syllabus

respectively were selected. Both these schools catered to children from to middle income group (income of Rs10,000/- to 25,000/- per month). Sample size was 251. 128 children were from the State Education Board School and 123 children from a school affiliated to CBSE. All the students were from the eighth standard.

A pre-tested questionnaire was used to assess the nutrition knowledge of the adolescent boys and girls. The questionnaire was constructed based on the science curriculum of III<sup>rd</sup> to VII<sup>th</sup> class syllabus (Vijayapushpam et al 2004). The questionnaire had objective type of questions including true or false, match the following, fill in the blanks and multiple choice type of questions. These questions assessed knowledge about various types of foods, sources of various micro and macro nutrients, functions of these foods and the disorders caused by micronutrient deficiencies. Snacking habits of adolescents was also assessed using a questionnaire. Demographic information regarding parental education and occupation was also recorded. Anthropometric measurements of height, weight and body mass index of the students was assessed to compare the nutritional status of the children from both the schools. The questionnaires were administered in class room, in the presence of the class teacher and the investigators. Data were analyzed using descriptive statistics. Chi square and paired 't' test were computed to compare the nutrition knowledge of the students from both the schools. P value <0.05 was considered as significant difference.

## RESULTS

The mean age of the students from State Education Board School was  $13.2 \pm .52$  and that of CBSE affiliated School was  $12.9 \pm .61$ . Mean height was  $153.9 \pm 8.2$  and  $155.5 \pm 7.7$  respectively. The mean age and height of the children did not differ significantly. The mean weight of children from State Education Board School was  $44.1 \pm 10.0$  and central board was  $46.5 \pm 11.1$  the difference in the mean weight was significant ( $p < 0.05$ ).

Parental education and occupation was used as proxy for socioeconomic status. 'Father's occupation' was comparable among both the two schools. 43.3% of the children from the State Education Board School had fathers working in government sector while there were 39% in the CBSE affiliated School group. 39.4% (State Education Board School) and 48.2% (CBSE) fathers worked in private firms. 37% and 43% of them were professionals (Doctors, Engineers or Lawyers)

and 52 % (State Education board) and 57% (CBSE) were graduates. Nearly 75% of the mothers of children from both schools were home makers and 56% of them were graduates. Parental education and occupation were found to be comparable among these two schools.

60% of the students from State Education Board School and 50% from CBSE affiliated school were boys.

### NUTRITION KNOWLEDGE

Children’s knowledge regarding sources and functions of various macro and micro nutrients was assessed. Nearly 80% of the students from both schools had knowledge about carbohydrates and their functions, they were also aware of foods rich in carbohydrates.

**Table 1: Knowledge about Proteins and Fats**

Knowledge items Proteins and Fats	State Board School	Central Board School	P value
Body building foods	35.3%(30)	72.4%(89)	.001
Protein rich foods	56.5%(48)	73.8%(90)	.007
High Fat foods	43.5%(37)	81.3%(100)	.000
Foods with trans fats	40.0%(34)	61.8%(76)	.002

There were significant differences between the two schools (Table 1) in knowledge about proteins and fats. Results show that children following the central board syllabus had significantly higher knowledge regarding

sources and functions of protein; they also had significantly higher knowledge regarding foods that have high fat content, and foods that contain Trans fats compared to children following the state syllabus.

**Table 2. Knowledge about micronutrients**

	State Board School	Central Board School	P value
Main sources of micronutrients	95.3%(81)	95.9% (118)	*NS
Sources of Vit A	56.5% (48)	67.5% (83)	NS
Sources of Calcium	89.4%(76)	87.8%(108)	NS
Mineral for bone strength	72.9% (62)	83.7% (103)	NS (.06)
Sources of Vit C	31.8% (27)	44.7% (55)	NS (.06)
Sources of Vit B	30.6% (26)	51.2% (63)	.003
Rich source of iron	72.9% (62)	72.4% (89)	NS

\*NS- Not Significant

Knowledge about the sources of various micronutrients and their function was comparable among both schools. However children from CBSE affiliated school had significantly higher knowledge

regarding sources of vitamin B. We also see higher (trend 0.06) knowledge regarding Calcium and Vitamin C, among children from the CBSE affiliated School.

**Table 3: Knowledge about micronutrient deficiencies**

	State Board School	Central Board School	P value
Iodine Deficiency	50.6% (43)	69.1% (85)	.007
Vitamin D	43.5% (37)	81.3% (100)	.000
Vitamin A	60.0%(51)	87.0%(107)	.000
Vitamin C	35.3% (30)	66.7%(82)	.000
Iron Deficiency	4.7%(4)	42.3%( 52)	.000

Table 3 shows the results of knowledge regarding micronutrient deficiencies related disorders. Children from the CBSE affiliated school have significantly higher knowledge regarding the consequences of

various micronutrient deficiencies. Only 4.7% children from the State Education Board knew iron deficiency causes anemia compared to the 42.3% of children from the school affiliated to CBSE.

**Table 4: Behaviour- Fruits and Nuts consumption**

(Table 4 gives the % of children who do not consume the fruits and nuts listed below at least once a week).

Fruit & Nuts	State Board	Central Board	P value
Banana	26.6%	8.1%	p>0.05
Papaya	62.5%	63.4%	NS*
Orange	25.0%	17.9%	NS
Guava	43.0%	35.8%	NS
Apple	0	0	NS
Pomegranate	59.4%	33.3%	p>0.05
Almonds	47.7%	21.0%	p>0.05
Pista	71.1%	52.0%	p>0.05

\*NS- Not significant

Frequency of consumption of fruits and nuts by children was assessed. Children from both schools reported that they consume fruit. Consumption pattern varied from (1) *daily*, (2) *once or twice a week* to (3) *not eating even once a week*. Table 4 gives the percentage of children who do not eat fruits or nuts at least once a week. Percentage of non consumption of fruit was significantly higher among children from state board school. Banana was not consumed by 26.6% of the children from state board compared to 8.1% of children from school affiliated to CBSE. Nearly 63% of children from both the schools did not eat papaya (at least) once a week (most children reported they do not like papaya). Fewer children from the central board did not consume pomegranate (33.3%) compared to 59.4% of children from state board school. All the children reported that they ate an apple at least once a week. Consumption of nuts was also significantly higher among children from the central board school when compared to the state board school. Nearly 80% of the children from the central board school said they ate two to three almonds every day. Children from both schools reported that they eat ground nuts almost every day as it was added in various preparations or in form of *chutney*.

It was noted that the consumption of junk foods (chips, wafers or other bakery products) was not high among these children. In all about 36% of children said they eat bakery products (puffs, pastries etc) and 15% of the children said they eat street food occasionally (once a month). Most of the children said they do not consume any aerated drinks.

## DISCUSSION

This exploratory study shows children studying in the school affiliated to CBSE have better nutrition

knowledge compared to children from State Education Board School. The knowledge of the children is in tandem with the education they receive in schools. CBSE syllabus has more content on nutrition and the present study shows that children following this syllabus have better knowledge regarding nutrition and consequences of micronutrient deficiencies; it was also found that healthier food habits like, consumption of fruits and nuts was better among children from the CBSE School compared to the children from the state board school.

Socioeconomic status was not assessed in detail (only parental occupation, education and monthly salary were recorded and both schools were comparable on these variables). However these responses were reported by the student themselves hence it may not be totally accurate. This is a limitation, as purchasing power determines the consumption of various foods. The low consumption of junk foods (bakery products) could also be because these schools cater to middle income group children, the children usually do not bring money to school and even if they do it is a very small amount. Another factor could be the fact that both these schools did not have canteen facility.

The better nutrition knowledge and practice of the CBSE students can further be attributed to the school curriculum as parental education which could influence nutrition was comparable among both the schools.

Conclusion: This exploratory study though had a relatively small sample size showed children following CBSE syllabus had better nutrition knowledge and practice compared to those following the State board syllabus, the difference was mainly seen in knowledge

about micronutrient deficiency disorders and consumption of fruits. A more comprehensive approach to nutrition education is needed to help children have an early start in making the right food choices.

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# Qualitative Assessment of Targeted Interventions (TI) Project for Truckers and Migrants for HIV/AIDS Prevention and Control, Himachal Pradesh, India

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## ABSTRACT

Qualitative assessment of Targeted Intervention (TI) program is important for program effective operationlization.

**Method:** Qualitative assessment of TI staff was made of 5 TI for truckers and 3 for migrants using semi-structured open ended questionnaire.

**Results:** TI staff has adequate disease knowledge. Incomplete Record maintenance, non use of checklist for interpersonal communication and Condom stock outs along with absence of condom depot signboards was observed in most of the TI sites.

**Conclusion:** Non adherence to programmatic tools like interpersonal communication checklist and poor records management explains condom stock out and incorrect demonstration.

**Keywords:** Qualitative, Targeted Intervention, Trucker, Migrant

## INTRODUCTION

Bridge population group, trucker and migrant plays an important role in disease spread form high risk like female sexual worker (FSW) and Intravenous drug user (IDU) to general population due to endorsement of high risk behavior. Developmental activities like industrialization in almost every state of India lead to increase movements of trucker and migrant across the geographic boundaries. These groups have been targeted for preventive and promotional activities to reduce high risk behavior under the targeted intervention (TI) program in India. Government of India and its development partners spend an average US \$104 (INR4680) per HIV infection averted and US \$10.7 (INR483) per DALY averted. <sup>(1)</sup> Activities are being delivered with involvement of non-governmental organizations (NGOs) under national AIDS Control Program (NACP) in India considering the best mode to reach out to these socially marginal groups. These NGOs receive financial grants from the state AIDS control societies (SACS) in all the states. Like every state in India the Himachal Pradesh state

has also undergoing developmental activities with influx and efflux of trucker and migrants.

Identification and sustained interaction with the all the stakeholders is key to success. Qualitative research helps to understand the social and behavioral determinants of target population provide more insight to health issues and further helps to redesign the project activities. It also address the functioning of NGOs and help to design the interventions more effectively.<sup>(2,3)</sup> A qualitative study was planned in the in order to assess the level of awareness among TI staff; to assess the basic infrastructure to deliver the preventive and promotive services to trucker and migrant in the state.

## METHOD

As per 2001 census, Himachal Pradesh state with population of 60,77,248 spread across 55,673 km<sup>2</sup> and almost all (90.0%) of population resides in rural area. TI projects were started in year 2001-02 through involvement of 9 NGOs over six districts. Five TI



projects were allocated for interventions among truckers and four among migrant population. Evaluation of these projects was carried out in January and February 2003 with structured and pretested questionnaire. Knowledge and awareness towards disease and project activities of project coordinator, outreach worker, peer educator and condom depot holder was assessed qualitatively. Evaluation was carried out by a team of faculty member (1), resident (1) and interns (2) of department of Community Medicine, Indira Gandhi Medical College, Shimla after one day training. Team visited all the NGOs as per pre-decided dates for onsite interview with project staff and observation of activities.

The samples for migrant population were completed from different focal points of construction sites at Bhawanagar, Karchham and Chamera projects in case of migrant population. At Kala Amb, this number was proportionally drawn from different factories. Respondents were interviewed consecutively till the number was completed. For truckers, the sample was completed proportionally from each truck union in the area. In case of only one truck union, the whole sample was drawn from one area. Due representation was also given to the cleaners of the trucks. Interviews were conducted consecutively to complete sample size.

Secondary stakeholders were selected from the list of intervention sites was obtained from the NGO. The sample size was completed by allocating quota to each of these units using nonrandom quota sampling method. Beside this, other persons were also interviewed who were indirectly related to these projects. They were Management staff of construction companies and factory owners; truck union management, truck owners, and opinion leaders in the area and health staff. Their views were ascertained to track the functioning of NGO and achievements regarding enabling environment in the area of operation. District AIDS Program Officers were also contacted to know their assessment regarding the activities of NGOs in their area

The TI- staff was assessed with specific checklist areas with subjective satisfaction of the team. Project coordinator assessed for 5, outreach for 9, peer educator 6 and condom depot holder for 7 variables. Therefore whole TI staff was assessed against 27 variables. The score of each TI staff member was calculated from common scale of 100 due different number of variables for comparison. Thereafter, mean

score for trucker and migrant TIs were calculated separately along with overall TI score. The difference of score between trucker and migrant TI was calculated by Mann Whitney U test.

## RESULTS

Total nine NGO were visited and the staff of one NGO working for migrant population could not be contacted. Overall mean TI score calculated for both the TI was 70.5, without significant difference ( $p=0.45$ ) between TI working for migrant (77.8) than trucker (63.3). Similar non-significant difference was observed among all the staff members working in TI truckers and migrants. Overall the knowledge of peer educator was observed to less in overall and separately for trucker and migrant TIs. Knowledge of condom depot holder was observed to be very less (48.6) than the migrant (76.2) TI and was non-significant (0.081) (Figure: 1). Stakeholders, truck union, key informants of migrants and district level of official was satisfied with the project activities of TIs.

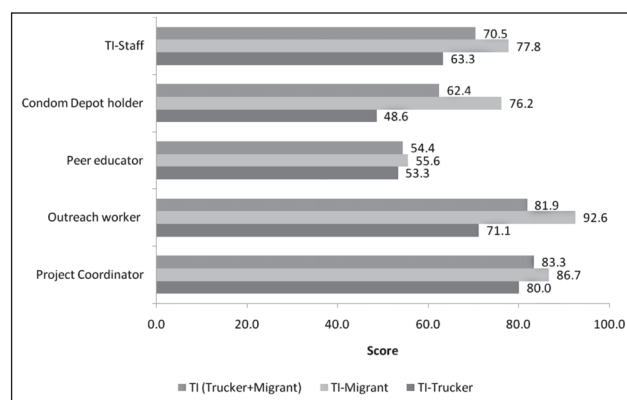


Fig. 1. Subjective score for Targeted Intervention (TI) project staff working for truckers and migrants in Himachal Pradesh, 2003.

Staff in most of the NGOs was regular since the start of the projects except at two sites. Project Coordinator had undertaken supervision of field workers regularly. Health checkup and sexually transmitted infection (STIs) diagnosis and treatment camps were also organized in all projects. Project staff, outreach workers and peer educators was observed with lack of knowledge of along with lack of orientation towards HIV/AIDS. Incorrect demonstration of correct use of condom, absence of signboard and IEC material at condom depots was also observed. Record maintenance by the peer educators, outreach worker and condom depot holders was found to incomplete at all the TIs despite their activities. Checklist was not being used during the interpersonal

and group meeting with workers at the site. Referred back cases of sexually transmitted infection were not being followed up by the TIs.

## DISCUSSION

Mobility and migration increases the vulnerability and high chances of HIV/AIDS transmission. Truck drivers and migrants together constitutes bridge population because of their reported high risk sexual behavior.<sup>(4)</sup> Bridge population has potential to further increase the epidemic by raising the size of sex worker, number of multiple sexual partners and raising the demand for sex. As mostly migrant and truck driver are male and remain alone and apart from unsafe sexual behavior they are also prone for substance drug abuse in oral and injectable form. Therefore, it becomes important to target this group in order to promote the safe sexual practices. National AIDS Control Program-phase II targeted these groups and extended the services to these groups through training and allocation of funds to NGOs. In India, the TI activities has been scaled up and improved across the India as an important strategy to reduce the disease transmission.<sup>(5)</sup> The number of TIs and condom distribution along with significant reduction in HIV and syphilis are reported in southern states of India.<sup>(6)</sup> The TIs reported to be cost effective<sup>(1,7)</sup> at all stages of HIV epidemic<sup>(7)</sup> and reduction of 47% (1.6 million) prevalent and 36% (2.7 million) cumulative HIV cases is expected by 2015.<sup>(1)</sup>

Documentation and presenting operational issues of program activities is key element. Gap assessment of knowledge attitude and practice (KAP) is an important to track progress towards objectives. Assessment of NGOs activities revealed a gap in knowledge attitude and behavior.<sup>(8)</sup> However, despite overall high score of 70.5 with satisfactory level of activities the observers and stakeholders, knowledge and practice gap was observed. Current study also revealed the inability to demonstrate correct condom use and sign board at condom depot at all the TIs.

Facilitating factors for effective activities like sustainable funding source, full time committed staff member, respectful treatment and appropriate motivation of the target group, suitable and sufficient equipment and supplies (particularly condoms), prior planning plays significant role in prevention and control of HIV and AIDS.<sup>(9)</sup> Present study observed full time committed staff with appropriate motivation. Activities checklist use and record maintenance was

not observed in the present study. As an important management tool it helps in self monitoring and supervision to assess the direction and timeliness of project activities. It expressed as major factor for irregular condom and financial supply. In addition, attention is required for strengthening formal networks, involvement of other social institutions, and efficient working with the public sector to create favorable policies for prevention and control of HIV/AIDS.<sup>(10)</sup> Current study recommended enhancing of checklist use, proper record maintenance, communication skills and involvement of local health functionaries in planning and operationisation of the activities.

## CONCLUSION

Progress of all these TI was found to be satisfactory with committed staff. Secondary stakeholders were satisfied with the TIs performance in the area.

## RECOMMENDATIONS

Quality of both interpersonal and record maintenance has to be ensured. Supportive supervision with on site skill building program needs to be initiated in the area.

**Conflict of Interest:** None

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# A Study on "Village Child Development Center (VCDC)" and its Role in Redressing Malnutrition Problem in Gadchiroli District, Maharashtra, India

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## ABSTRACT

**Objectives of the study:** To assess the instrumentality of VCDC (Village child development center) in improving malnutrition problem in Gadchiroli district.

**Methodology:** Village child development center is a unique health intervention to address malnutrition problem in the district and is operational since 2010. The district health office receives routine performance report of each VCDC from the peripheral units. It is analyzed at district level and feedback is being given to each unit. The present study is based on the analysis of the data collected at district health office from each peripheral unit wherever VCDC used to happen. In this study data of six months (July 2011 to December 2011) have been used.

**Observation and Discussion:** The study used data of six months from July 2011 to December 2011 for analysis. During these six months 13584 children have been admitted to 2271 VCDCs organized at various Anganwadi centers of the district and 10439 malnourished children gained improvement. Again 1828 severely acute malnourished (SAM) children were converted to moderately acute malnourished (MAM) children, 7677 moderately acute malnourished children regained their normalcy and 934 severely acute malnourished children regained their normalcy.

**Conclusion and recommendation:** Out of total severely and moderately acute malnourished children admitted to VCDC 76% got improved in total but still the individual indicators show a piteous picture and needs special emphasis. Simple and cost effective interventions like VCDC is definitely of great help in tribal districts like Gadchiroli to reduce malnutrition problem.

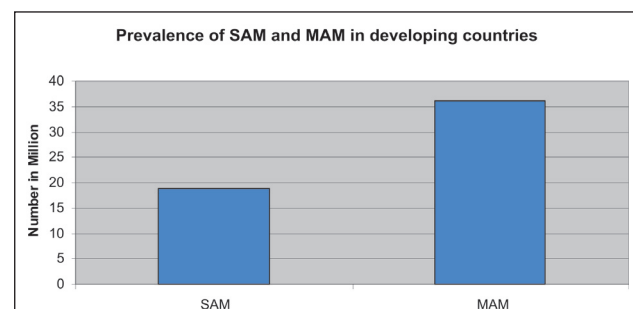
**Keywords:** Malnutrition, VCDC, SAM and MAM

## INTRODUCTION

Malnutrition is a major public health problem throughout the developing world and is an underlying factor in over 50% of the 10-11 million children under 5 years of age who die each year of preventable causes.<sup>16</sup> It continues to be one of the world's most serious development problems. It matters mainly due to Disease-Nutrition interaction and Economic/Productivity concerns.<sup>3</sup> It is "a pathological condition resulting from a relative or absolute deficiency or excess of one or more essential nutrients. It comprises four forms, such as under nutrition, over nutrition, imbalance and specific deficiency."<sup>15</sup> WHO has categorized malnutrition in to two different types, such as Severe acute malnutrition (SAM) and Moderate acute malnutrition (MAM). Severe acute malnutrition (SAM) is defined as weight-for-height measurement

of 70% or less below the median, or 3 standard deviation or more below the mean National Center for Health statistics reference values, the presence of bilateral pitting edema of nutritional origin, or a mid-upper-arm circumference of less than 110 mm in children age 1-5 years.<sup>2-5</sup>

Fig. 1. Prevalence of SAM and MAM in developing countries.



# Source- Black et al. Lancet 371:243, 2008.

As per the National Family Health Survey (NFHS) 2005-06 both chronic and acute under nutrition were found to be high in 7 states namely Haryana, Karnataka, Maharashtra, Orissa, Tamilnadu, Uttar Pradesh and Goa. Presently in India 48% of children under 5 years of age are underweight including 43% moderate to severe cases, 16% severe malnutrition, of those, 20% have moderate to severe wasting and 48% moderate to severe stunting.<sup>1-4</sup> Almost half the children in Maharashtra between one year and five years of age are stunted. One in six children is wasted and one in three is under weight.<sup>1-8</sup> The National Nutrition-Monitoring Bureau (NNMB) states that more than 40 lakh children are found with grade 2-4 malnutrition in Maharashtra. It seems high in tribal dominated districts such as Gadchiroli, Amravati, Yawatmal, Chandrapur, Bhandara, and Melghat etc. It is estimated that 82000 children die in rural area, 23500 in tribal area and 56000 in urban slums.<sup>9</sup> Though the problem is serious at every level, take it international, national or local still certain interventions can definitely be of great help in reducing the problem. A wide spectrum of cost effective interventions at the national, sub-national or community level have been undertaken to redress malnutrition. Interventions ranging from those to improve food intake or reduce nutrition inhibiting infection to those addressing underlying determinants of malnutrition can contribute to accelerating global progress in eliminating malnutrition.<sup>3</sup>

Village child development center is one of such simple interventions to reduce malnutrition burden in Gadchiroli district. It specially addresses children with severe acute malnutrition and moderately acute malnutrition. Anganwadi workers (AWW) supervised by their supervisors organize it at Anganwadi Centers. Children up to 6 yrs of age are admitted in VCDC and are kept for a period of one month. The SAM and MAM categorization is done by the help of WHO growth monitoring chart. AWW tells the importance of VCDC and impact of age wise height and weight growth on brain of by arranging meetings at village level. Services are made available as per VCDC guidelines. The AWW seeks medical help for any child getting sick during his/her stay at the VCDC and provide medication as instructed. She displays height-weight monitoring chart. A variety in taste of the food served is maintained keeping the ingredients unaltered to avoid boredom. Registration of children both in morning and evening is done everyday. Children's active participation in sports and other related activities is ensured. Height and weight is recorded at admission, every week and at the end with minimum clothing by the help of a valid and reliable weighing machine. The height and weight of a child is recorded up to one year after s/he leaves a VCDC to monitor his/her growth.<sup>6</sup>

**Table 1. Dietary regimen for 30 days (6M-6Y children).<sup>6</sup>**

Sl No	Time	Calorie requirement	Protein value	Diet	Quantity in Gram
1	8 AM	420 Kcal	08	Amylase rich flour preparation	100
2	10 AM			Anganwadi diet + 5 ML oil	
3	12.00			Anganwadi diet + 5 ML oil	
4	2 PM			Home based preparation	
5	4 PM	100 Kcal	04	One potato + one banana/ one egg + one banana	100
6	6 PM	420 Kcal	08	Amylase rich flour preparation	100
7	8 PM			Home based preparation	
Total		940	20		

# Children should be fed with sweet preparation in the morning and some bitter and pungent preparation (Upma) in the evening.

**Table 2. Ingredients for Upma (a semi solid gruel) preparation/Bitter prep.<sup>6</sup>**

Sl No	Ingredients	Quantity	Energy in Kcal	Protein	Apprx. Expenses in rupees
1	Milk	25 ML	33.3	1.8	0.60
2	Sugar	5 Gm	20.00		0.20
3	Amylase rich wheat flour	20 Gm	68.00	2.56	0.40
4	Amylase rich green gram flour	10 Gm	34.8	2.45	0.65
5	Ground nut	10 Gm	56.8	2.52	0.55
6	Sesame	20 ML	180		1.10
7	Oil	5 Gm	28.15	0.92	0.50
8	Chilly, turmeric, cumin, garlic, fennel etc.				0.20
9		95Gm	421.05	10.25	4.20

# Children are fed with above preparation in the evening



**Table 3. Ingredients for sweet preparation<sup>6</sup>**

SI No	Ingredients	Quantity	Energy in Kcal	Protein	Apprx. Expenses in rupees
1	Milk	25 ML	33.3	1.8	0.60
2	Sugar/Jagery	25 Gm	100.00		1.00
3	Amylase rich wheat flour	20 Gm	68.00	2.56	0.40
4	Amylase rich green gram flour	10 Gm	34.8	2.45	0.65
5	Oil	20 Gm	180		1.10
6	Sesame	5 Gm	28.15	0.92	0.50
7	Elaichi	As per taste			0.10
8	Water	As required			
9		105 Gm	444.25	7.73	4.35

# Children are fed with above preparation in the morning.

**Table 4. Medication prior to VCDC.<sup>6</sup>**

Medications prior to VCDC			
SI No	Name of the medication	Dosage	Time
1	Albendazole	1-2 yrs 200mg(5 ml) 2-3 yrs 400mg(10ml) 3-6 yrs 400mg(1 tab)	3 days prior
2	Vit A	Below 1 yr 1 ml, above 1 yr 2 ml	2 days prior
Initial 7 days			
3	Folic acid tab	1 mg	8.00 AM
4	Amoxicilin syrup	25mg/kg/day	10.00 AM-4.00 PM
For the whole month (30 days)			
5	Syrup Macalvit plus (Multi vitamin)	1 ml/kg/day	10.00 AM
6	Syrup Hovite RB	1-2 yr 2 ml-6 yr 4 ml	4.00 PM
7	Syrup Orofer XT	3mg/kg/day	6.00 PM

## OBJECTIVES OF THE STUDY

Seven in ten of child deaths are either due to ARI (Mostly Pneumonia), Diarrhea, Measles, Malaria or Malnutrition or a combination of these illnesses. In India malnutrition contributes the highest (43%) among these causes of child mortality.<sup>10</sup> Naturally malnutrition problem becomes an important issue for health department. The same is the case with Gadchiroli district and an intervention called "Village Child Development Center" is operational in the district to reduce problems with child malnutrition. At this point it was felt to conduct a study to: -

1. Assess the instrumentality of VCDC in addressing malnutrition problem in the district.
2. See the effectiveness of VCDC as an intervention measure.
3. Redesign, if required, its operational/ implementation strategy.

## METHODOLOGY

Village child development center is a unique health intervention to address malnutrition problem in the district and is operational in the district since 2010. The district health office receives the routine performance report of each VCDC from the peripheral units. It is analyzed at district level and feedback is being given to each unit. The present study is based on the analysis of the data collected at district health office from each peripheral unit wherever VCDC used to happen. In this study data of six months (July 2011 to December 2011) have been used.

## OBSERVATION AND DISCUSSION

The study used data of six months from July 2011 to December 2011 for analysis. During these six months 13584 children have been admitted to 2271 VCDCs organized at various Anganwadi centers of the district and 10439 (76%) malnourished children got improved. Again 1828 (15%) severely acute malnourished (SAM)

children were converted to moderately acute malnourished (MAM) children, 7677(18%) moderately acute malnourished children regained their normalcy and 934 (8%) severely acute malnourished children regained their normalcy.

**Table 5. Shows baseline Month wise data of total 0-6 yrs children, total children with malnutrition (both SAM & MAM) and total number of VCDCs completed in Gadchiroli district. (As per survey conducted on Aug. 2011)**

Sl No	Month	Total 0-6yrs children	Total SAM children	Total MAM children	Cumulative Total	Total VCDC
1	July 2011	90861	2467	9288	11755	114
2	Aug 2011	93734	1843	6545	8388	184
3	Sept 2011	93734	1843	6545	8388	355
4	Oct 2011	93734	1843	6545	8388	415
5	Nov 2011	93734	1843	6545	8388	561
6	Dec 2011	93734	1843	6545	8388	642
7	Total	559531	11682	42013	53695	2271

# The constancy of data from Aug. 2011 to Dec 2011 is due to one time survey in the month of Aug 2011 i.e., no survey was carried out till Dec 2011.

The baseline data shows constancy in the total number of children in the district from Aug.2011 to Dec.2011 based on the survey conducted in the month of Aug. 2011. The baseline data again shows an increasing trend of the number of VCDCs conducted during these six months. Table-6 also shows an increasing trend in improvement of children admitted in VCDCs and ranges from 53% to 83%. The improvement is appreciable and noticeable in-toto but is not the same with individual performance and as

far as regaining normalcy is concerned the picture is piteous. The salient observations in the study are as follows-

1. Total SAM to MAM- 15%
2. Total MAM to normal- 18%
3. Total SAM to normal- 8%
4. Total improvement-76%

**Table 6. Shows improvement in children with SAM and MAM after being admitted to VCDC in Gadchiroli district.**

Sl No	Month	Total number of children Admitted in VCDC	MAM to normal	SAM to normal	SAM to MAM	Total improvement	% of improvement
1	July, 2011	116	46	9	7	62	53%
2	Aug, 2011	735	341	29	123	493	67%
3	Sept, 2011	1543	799	106	210	1115	72%
4	Oct, 2011	2676	1417	240	344	2001	75%
5	Nov, 2011	4184	2479	275	555	3309	79%
6	Dec, 2011	4330	2595	275	589	3459	82%
7	Total	13584	7677	934	1828	10439	76%

### CONCLUSION AND RECOMMENDATION

The study clearly reveals an appreciable over all performance but the individual analysis shows a piteous picture. The improvement either in conversion of SAM to MAM or attaining normalcy from SAM or MAM is negligible. So the district needs to emphasize on activities, which would change the picture relatively better. Some of the possible recommendations may be-

1. As a cost effective intervention VCDC can be of great help in redressing malnutrition problem in a tribal district like Gadchiroli but it requires special emphasis on not only SAM children but also on MAM children because in both the cases the picture is piteous.
2. Regular sensitization training of AWWs to make them understand about the importance of VCDC

and malnutrition and upgrading their skills to appreciate SAM and MAM children properly on WHO growth monitoring chart.

3. IEC activities to aware the parents about the importance of VCDC and malnutrition.
4. Ensure proper implementation of VCDC at ground level by appropriate skilled supervisors.
5. Above all monitoring and evaluation of VCDCs at each level at regular intervals will make it a more use full intervention measure to mitigate malnutrition problem.

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# A Study on Cause of Death and Assessment of the Preventability of Infant Deaths in a Tribal Block of South Gujarat

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## ABSTRACT

**Introduction:** With decrease in IMR, it becomes important to find out cause of death and assess the preventability for each case of infant death. In India, data on the local prevalent causes of death in general and infant death in particular are virtually non-existent. No such community-based study has been undertaken in Gujarat. This study was carried out with objective of finding out cause of death and assessing the preventability for all infant deaths.

**Materials and method:** Study was conducted in 51 villages of 3 Primary Health Centers from a tribal dominated Taluka of South Gujarat. The study incorporated all the infant deaths occurred during 1st September 2004 to 31st August 2005. Data was collected in a designed verbal autopsy questionnaire by house to house survey and analyzed in Epi Info software.

**Results:** A total of 48 infant deaths were found. Out of 35 cases who sought treatment, in 9(28%) cases treatment was received from government health facilities. It was within half an hour in 13(37.2%) cases. 29(60.4%) infants died at home. The leading causes of death were low birth weight (45.8%), pre-maturity (31.3%), pneumonia (22.9%) and diarrhea (14.6%). In 75% cases death was preventable.

**Conclusion:** If all infant deaths were reviewed from a prevention assessment perspective, targeted and data-driven recommendations for prevention could be developed for each community, and then majority of deaths could be prevented. Sensitization of doctors and grass root health workers is must to revitalize the health system.

**Keywords:** *Infant Deaths, Cause of Death, Preventability*

## INTRODUCTION

Infant mortality rate (IMR) (infant deaths per 1000 live births) has declined in last decades in India (50) and in Gujarat (48)<sup>1</sup> though it is still high compared to developed countries<sup>2</sup>. With decrease in IMR, it becomes important to find out cause of death and assess the preventability for each case of infant death. Ideally, this should be carried out by a local review team on infant mortality for a selected local area.

Because when local teams review deaths, prevention strategies can be developed that best meet the needs of the local community.<sup>3</sup>

In India, data on the local prevalent causes of death in general and infant death in particular are virtually non-existent. To our best of knowledge no such community-based study has been undertaken in Gujarat. With this background it was proposed to undertake this study with objective of finding out cause of death and assessing the preventability for all infant deaths.

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## MATERIALS AND METHOD

Study was carried out in all 51 villages of 3 selected Primary Health Centers (PHCs) of a remotely located, tribal dominated block from a border district of South

Gujarat. Purposive sampling was done to select study populations keeping in mind the resources, feasibility, logistics and the availability of time. It was thought that population of 3 PHCs would be sufficient to meet the required sample size to fulfill the objective of the study. The study incorporated all the infant deaths, which occurred during selected one year period (from 1st September 2004 to 31st August 2005). Field based data collection was accomplished within three months period. The infant deaths in which the mother was daughter-in-law of the village only, were included in the study. The information regarding infant deaths was gathered through 4 sources namely health care system, Integrated Child development services (ICDS) scheme, Civil Registration System (CRS) and Investigator himself. The disparity in reporting infant death by various agencies during the same period and in the same study area is reported elsewhere.<sup>4</sup>Data collection was done through house to house visits in study area. For every infant death, interview was conducted at informant's house in the local language. First of all the purpose for study was explained to the informant and his/ her consent was obtained. Information was gathered by interviewing the available parent (preferably mother), on a designed verbal autopsy (VA) questionnaire - developed with the help of VA questionnaire of various agencies like WHO, SEARCH team, Centre for Global Research and Aga Khan foundation. The questionnaire comprised of two parts. First part dealt with the socio – demographic and epidemiological details of each infant death and second part aimed to ascertain the medical cause of infant death. Data was entered and analyzed with Epi Info 6.04 version software.

## RESULTS

A total of 48 infant deaths from the study area during one year period were found. Out of this, 19 (39.6%) cases were delivered in hospital. Treatment was sought during terminal illness in case of 35 (72.9%) cases comprising 81.8 % (27 out of 33) males and 53.3 % (8 out of 15) females.

Out of 35 cases who sought treatment, in 33(94.2%) cases, the child was taken to a private health facility either a private pediatric hospital or a local doctor. While in 9(28%) cases, treatment was received from government health facilities, but no case was taken for first or second consultation at PHC. 6 (17.1%) cases sought care from traditional healer and 3 (8.6%) cases were born in obstetrics hospital and died within few

minutes. Regarding action taken by health care provider at first consultation, 29.2 % infants were given some medicine on OPD basis. Another 10 (32.2%) infants were admitted for treatment, 11(35.4%) were referred after initial assessment or treatment and one case was immediately referred without examination (Table 1).

After first symptom was noticed, treatment was sought within half an hour in 13(37.2%) cases including hospital delivery cases. It was delayed by half to 3 hours and 3-24 hours in 8.6 % and 11.4 % cases respectively. Treatment was received after one day with maximum 30 days in rest (42.8%) cases. Mean and median interval between first symptom and seeking first level of care was 2 days and 4 hours respectively. Child survived after seeking treatment was less than one day in 22.9 % infant deaths. While in rest (77.1%) cases, child survived for one day or more including 45.7 % cases survived for 1-5 days. 29(60.4%) infants died at home and near one third (31.3%) deaths occurred at private health facility, whereas 6.2 % infant deaths happened at govt. health facility (all at CHC) and one case died during transport (Table 2).

Out of 13 cases that did not seek care, major reasons for no consultation were non- recognition of illness (23.1%), felt no need of consultation because of faith in home remedy (23.1%), lack of money (15.4%) and non-availability of doctor at health center (15.4%). 3 (23.1%) cases did not give any reason. Out of 35 cases that got consultation, 22(62.8%) did not set out for further consultation. Major reasons were death of child (40.9%), lack of money (22.7%), lack of improvement in condition by treatment (18.2%) and no hope for survival in 13.6% cases (Table 3).

The leading causes of death ascertained by verbal autopsy were low birth weight (45.8%), pre-maturity (31.3%), pneumonia (22.9%) and diarrhea (14.6%) including both acute watery and persistent diarrhea. Other common causes included neonatal sepsis (10.5%), malnutrition (10.5%) and birth asphyxia (8.4%). In 6 (12.5%) cases, no cause could be concluded. Each and every case of infant death was thoroughly investigated and on the basis of information like place of delivery, care and death; cause of death and treatment taken timely, preventability of death was classified as preventable (P), possibly preventable (PP) and non preventable (NP). It was found that in majority (75%) cases death was preventable either totally (62.5%) or partially (12.5%). While in one-fourth (25%) cases it was not preventable (Table 4).



**Table 1: Distribution of cases according to place of care during terminal illness and action taken at first consultation**

Characteristic	Infant deaths	
	No.	%
<b>Place of care during terminal illness* (N=35)</b>		
Traditional healer	6	17.1
Sub centre	2	5.7
Primary health centre	1	2.8
Community health centre	6	17.1
Private local doctor	12	34.2
Pediatric hospital	21	60.0
Obstetrics hospital	3	8.6
<b>Action taken at first consultation (N=31) **</b>		
OPD treatment	9	29.2
Admission and treatment	10	32.2
Refer after initial treatment	6	19.3
Refer after assessment	5	16.1
Immediate referral without examination	1	3.2

\*Multiple responses

\*\*Excludes 3 cases died within minutes after delivery in hospital, 1 sought care at traditional healer & 13 did not receive any type of care

**Table 2: Distribution of infant deaths according to time taken for treatment seeking, survival period and place of death**

Characteristic	Infant Deaths	
	No.	%
<b>Time interval between first symptom &amp; treatment seeking (N=35)*</b>		
Within hospital	4	11.4
< 30 min	9	25.8
30 min – 3 hrs	3	8.6
3 – 24 hrs	4	11.4
1 – 3 days	8	22.8
>3 days	7	20.0
<b>Survival period after seeking treatment (N=35)*</b>		
<1day	8	22.9
1 – 5 days	16	45.7
5 – 10 days	4	11.4
10 – 15 days	5	14.3
15 – 25 days	2	5.7
<b>Place of death (N=48)</b>		
Home	29	60.4
Private health facility	15	31.3
Government health facility (Community health centre)	3	6.2
During transport	1	2.1

\*Excludes 13 cases who did not go for any treatment

**Table 3: Distribution of infant deaths according to reason for no first/ subsequent consultation**

Reasons	No Consultation (N=13)*		No Subsequent Consultation (N=22)*	
	No.	%	No.	%
No reason	3	23.1	-	-
Home remedy (felt no need of consultation)	3	23.1	-	-
Did not recognize illness	3	23.1	-	-
Non-availability of doctor at health centre	2	15.4	-	-
Lack of money	2	15.4	5	22.7
Doctor denied hospital admission	1	7.7	1	2.8
Lack of time	1	7.7	1	4.5
Child died	-	-	9	40.9
Lack of improvement	-	-	4	18.2
No hope for survival	-	-	3	13.6
Lack of credibility of govt. hospital	-	-	2	9.1
Health provider's assurance	-	-	2	9.1
Distance of referral center	-	-	1	4.5
Faith in traditional healer	-	-	1	4.5

\*Multiple responses

**Table 4: Distribution of cause and preventability of infant death (N=48)**

Characteristic	Infant Deaths	
	No.	%
<b>Cause of infant death*</b>		
Low birth weight	22	45.8
Pre-maturity	15	31.3
Pneumonia	11	22.9
Neonatal sepsis	5	10.5
Acute watery diarrhea	5	10.5
Malnutrition	5	10.5
Birth asphyxia	4	8.4
Unspecified fever	2	4.2
Persistent diarrhea	2	4.2
Congenital malformation	2	4.2
Measles	1	2.1
Post neonatal sepsis	1	2.1
Post natal aspiration	1	2.1
Sudden death	1	2.1
No cause found	6	12.5
<b>Preventability of death</b>		
Preventable (P)	30	62.5
Possibly Preventable (PP)	6	12.5
Non Preventable (NP)	12	25.0

\*Multiple causes

## DISCUSSION

Out of 48 infant deaths, treatment was sought in 35 (72.9%) cases during terminal illness, which was comparable with Gujarat (57-73%)<sup>5</sup>. Infant was taken to a government health setup only in 9(28%) cases including 5 (14.3%) cases of first consultation from SC/CHC. It raises a very serious question about the role of PHC in infant care as none of the infant who died went there for any (first or second) consultation. In contrast to this, 55% cases received care from a government setup in a study from north India<sup>6</sup>.

On first consultation, 10 (32.2%) infants were admitted for treatment in pediatric hospital, but not a single case at government health facility. Other study<sup>6</sup> documented 30% admission of neonates for treatment in government hospital. 57.2% cases sought treatment within 1 day of noticing first symptom, which was less compared to 75% observed by others<sup>6</sup>. A study from Delhi<sup>7</sup> observed 61% first week deaths within 24 hours of recognition of illness, which might have been too a short time for effective interventions by care providers. However, median interval between first symptom and seeking care was 4 hours only in our study. Also, mean and median survival period for infants after seeking treatment were 5 and 2 days respectively. It showed that there was enough time for interventions in present study. 29 (60.4%) infants died at home. Reasons reported for no consultation (first/subsequent) reflects lack of awareness of illness, lack of positive experiences and lack of credibility of hospitals particularly of a government setup in tackling such cases.

The leading causes of infant deaths were low birth weight, pre-maturity, pneumonia and diarrhea consistent with a report by Government of India<sup>8</sup>. Other causes included neonatal sepsis, malnutrition and birth asphyxia. Studies from India<sup>9-11</sup> reported same findings.

Our study found that in majority (75%) cases death was preventable either totally (62.5%) or partially (12.5%). Research suggests that most infant deaths are preventable through interventions that have been proven efficacious.<sup>3,12</sup> Studies demonstrated dramatic success in reducing childhood mortality through home based care delivered by village health workers and suggested that the first line health and development workers could affect changes in maternal and child

care practices if they improved coverage, timing and informational content of their outreach to pregnant women.<sup>13-14</sup>

## CONCLUSION AND RECOMMENDATIONS

Present study showed that majority of infant deaths was preventable. Role of PHC and SC in providing health care was embarrassing; as care was not sought or provided from these centers despite enough survival periods to take appropriate interventions in most of cases. Sensitization of doctors and grass root health workers is must to revitalize the health system. If all infant deaths were reviewed from a prevention/needs assessment perspective, targeted and data-driven recommendations for prevention could be developed for each community, and then majority of deaths could be prevented. This can be achieved within the existing resources with same system and manpower.

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# Antenatal Care Scenario-A Study among Pregnant Women of Peri-Urban Area of Aligarh

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## ABSTRACT

**Background:** Antenatal care is of the four most important pillars of safe motherhood along with family planning, safe delivery, and essential obstetric care<sup>1</sup> The safe motherhood initiative proclaims that all pregnant women must receive basic professional antenatal care.

**Objective:** The study aims to assess antenatal care scenario among pregnant women of periurban area of Aligarh.

**Study design:** A community based study.

**Setting:** Field practice areas of Urban Health Training Center Department of Community Medicine, JNMCH, AMU Aligarh.

**Participants:** 200 pregnant women

**Sampling:** Purposive sampling method.

**Statistical Analysis:** Data analysed with Epi Info version 3.5.1. Percentages, and Chi Square Test used.

**Results:** Majority of pregnant women (75%) had more than one live issue. 58 (29%) pregnant women were registered for antenatal care ( $\chi^2=0.87$ , p-value>0.05). 33(16.5%) of total pregnant women had three or more antenatal checkups ( $\chi^2=0.33$ , p-value >0.05). Whereas 25(12.5%) of total pregnant women had less than three antenatal checkups ( $\chi^2=0.41$ , p-value>0.05). 13(7.5%) pregnant women received Iron Folic Acid(IFA) supplement for equal or more than 3 months ( $\chi^2=0.08$ , p-value>0.05). 45(22.5%) pregnant women received IFA supplement for less than 3 months ( $\chi^2=0.72$ , p-value>0.05). Tetanus Toxoid (TT) immunization coverage (2 doses) was 43.5% ( $\chi^2=0.18$ , p-value>0.05). 67 (33.5%) pregnant women received only single dose of TT immunization ( $\chi^2=0.20$ , p-value>0.05).

**Conclusion:** It was concluded that the overall antenatal care level was poor in peri-urban area of Aligarh.

**Keywords:** Pregnant women, antenatal care, Iron Folic Acid (IFA) supplement, Tetanus Toxoid

## INTRODUCTION

The National Population Policy 2000 (NPP-2000) envisages the goal of 100 percent registration of

pregnancy, 80 percent institutional deliveries and 100 percent deliveries to be conducted by trained staff/ birth attendant by the year 2010<sup>2</sup>. Reproductive & child health program<sup>3</sup> recommends that as a part of antenatal Care, women should get registered & receive at least three antenatal checkups which include weight and height measurement, blood pressure records, abdominal examination along with General Physical Examination and investigations to detect any complication. It also includes provision of two doses of tetanus toxoid vaccine, 100 IFA tablets prophylactically to prevent anemia, dietary advice, intranatal and postnatal care which includes, new born care, family planning etc <sup>4</sup>.

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The antenatal care a woman receives can have a strong influence on her newborn's health and potential for survival. In recent years, research has shown that a narrower range of services during fewer visits can also improve maternal and newborn health. It is found that antenatal care programs could have a positive impact on newborn health if they include measures like TT immunization, IFA supplementation, consumption of balanced amount of energy and protein, educate women about the importance of immediate and exclusive breastfeeding<sup>[5]</sup>. In India 77% of women received the recommended three or more antenatal checkup and for urban area it was 91%. In Uttar Pradesh, 67% women received the recommended three or more antenatal checkup and for urban area it was 91% (NFHS-3). So the present study was carried out to assess antenatal care scenario among pregnant women of periurban area of Aligarh.

## MATERIALS & METHOD

The present study community based study was conducted in the field practice area of the Urban Health Training Centre, Department of Community Medicine, Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh, Uttar Pradesh. The Urban Health Training Center (UHTC) of the Department of Community Medicine is located 2 Kms away from the medical college on the Qila road. The area is basically a peri-urban area situated on the outskirts of the city. The subjects included in the study were residents of four registered areas of the urban health training center. Urban Health Training Centre caters a total population of 11199 at the start of the study. There were four slums i.e. Firdaus Nagar, Nagla Qila, Patwari ka Nagla, and Shahanshabad under UHTC. Out of these 4 areas, 2 areas (Firdaus Nagar, Nagla Qila) were chosen for group A and the other 2 areas (Patwari ka Nagla, Shahanshabad) served as group B. The population in this area was relatively stable and allowed for follow up visits. Approval for study was passed from the institutional board of study meeting. Purposive sampling i.e. nonrandom sampling to include subjects that serve the specific purpose was used. Two hundred pregnant women as observed from the previous records were chosen for the study.

Exclusion criteria were high-risk pregnant women, pregnant women who opted to deliver outside Aligarh. Ethical considerations are local cultural values and

ideas were respected. Confidentiality was assured. All pregnant women were approached individually and an informed consent was taken before collecting data. Proper management or referral was given to women who were found to have any health problem.

A house to house visit was made to get the information about pregnant women till 200 pregnant women were enrolled in the study (purposive sampling). The data were collected by using pre-designed and pre-tested semi structured questionnaire. It included information regarding identification, socioeconomic status, and antenatal care. Socioeconomic status was assessed using Modified Kuppusswami Scale<sup>7</sup>. Data entry and statistical analysis were carried out using software Epi Info version 3.5.1. Epi Info is a series of freely distributable programs for use by public health professionals in conducting outbreak investigations, general database and statistics applications. Significant difference was determined using Chi-square test. Chi-square test is a non-parametric test, tell about whether it significant or not P-value was calculated using chi-square test and difference was accepted significant at more than 95% (p-value <0.05).

## RESULTS

83% pregnant women were in the age group of 15-30 years 17% in the age group of 31-45 years ( $\chi^2=1.3$ , p-value->0.05). Most of the pregnant women (90%) were Muslim and rest of them belonged to Hindu community ( $\chi^2=13.08$ , p-value-<0.05). 75% of pregnant women were illiterate ( $\chi^2=0.97$ , p-value->0.05). Education of husbands of pregnant women was also low i.e. 54% illiterate ( $\chi^2=3.70$ , p-value>0.05). Majority of the families (64.5 %) were nuclear. 99% pregnant women were housewives. 48.5% pregnant women were belonged to upper lower class according to Modified Kuppusswami Scale of socio-economic status (Table1). Majority of pregnant women (75%) had more than one live issue. 58 (29%) pregnant women were registered for antenatal care ( $\chi^2=0.87$ , p-value>0.05). 33(16.5%) of total pregnant women had three or more antenatal checkups ( $\chi^2=0.33$ , p-value >0.05). Whereas 25(12.5%) of total pregnant women had less than three antenatal checkups ( $\chi^2=0.41$ , p-value>0.05). 13(7.5%) pregnant women received IFA supplement for equal or more than 3 months ( $\chi^2=0.08$ , p-value>0.05).



45(22.5%) pregnant women received IFA supplement for less than 3 months ( $\chi^2=0.72$ , p-value>0.05). Tetanus Toxoid (TT) immunization coverage (2 doses) was 43.5% ( $\chi^2=0.18$ , p-value>0.05). 67 (33.5%) pregnant women received only single dose of TT immunization ( $\chi^2=0.20$ , p-value>0.05) Table III.

Table I: Demographic profile of pregnant women

Variables	Group A N=100	Group B N=100
<b>Age group</b>		
15-30	86	80
31-45	14	20
$\chi^2=1.3$ , df=1, p-value->0.05		
<b>Religion</b>		
Hindu	02	17
Muslim	98	83
$\chi^2=13.08$ , df=1, p-value-<0.05		
<b>Education of pregnant women</b>		
Illiterate	78	72
Up to high school	16	20
Above high school	06	08
$\chi^2=0.97$ , df=2, p-value->0.05		
<b>Education of husband</b>		
Illiterate	59	49
Up to high school	37	41
Above high school	04	10
$\chi^2=3.70$ , df=2, p-value>0.05		
<b>Occupation of pregnant women</b>		
Housewife	100	98
Unskilled	00	02
<b>Occupation of husband</b>		
Unemployed	58	55
Semiskilled	25	24
Skilled	09	12
Clerical/shop	08	09
$\chi^2=0.59$ , df=3, p-value>0.05		
<b>Type of family</b>		
Nuclear	67	62
Joint	33	38
$\chi^2=0.54$ , df=1, p-value>0.05		
<b>Social class</b>		
Upper	00	02
Upper middle	14	16
Lower middle	30	35
Upper lower	51	46
Lower	05	01

$\chi^2=5.79$ , df=4, p-value>0.05

**Table II: Obstetric history of pregnant women during present pregnancy**

Variables		Group A	Group B
		N=100	N=100
Gravida	Two	22	23
	More than two	78	77
$\chi^2=0.03, df=1, p\text{-value}>0.05$			
Parity	One	23	24
	More than one	77	76
$\chi^2=0.03, df=1, p\text{-value} >0.05$			
Live birth	One	24	26
	More than one	76	74

$\chi^2=0.11, df=1, p\text{-value} >0.05$

**Table III: Antenatal care practices**

Variables		Group A	Group B
		N=100	N=100
Registered for ANC	Yes	26	32
	No	74	68
$\chi^2=0.87, df=1, p\text{-value}>0.05$			
No. of visits	<3 visits	Yes	11 14
		No	89 86
$\chi^2=0.41, df =1, p\text{-value}>0.05$			
Equal or more than 3	Yes	15	18
		No	85 82
$\chi^2=0.33, df=1, p\text{-value} >0.05$			
IFA Supplement	< 3 month	Yes	20 25
		No	80 75
$\chi^2=0.72, df=1, p\text{-value}>0.05$			
Equal or more than >3month	Yes	06	07
		No	94 93
$\chi^2=0.08, df=1, p\text{-value}>0.05$			
TT Immunization	1 dose	Yes	32 35
		No	68 65
$\chi^2=0.20, df=1, p\text{-value}>0.05$			
	2 doses	Yes	42 45
		No	58 55

$\chi^2=0.18, df=1, p\text{-value}>0.05$

**DISCUSSION**

Antenatal care is most important health care for the maintenances of sound health of pregnant mother and intrauterine baby. Poor antenatal care may results severe health problems of both the mother and prenatal baby<sup>9</sup>. According to, National Family Health Survey (NFHS-3), India, out of total urban population, 75.5% population is Hindu and 17.5% population is Muslim. The high percentage of Muslim in the study was due to the fact that study area had mainly Muslim population. Illiteracy among these women was higher as compared to NFHS-3, India, i.e. 49.8%. Majority of

pregnant women (75%) had more than one live issue where as, 28.6% urban poor women (NFHS-3) had higher birth order (3+births) which is lower as compared to the present study. Only 16.5% of pregnant women had three or more antenatal checkups when compared to 40.9% for urban Uttar Pradesh according to NFHS-3, India. Other researcher from Allahabad, Joshi<sup>10</sup> showed a higher percentage of mothers receiving ANC checkups (24.84% mothers received proper antenatal checkup and 27.95% received <3 antenatal checkups). The reason for the difference between the two studies was that their study was hospital based whereas the present study was

community based intervention study. Another study from Indore, India by Agarwal<sup>11</sup> revealed that 76.6% mothers had received at least one ANC checkup and 40.1% mothers received three or more ANC checkups during their pregnancy. This difference was due to large sample size (11 slums out of 79 were taken). In Patna, Srivastava<sup>12</sup> reported lower percentage (24.7%) of mothers receiving ANC checkups. In a study, conducted in Nepal, Sreeramareddy<sup>13</sup> reported that only 10.4% mothers had at least four antenatal visits. The reason for the difference from the present study was that they had included more number of antenatal visits in their study. Another study in the entire state of west Bengal, Sinha<sup>14</sup> observed that mothers who had three or more antenatal check ups varied from 54% to 82% in different study areas.

13% of total pregnant women had received IFA supplement for equal or more than 3 months. NFHS-3, India analyzed that mothers who consumed IFA for 90 days or more were 22.3% (34.5% urban, 18 % rural) which was higher as compared to present study. Agarwal<sup>[11]</sup> revealed in his study from Indore that 86.2% mothers received IFA tablets. Out of the mothers who received IFA tablets only 11.5% of them consumed IFA tablets for 3+ months during their pregnancy which was similar to present study.

Tetanus Toxoid immunization coverage (2 doses) was 43.5% as compared to NFHS-3 India; urban poor mothers who received Tetanus toxoid vaccine (minimum of 2) were 75.8%. Another study from Indore, India by Agarwal<sup>11</sup> revealed that 82.0% of mothers had received 2 TT shots during their pregnancy. Khan<sup>15</sup> reported that majority of women received two doses of Inj. Tetvac (78.2%) in peri-urban area of Aligarh. TT Immunization coverage was higher in this study due urban health post and immunization camp running in this area.

### CONCLUSION

It was concluded that there was a low utilization of antenatal care among pregnant women of periurban area of Aligarh. There is an urgent need to educate adolescent girls, mothers and train health care providers including ANM, ASHA and CMC workers etc. about advantages of antenatal care. Doctors and staff of the centre should be involved in the educational sessions along with the elderly females; mother-in-laws, dais and reproductive age group women and efforts should be made to address the harmful socio-cultural beliefs and practices prevalent in the

community. Behaviour change communication (BCC) package should be designed focusing on changing the adverse behaviour of pregnant women regarding antenatal care and neonatal care. BCC should be applied through health workers in the community to improve antenatal care and neonatal care that can decrease the morbidity and mortality among mothers and infants. Proper antenatal coverage i.e. registration should be done up to 12 weeks. There should be minimum three antenatal checks up. Hundreds iron folic acid tablets and two Tetanus Toxoid injections should be taken. There should be a good rapport between the doctors of the government institutions and mothers so that the mothers feel free to go for institutional delivery. There should be regular training session for interns, junior residents and paramedical staff of Institutions.

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# Diagnostic Dilemma a Case Report and Review of Literature

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## ABSTRACT

Extrapelvic endometriosis is a fairly uncommon disorder. Cutaneous endometriosis is a rare phenomenon. Cutaneous endometriosis is characterised by presence of extrauterine endometrial tissue in or under the skin. Most cases of cutaneous endometriosis in the abdominal wall develop at the site of previous abdominal operations or pelvic procedures.

**Keywords:** Endometrioma, Cutaneous

## INTRODUCTION

Few problems in the field of medicine test the diagnostic and therapeutic judgment of the surgeon more fully than endometriosis. It is unfortunate that despite extensive investigations the complex nature of this disease is still not fully understood.<sup>1</sup>Endometriosis is defined as the presence of endometrial glands and stroma outside the uterine cavity and musculature.<sup>2</sup>Extrapelvic endometriosis is a fairly uncommon disorder. Cutaneous endometriosis is a rare phenomenon. Cutaneous endometriosis is characterised by presence of extrauterine endometrial tissue in or under the skin. Most cases of cutaneous endometriosis in the abdominal wall develop at the site of previous abdominal operations or pelvic procedures.<sup>3</sup>

Although a relatively common condition, endometriosis and in particular extra genital endometriosis remains a difficult condition to recognize, diagnose and treat because of the extreme variability in the presentation. Our case report highlights the potential difficulties with the diagnosis of extra genital endometriosis.

## CASE REPORT

A 35 year old woman came with the complaint of menorrhagia, dysmenorrhoea along with painful lump just on the right lateral side of the vertical incision of previous cesarean scar on the lower abdomen. The pain

abdomen was more severe during periods and it then used to gradually settle down to continuous dull pain. Abdominal examination revealed a well circumscribed fixed, tender approx. 4 x 5 cm mass just lateral to the vertical incision. Patient narrates that the mass used to progressively enlarge and become more painful during menses. On per vaginum examination, her uterus was bulky, retroverted and tenderness was present in both fornices. She had these complaints since 4 - 5 years for which she had consulted many physicians and surgeons. She took Danazol for 2 years. Many times she was given injection of Depo-Medroxy Progesterone Acetate and even some surgeon had injected steroids into that lump. She was also given many courses of NSAID's and OCPs. The relief was just temporary. Her obstetric history is P<sub>2</sub>A<sub>2</sub> with previous two NVDs. Six years back she underwent hysterotomy at 4<sup>1</sup>/<sub>2</sub> month of amenorrhoea. After 6 - 8 months, she developed pain abdomen on right side. Patient was thoroughly investigated and apart from baseline investigations, Thyroid Profile and CA - 125 was also done. Reports were within normal limits. In the Ultrasound the uterus was of normal size & ovary showed cyst with thick echoes measuring 35 x 45 mm. An ill-defined heterogenous mass measuring 32 x 20 x 40 mm with small cystic lesions are seen just near to the rectus sheath. FNAC confirmed the diagnosis of endometrioma which shows three characteristics of endometriosis - benign endometrial gland, stroma and brown pigment laden macrophage.



After complete investigations, excision of the lump along with total abdominal hysterectomy with bilateral salpingo oophorectomy was done. Cut surface showed a semi firm brownish coloured mass in the wall of the sheath filled with brownish material. The endometrioma was firmly adherent to the rectus sheath, so it was partly removed, partly thermal cautery was done. Histopathology report of the excised mass of specimen of uterus confirmed the diagnosis of endometrioma along with intrapelvic endometriosis. Pelvic adhesions involving the gut were also present. Both the ovaries were cystic with dark brown flakes all over the surface of the uterus, ovaries and pelvic peritoneum.



Fig. 1. Endometrioma Rectus Sheath

## DISCUSSION

Endometriosis is a functional endometrial tissue located outside the uterus, when endometriosis develops as a distinct mass the condition is classified as endometrioma. It is estimated to affect 15% of women of reproductive age and up to 50% of infertile women.<sup>4</sup> The presence of endometrioma in and around caesarean section has been clearly established with the reported incidence ranging from 0.03% to 0.15%.<sup>2</sup> Incidence of endometrioma alone is 1% with the mean period between the procedure and symptom starting around 5 years.<sup>5</sup> Several theories exist for the development of cutaneous endometriosis, including metaplasia, venous or lymphatic metastasis and mechanical transplantation.<sup>6</sup>

Aetiology of cutaneous endometriosis is probably transplantation of viable endometrial cells into scars at the time of surgery. Its occurrence has also been well documented in incisions of any type where there has been possible contact with endometrial tissue,

including episiotomy, hysterotomy, ectopic pregnancy, laparoscopy, tubal ligations and caesarean section. This theory is consistent with experiments that demonstrates, that transplantations of normal menstrual effluent to the abdominal wall results in subcutaneous endometriosis.<sup>3,7</sup>

Although clinical diagnosis can be difficult, it should be suspected in any women with a nodule near the umbilicus to present with pain, itch, odour and bleeding associated with menstrual cycle.<sup>8</sup> However other differential diagnosis should be considered. These include incisional hernia, haematoma, abscess, granuloma, embryological rests, primary malignancy such as malignant endometriosis, desmoid tumour and haemangioma.<sup>9</sup>

Diagnosis is commonly made by histopathology. Histological examinations reveal ectopic endometrial glands with surrounding cellular stroma, occasionally associated with extravasation of erythrocytes in the stroma and some acute inflammatory infiltrates around the glands.<sup>3</sup>

Management includes both surgery and hormones suppression.<sup>8</sup> The combined OCP Progestogens and gonadotropin releasing hormone analogues has been attempted. Only short term success in alleviation of symptoms have been achieved and recurrence is common after cessation of therapy.<sup>5,9</sup> However, this type of medication has undesirable androgen side-effects, such as amenorrhoea, hirsutism, weight gain and acne which may influence compliance.<sup>7</sup> Surgical excision of cutaneous endometriosis is the treatment of choice. Malignant degeneration of extra gonadal endometriosis occur in 21.3%. However, malignant conditions such as endometrial carcinoma that arise from cutaneous endometriosis in surgical scars are rare at 0.3% to 0.1%<sup>10</sup> Local recurrence after adequate surgical excision is not common. When it recurs, it is likely to be a result of inadequate excision.<sup>5</sup>

## CONCLUSION

Endometrioma should be included in the differential diagnosis for any abdominal mass in women of child bearing age group, especially if it is in close proximity to the surgical scar. Greater awareness of endometrioma by surgeons can increase the pre-operative diagnosis, better surgical planes and eliminate the need for post operative diagnostic studies. As extra pelvic endometriosis responds less

to medical treatment, the surgery should be planned as early as possible after the diagnosis is confirmed to relieve the patient of her unbearable agony.

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# Demographic Profile of Cancers of the Large Intestine in Davangere District

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## ABSTRACT

**Background:** Colon including rectum is one of the most common hosts of primary neoplasms in the body. Overall colorectal cancers rank second only to bronchogenic carcinoma in male and breast cancer in female.

In India, due to changing life styles and dietary habits, colorectal cancer incidence is increasing. In men, rectal cancer ranks 7<sup>th</sup> in Bhopal and Bangalore cancer registry. In women, rectal cancer ranks 8<sup>th</sup> in Bombay and Madras while colon cancer ranks 8<sup>th</sup> in Bangalore and Bhopal.

**Aims And Objectives:** To know the prevalence of tumours of large intestine and to know the age, sex, presenting features and other demographic features.

**Materials And Method:** A study of malignancies of large intestine was undertaken for a period of two years. Material consisted of details of patients with suspected malignancies of the large intestine whose resected and biopsied specimen were received for histopathology from various hospitals in and around Davangere. Relevant clinical data regarding age, sex, presenting complaints, were collected from the patients records and operated specimen were examined for gross and microscopic features.

**Results And Discussion:** A total of 45 tumors of the large intestine were included for the study. Age of the patients ranged from 14 to 85 years with 31 patients (68.89 %) above 40 years of age. Total number of females with colonic cancer were more than males. The F : M being 1.38:1. The commonest presenting complaint was bleeding per rectum (40%). Rectum was also found to be the commonest site of malignancy accounting for 57.78% of colorectal tumours.

**Conclusion:** Large intestinal malignancies are becoming more frequent and so careful evaluation of the patient presenting with clinical features like bleeding per rectum or mass abdomen must be carried out for early detection and prevention of malignancies.

Bleeding per rectum is considered frequently as piles by common man and hence an awareness has to be created among general public about bleeding per rectum which is the commonest symptom of cancer rectum, and people should be discouraged from going to quacks for therapy of the same which endangers life.

**Keywords:** Colorectal Cancers, Large Intestine Tumors, Large Intestine Malignancy

## INTRODUCTION

Colon including rectum is one of the most common hosts of primary neoplasms in the body. Overall colorectal cancers rank second only to bronchogenic carcinoma in male and breast cancer in female.<sup>1</sup>

In India, due to changing life styles and dietary habits, colorectal cancer incidence is increasing. In men rectal cancer ranks 7<sup>th</sup> in Bhopal and Bangalore cancer registry. In women, rectal cancer ranks 8<sup>th</sup> in Bombay and Madras while colon cancer ranks 8<sup>th</sup> in Bangalore and Bhopal.<sup>2</sup>

## AIM AND OBJECTIVES

To know the prevalence of tumours of large intestine and to know the age, sex, presenting features and other demographic features.

## MATERIALS AND METHOD

A descriptive study of malignancies of large intestine (colorectal tumors) was undertaken for a period of two years. Material consisted of details of patients with suspected malignancy of large intestine, whose resected and biopsied specimen were received for histopathology. These patients were admitted in various hospitals in and around Davangere.

Relevant clinical data regarding age, sex, presenting complaints, were collected from the patients

records. Operated specimen were examined in detail for gross and microscopic features, for confirmation of clinical diagnosis and for histological typing and grading.

## RESULTS

There were 127 patients who underwent surgical procedure on large intestine and anal canal during the study period, which constituted 1.24% of the total number of (10,216) specimen sent for histopathology.

Of the 127 patients, 45 (35.43%) who had malignancy confined to the large intestine were included for the study. Tumors of the anal canal, tumor-like lesions of the large intestine, various non-neoplastic and inflammatory lesions were excluded from the study.

### Age and sex incidence of large intestine tumors

Table 1:

Age in years	Rectum		Colon		Total
	Males	Females	Males	Females	
11-20	—	—	—	1	1
21-30	2	2	—	1	5
31-40	2	3	1	2	8
41-50	2	7	2	2	13
51-60	4	2	3	3	12
61-70	1	—	2	—	3
71-80	—	1	—	1	2
81-90	—	—	—	1	1
Total	11	15	8	11	45

31 patients (68.89%) were above 40 years of age and 14 patients (31.11%) were less than 40 years. The youngest patient encountered was 14 yrs old.

19 patients (42.22%) were males and 26 patients (57.78%) were females.

### Presenting Complaints

Table 2:

Presenting complaints	No. of patients	Percentage
Bleeding per rectum	18	40 %
Bleeding per rectum with mass per abdomen	02	4.44 %
Bleeding with mass per rectum	06	13.33 %
Mass per Rectum	01	2.22 %
Mass per abdomen	08	17.77 %
Pain abdomen	03	6.66 %
Mass per abdomen with pain	01	2.22 %
Distension with mass per abdomen	02	4.44 %
Distension with pain abdomen	04	8.88 %
Total	45	100

The commonest presenting complaint was bleeding per rectum, which was encountered in 18 patients (40%). Next commonest complaint was mass per abdomen in 8 of the patients (17.77%).

**Location of Tumors**

**Table 3:**

Location of tumor	Total	Percentage
Caecum	8	17.78
Ascending colon	2	4.44
Hepatic flexure	—	—
Transverse colon	1	2.22
Splenic flexure	1	2.22
Descending colon	3	6.67
Sigmoid colon	4	8.89
Rectum	26	57.78
Total	45	100

The commonest location of tumors encountered was rectum, seen in 26 patients (57.78%), followed by caecum in 8 patients(17.78%).

**DISCUSSION**

This is a descriptive study undertaken in a tertiary hospital of Davangere, a district in Central Karnataka, with a population of 6 lakhs. There were 660 patients with various malignancies during the study period. Of these, cancers of gastrointestinal tract ranked second with 115 patients (17.42% ), among which, 45 patients (39.13%) had large intestinal malignancy.

Incidence of various malignancies during the study period

**Table 4:**

Site of malignancy	No of cases	Percentage
Head and neck	178	26.97
Gastrointestinal tract (excluding oral cavity)	115	17.42
Female genital system	101	15.30
Breast	60	9.09
Male genital system	49	7.42
Lymph node	44	6.67
Hepatobiliary	25	3.79
Renal system	21	3.18
Skin	21	3.18
Bones and joints	20	3.03
Soft tissue	14	2.12
Eye	06	0.91
Lung	05	0.76
Central nervous system	01	0.16
Total	660	100

Geographic variation has been well documented in different parts of the world and this variation has been ascribed to multiple environmental factors.<sup>3</sup>

Large intestinal malignancies in the present study constituted 6.81 % of the total (660) malignancies reported during the study period .

In west midlands, annual incidence between 1957 – 1981, was 24.5 per 1,00,000 population for colonic cancer and 18.4 per 1,00,000 for that of the rectum.<sup>4</sup>

However in the present study, the prevalence of colorectal carcinoma was 0.44%, which represents only a hospital based statistics.

**Age:** Colorectal cancer becomes more frequent with increasing age, but is by no means a disease of extreme old age. The mean age at diagnosis is around 60 years.<sup>5</sup>

The mean age of patients with colorectal carcinoma in the present study was 48.8 an observation consistent with the Jordanian study reported by Dajani et al.<sup>3</sup>

Mean age of patients with colorectal carcinomas in different studies

**Table 5:**

Studies	Age-Range	Mean – Age
Dajani et al <sup>3</sup> Jordanian study Nova Scotian study(1980)	14-81 years 26-92 years	49 years 66 years
Qizilbash Ali(1982) <sup>6</sup>	1-97 years	—
Osime U, Morgan A, goirguis M.(1988) <sup>7</sup>	35-72 years	56.4 years
Present study	14-85 years	48.88 years

Peak incidence for colorectal carcinoma is 60-79 years, fewer than 20% of cases occur before the age of 50 years.<sup>1</sup>

The risk of developing colorectal cancer between the ages of 50 -75 in the United States is approximately 5%. The median age at diagnosis is 71 years.<sup>8</sup>

**Sex:** In men rectal cancer ranks 7<sup>th</sup> in Bhopal and Bangalore Cancer registry. In women rectal cancer ranks 8<sup>th</sup> in Bombay and Madras, while colon cancer ranks 8<sup>th</sup> in Bangalore and Bhopal. <sup>2</sup>

Cancer of colon is more common in women than men in a proportion of 2:1<sup>9</sup>

In the present study, the number of females with colonic cancer were more than males. The F: M being 1.38:1



Rectal cancer is more frequent in males and difference increases with age.<sup>5,9,14.</sup>

This was not substantiated in the present study, where M:F was 1:1.

Number of males and females in different studies of colorectal cancers

**Table 6:**

Studies	Males	Females	Total
Qizilbash Ali H( 1982) <sup>6</sup>	119(46.30%)	138(53.69%)	257
Rao Bhaskar N et al.(1985) <sup>10</sup>	17(56.67%)	13(43.33%)	30
Behbehani A et al,(1985) <sup>11</sup>	18(38.30%)	18(38.30%)	47
Osime U , Morgan A, Guirguis M.(1988) <sup>7</sup>	60(78.95%)	16(21.05%)	76
Present study	19(42.22%)	26(57.77%)	45

## Presenting Complaints

According to a UK based study, the proportion of colorectal cancer patients with a palpable abdominal mass is reported as 4–6% in a hospital series. Rectal masses are more common; reported as being present in 24–50% of colorectal cancers in two hospital series.<sup>12</sup>

In our study the commonest presenting complaint was bleeding per rectum in 18 patients (40%) followed by mass per abdomen in 8 patients (17.77%)

**Location:** Rectum was found to be the commonest site of malignancy accounting for 57.78% of colorectal tumours a finding consistent with observations made by various authors.

## Location of tumors of large intestine in different studies

**Table 7:**

Site	Dajani et al(1980) <sup>3</sup>		Qizilbash Al H (1982) <sup>6</sup>	Osime, Morgan, Guirguis (1988) <sup>7</sup>	Present study
	Jordanian	Novascotian			
Caecum	13%	15%	13.53%	2.63%	17.78%
Ascending colon	11%	15%	11.28%	2.63%	4.445%
Hepatic flexure	5%	2%	1.50%	1.32%	—
Transverse colon	7%	13%	4.89%	1.32%	2.22%
Splenic flexure	—	2%	2.63%	1.32%	2.22%
Descending colon	15%	8%	6.77%	3.94%	6.67%
Sigmoid colon	38%	31%	34.21%	7.89%	8.89%
Rectosigmoid	—	—	9.02%	—	—
Rectum	—	—	14.28%	78.95%	57.78%
Nonspecified	11%	13%	1.88%	—	—
Total no of tumors	61	1115	266	76	45

About 50% of all carcinoma occur in the recto-sigmoid area although their relative incidence seems to be decreasing <sup>9, 13,14.</sup>

34(75.56%) of the large intestine were located on the left side, sites being rectum, sigmoid, descending

colon, and splenic flexure, giving rise to left sided preponderance as in Jordanian study by Dajani et al, study by Qizilbash et al and other studies <sup>3,6</sup>

**Incidence of colorectal cancers in various studies**

**Table 8 :**

Studies		Adenocarcinoma	Malignant lymphoma	Carcinoid	Melanocarcinoma	Leiomyosarcoma	Adenosquamous carcinoma	Undifferentiated carcinoma	Fibrosarcoma	Total
Dajani et al <sup>3</sup>										
Jordanian study	colon	61(88%)	6(9%)	1(1%)	—	1(1%)	—	—	—	69
	rectum	80 (98%)	—	1(1%)	1(1%)	—	—	—	—	82
Novascotian study	colon	16880(90%)	53(0.3%)	40(0.2%)	—	17(0.1%)	—	—	—	16990
	rectum	5190(93%)	12(0.2%)	33(0.6%)	10(0.2%)	11(0.2%)	—	—	—	5256
Qizilbash Al (1982) <sup>6</sup>		262(98%)	—	—	—	—	—	2(1%)	2(1%)	266
Osime, Morgan, Guirguis(1988) <sup>7</sup>		73(96.05%)	2(2.63%)	—	—	—	—	—	(1.32%)	76
Present study		42(93.34%)	1(2.22%)	1(2.22%)	1(2.22%)	—	—	—	—	45

**CONCLUSION**

Though, malignancies of the large intestine are more frequent with increasing age, it is no longer a disease of extreme old age, as no age is exempt from the same .

Careful evaluation of the patient presenting with clinical features like bleeding per rectum or mass abdomen must be carried out for early detection and prevention of large intestinal malignancies.

Bleeding per rectum is considered frequently as piles by common man and hence an awareness has to be created among general public about bleeding per rectum which is the commonest symptom of cancer rectum ,and people should be discouraged from going to quacks for therapy of the same which endangers life.

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# A Study of Consumption of Iodized Salt among Households of District Lucknow, India

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## ABSTRACT

Iodine deficiency is the world's single greatest cause of preventable mental retardation. Universal Salt Iodization is a safe, cost-effective and sustainable strategy to ensure sufficient intake of iodine by all individuals. In Uttar Pradesh only 42.5 % households are using cooking salt which was iodized at the recommended level. The present study was conducted to assess the pattern of consumption of iodized salt and the awareness about health benefits of iodized salt among households in Lucknow. A cross sectional study was conducted in rural and urban Lucknow in 400 households selected using PPS technique and were interviewed using predesigned oral questionnaire and household salt was tested for Iodine content by kit. It was observed that 257(64.2%) households were using salt of iodine content of >15ppm, 135(31.8%) were using salt with inadequate iodine content and 8(4%) households were consuming salt with no iodine. On multivariate analysis high social class, literacy status, exposure to mass media was significantly associated with consumption of adequately iodized salt. 62% of the people surveyed knew iodine deficiency results in goiter, iodization of salt as an important attribute to the quality of salt was found only in 11.2 % respondents. It is recommended better IEC is the need of the hour to improve consumption of appropriately iodized salt.

**Keywords:** Iodized Salt, Household Level

## INTRODUCTION

Iodine Deficiency Disorders (IDD) remains a significant public health problem in over 50 countries. Iodine deficiency is the world's single greatest cause of preventable mental retardation. It has been estimated that 200 million people in India are exposed to the risk of IDD and more than 71 million suffer from goitre and other forms of IDD. Children and adults need an adequate amount of iodine in their diets to avoid getting IDD. Iodine deficiency is known to cause goitre and cretinism. Children with IDD can grow up stunted, apathetic, mentally retarded, and incapable of normal movement, speech, or hearing. IDD in pregnant women may cause miscarriage, stillbirth, and mental retardation in infants <sup>(1)</sup>.

The World Health Organization (WHO) and United Nations Children's Fund (UNICEF) have recommended Universal Salt Iodization (USI) as a safe, cost-effective and sustainable strategy to ensure sufficient intake of iodine by all individuals <sup>(2)</sup>.

UNICEF conducted a Coverage Evaluation Survey in 2009 (CES 2009), in India overall, 71.1 percent of the households were using cooking salt which was iodized at the recommended level of 15 ppm or more. Only 9.3 percent of the households used salt that was not iodized at all and 19.3 percent used salt that was iodized inadequately (<15 ppm). But the same survey revealed that in Uttar Pradesh only 42.5 % households were using cooking salt which was iodized at the recommended level<sup>(3)</sup>. Keeping in view the above facts the present study was conducted to assess the pattern of consumption of iodized salt and the awareness about health benefits of iodized salt among households in Lucknow.

## MATERIAL & METHOD

A cross-sectional house to house study was conducted in district Lucknow in one rural block (Malhiabad) and one urban sector (Chowk) chosen randomly. Sample size was calculated based on the

formula  $4PQ/L^2$ , where P is the prevalence (42.5. %), Q is 100-P (50) and L is the permissible error i.e. 10% of P, sample size comes out to be ~400<sup>(4)</sup>. Number of household to be taken for the survey in a village / ward was decided according to population proportion to size (PPS).

Each respondent was explained the purpose of the study by the investigator prior to the administration of interview and informed consent was obtained. The confidentiality of the information was assured. Interview was started with general discussion to gain confidence and it slowly extended to specific points. Using a pre-tested interview schedule, the following aspects were enquired from the respondents - background characteristics like religion, locality, education. Socio economic status was calculated by modified Prasad's classification based on the per capita monthly income and in order to offset inflationary trends, All India Whole Price Index (AIWPI) of year 2010 was used.<sup>(5)</sup>

Respondents were also asked about the type of cooking salt that they predominantly use; reasons for the same, awareness about the benefits of iodized salt and salt storage practices.

Respondents' media exposure was measured by asking about the frequency (almost every day; at least once a week; less than once a week; or not at all) with which they read a newspaper or magazine, watch television, or listen to the radio. In addition, all respondents were asked whether they 'usually go to a cinema hall or theatre to see a movie at least once a month'. Respondents who do not read a newspaper or magazine, watch television, or listen to the radio at least once a week, or see a movie at least once a month were considered to not be regularly exposed to any media.<sup>(6)</sup>

Iodine content of cooking salt in each interviewed household was done using a rapid-test kit (MBI Kits) obtained from state health department. One drop of the starch solution was squeezed onto a half tea spoon sample of cooking salt obtained from the household. If the colour changed (from light blue through dark violet), it was matched to a colour chart provided with the test kit and recorded the iodine level as <15 or >15 ppm. If the initial test was negative (no change in colour), a second confirmatory test, adding an acid-based solution in addition to the starch solution was done. If the colour of the salt does not change even after the confirmatory test, the salt is not iodized (zero Iodine level).<sup>(6)</sup>

Data was entered by two different persons separately on Microsoft Access and cross matched to detect any discrepancy in data entry before the data was analyzed using SPSS software version 17.01 for Windows XP.

## RESULTS

Of the 400 households, 208 (52.0%) were urban and 209(52.3%) Muslim. In 73 % of respondents head of the family was illiterate and 61.2 % respondents belonged to social class V according to modified Prasad's Classification. Exposure to any form of mass media was found in 64 % respondents. (Table 1)

It was observed that 257(64.2%) households were using salt of iodine content of >15ppm, 135(31.8%) were using salt with inadequate iodine content and 8(4%) households were consuming salt with no iodine.(Figure I)

As depicted in Table II, among people surveyed, 58.5% were aware of iodized salt. There is fair knowledge among the respondents about the effects of iodine deficiency on the human body. 62% of the people surveyed knew iodine deficiency results in goiter. 15.3% of the people knew that iodine deficiency causes "less mental development" and 11.0 % knew it causes "less physical development".

Iodization of salt is not generally seen as an important quality when people are assessing quality of salt. In fact, iodization of salt as an important attribute to the quality of salt was found only in 11.2 % respondents. Of all the important attributes that people ascribe to salt, "Whiteness" (43.0%) seemed to be the most important followed by, "Looks good" (34.8 %) and "Tastes good" (11.0%).

The study findings demonstrate that the type of salt consumed has important ramifications for iodized salt coverage. 68.5 % of packaged refined salt was adequately iodized. Among the households surveyed, 93.7% are using packaged refined salt. This study further reveals that people stored their salt well, 64.8% of the people stored their salt in containers with lids, 14.4 % stored salt in the same pouch in which they bought it and 20.8% stored it in a container without a lid

Consumption of appropriately iodized salt (>15 ppm) had no relationship with locality and religion of households. Literacy status of head of household, higher socioeconomic status, exposure to mass media



and consumption of refined salt were associated significantly with adequately iodized salt ( $p < 0.005$ ). Surprisingly respondents who had knowledge of effect of iodine deficiency were not consuming adequately iodized salt. (Table III)

On multivariate analysis high social class, literacy status, exposure to mass media was significantly associated with consumption of adequately iodized salt. (Table IV)

## DISCUSSION

IDD are among the easiest and least expensive of all nutrient disorders to prevent. The addition of a small, constant amount of iodine to the salt that people consume daily is all that is needed.

One of the goal for monitoring progress towards sustainable elimination of IDD as a public health problem determined by a Joint WHO/ UNICEF/ ICCIDD Working Group on assessment and monitoring of IDD is percentage of households consuming effectively iodized salt should be  $>90\%$ ,<sup>(7)</sup> the study reveals that only 64.25 % of households are consuming adequately iodized salt in Lucknow, which is far below the target of  $>90\%$  salt iodization. According to NFHS-3 in UP 49 % of households were consuming salt with iodine content  $> 15\text{PPM}$ ,<sup>(6)</sup> baseline facts – concurrent assessment of health and family health programme (2007) found 56 % households in Lucknow consuming salt with iodine content  $>15\text{ppm}$ .<sup>(8)</sup>

Household socioeconomic status is an important determinant in consumption of adequately iodized salt. In the market the cost of branded packaged iodized salt is almost five times higher than the easily available coarse crystalline salt. Thus poorer household are much likely to purchase coarser salt. Coarser salt is uncrushed, has a larger crystal size than refined salt and higher levels of impurities and higher affinity to moisture causing leaching of  $\text{KIO}_3$  especially if it is not packaged and stored properly. This is what was found in our study that none of the samples of coarse salt had adequate iodine levels.<sup>(9)</sup>

The head of the household is the most important person who takes decisions in the household and education improves knowledge and awareness of need of iodized salt. In our study as also seen in NFHS-2 report availability of adequately iodized salt was significantly higher in literate households.<sup>(10)</sup>

An important finding in the study is that respondents who were exposed to mass media were consuming adequately iodized salt. A similar study in Turkey showed that the use of local mass media is effective in raising the prevalence of iodized salt use. Local mass media could therefore be used as part of a national strategy to prevent iodine deficiency disorders.<sup>(11)</sup>

A limitation of this paper is the potential for recall bias and method of determining iodine content with Kit. The titration method is the best method. Recent evaluations of kits showed that the colour reaction cannot be used as a quantitative indication of the iodine content. These kits should therefore be regarded as qualitative rather than quantitative and are most appropriate to indicate the presence or absence of iodine, but not of the concentration. An advantage of rapid test kits is that they can be used in the field to give an immediate result. They are therefore useful to health inspectors and others who are involved in carrying out spot checks on food quality or household surveys. They may also play a valuable educational role, in that they provide a visible indication that salt actually is iodized.<sup>(12)</sup>

## CONCLUSION

The study has provided a picture of iodized salt consumption and awareness in district Lucknow. It gives us with information on underlying factors that may be inhibiting the community switch to iodized salt. This switch over requires advocacy, which is not an event rather a process and thus a continuous efforts at community and national level are required. It is often contended that lack of cash prevents impoverished families from buying iodized salt, when coarse salt is readily available. However, even in impoverished households men often smoke tobacco and chew gutka. Messages with calculations of the cost of a pack of Bidi or a pack of gutka against the annual cost of using iodized salt to prevent brain damage in children may facilitate a change of priority even among relatively poor families. Messages should also be targeted also on proper storage of salt as improper practices can lead to loss of iodine content in salt. Further the quality of knowledge about IDD is to be improved. Knowledge about IDD has most often been limited to visible goitre. There needs to be clear and direct messages about IDD's brain damage threat and its relevance to school performance and subsequent economic productivity for the family.



**Acknowledgements:** None

**Interest of conflict:** None

**Table I: Socio- Demographic Characteristics of Studied Population**

Characteristics	N (%)
<b>Religion</b>	
Hindu	191(47.7)
Muslim	209(52.3)
<b>Education of Head of the Family</b>	
Illiterate	296(73.0)
Literate	104(27.0)
<b>Locality</b>	
Rural	192(48.0)
Urban	208 (52.0)
<b>Social Class(Modified Prasad)</b>	
II	20(5.0)
III	47(11.8)
IV	88 (22.0)
V	245(61.2)
<b>Exposure to Media</b>	
Yes	256(64.0)
No	144 (36.0)

**Table II: Salt Related Practices of studied population**

Characteristics	N (%)
<b>Awareness of Iodized Salt</b>	
Yes	234(58.5)
No	166(41.5)
<b>Knowledge About Health effects of Iodine</b>	
No	44(11.0)
Goitre	246(61.50)
Less Mental development	61(15.3)
Less Physical development	44(11.0)
Others	5(1.3)
<b>Respondents perception of good Quality of Salt</b>	
Tastes Good	44(11.0)
Whiteness	172(43.0)
Looks Good	139(34.8)
Iodized	45(11.3)
<b>Type of Salt Consumed</b>	
Crystalline	25 (6.3)
Refined	357 (93.7)
<b>Salt Storage practices</b>	
Container with lid	259(64.8)
Pouch of the salt	58(14.4)
Container without Lid	83(20.8)

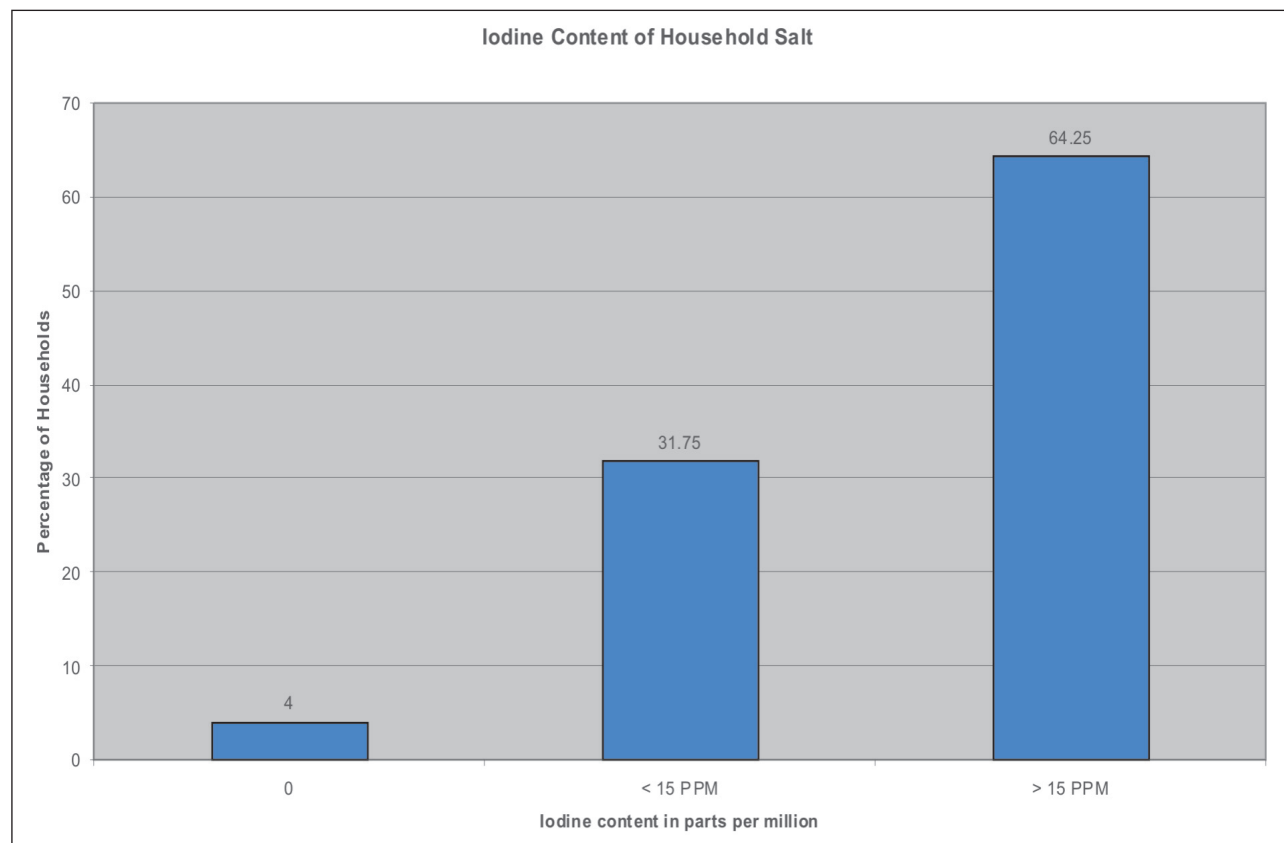


Table III: Determinants of Levels of Iodized Salt Consumption

Variables	Iodine Content of Cooking Salt					
	< 15 ppm(143)		> 15 ppm (257)		Total(400)	
	No.	%	No.	%	No.	%
<b>Religion</b>						
Hindu	68	47.5	123	47.8	191	47.7
Muslim	75	52.4	134	52.2	209	52.3
Chi square=1.235 Df=1 p=0.425						
<b>Locality</b>						
Rural	63	44.1	129	50.2	192	48.0
Urban	80	55.9	128	49.8	208	52.0
Chi square=1.387 Df=1 p=0.239						
<b>Literacy of head of Head of the Family</b>						
Illiterate	130	90.9	166	64.6	296	74.0
Literate	13	9.1	91	35.4	104	26.0
Chi square=33.075 Df=1 p<0.001						
<b>Socio Economic Status of household</b>						
II	0	.0	20	7.8	20	5.0
III	3	2.1	44	17.1	47	11.8
IV	37	25.9	51	19.8	88	22.0
V	103	72.0	142	55.3	245	61.3
Chi square=34.515 Df=3 p<0.001						
<b>Exposure to Mass media</b>						
Yes	63	44.1	193	75.1	256	64.0
No	80	55.9	64	24.9	144	36.0
Chi square=38.424 Df=1 p<0.001						
<b>Salt Consumed</b>						
Crystalline	25	17.5	0	.0	25	6.3
Refined	118	82.5	257	100.0	357	93.8
Chi square=47.925 Df=1 p<0.001						
<b>Knowledge about Effect of Iodine deficiency</b>						
Yes	126	88.1	230	89.5	356	89.0
No	17	11.9	27	10.5	44	11.0

Chi square=0.179 Df=1 p=0.672

Table: IV Results from the logistic regression analysis on Iodized Salt Consumption

Variable	Category	P value	95 % Confidence Interval	
			Lower	Upper
Social Class	II and III	<0.001	0.17	0.305
	IV and V			
Respondents Education	Literate	<0.001	0.207	0.573
	illiterate			
Locality	Urban	<0.78	0.2589	15.457
	Rural			
Exposure to Media	Yes	<0.001	0.326	0.898
	No			
Type of salt	Crystalline	<0.03	0.130	0.1233
	Refined			

Note: Dependent variable: Iodized Salt (&gt;15ppm)

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# Comparative Study of Type II Diabetes Mellitus and HIV Co-morbidity among Tuberculosis Patients Attending Tertiary Care Hospital in Davangere

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## ABSTRACT

**Background and Objectives:** India is experiencing a double epidemic of HIV and Diabetes Mellitus (DM), both of which are strongly associated with immune suppression. Although more focus is given on TB HIV co-infection other underlying factors such as Diabetes mellitus can compromise the immune status and is associated with TB. The global burden of DM is increasing and in India it is projected to rise in future which can lead to new tuberculosis cases.

**Objectives:** 1) To know the occurrence of Type2 DM and HIV among TB patients. 2) To know the Bio social profile of TB patients.

**Method:** Cross-sectional study done on 182 pulmonary TB and 18 extra-pulmonary TB patients Pulmonary TB diagnosed by sputum smear microscopy. Extra-pulmonary TB diagnosed radiological/culture/PCR. Diabetes from history, previous records and blood examination as per ADA criteria (2010)<sup>4</sup>

**Study Design:** Cross-sectional descriptive

**Sample Size:** 200 Tuberculosis patients

**Duration:** September 2011- December 2011

**Statistical analysis:** Percentage and chi-square

**Results:** Mean age of 200 TB patients was 46.4 years .89% were sputum positive pulmonary TB, 10% were Extra-pulmonary TB. 17% had Type2 Diabetes Mellitus for a mean duration of 6 years, majority diagnosed after TB. Mean GRBS was 143.7 mg/dl 11% were HIV positive. Only 1 (0.05%) had both TB+HIV.

**Conclusion :** Though more importance is being given to HIV-TB co-infection, this study has shown higher preponderance of DM compared to HIV and this may adversely affect TB control. Integrating TB and diabetes control Programs would facilitate TB prevention among diabetes patients.

**Keywords:** Comorbidities, Tuberculosis, Type2diabetes Mellitus

## INTRODUCTION

India is the highest TB burden country in the world, with over 1.9 million estimated TB cases per year.<sup>1</sup> India is experiencing a double epidemic of Human

Immunodeficiency Virus(HIV) and Diabetes Mellitus (DM), both of which are strongly associated with immune suppression. TB is greatest among patients with impaired immunity. Changes in lifestyle and diet have contributed to an increased prevalence of diabetes in many low-income and middle-income countries where the burden of Tuberculosis(TB) is high more so in India.<sup>2</sup> In India, there are around 1.8 million new cases of TB annually<sup>3</sup> and around 2.5 million HIV/AIDS<sup>2</sup> which makes India the world's third-highest total HIV burden. It is estimated that 23.9 lakh people living with HIV/AIDS in India with an adult prevalence of 0.31 percent in 2009 and approximately

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1.2 lakh new HIV infections in 2009.<sup>4</sup> The human immunodeficiency virus (HIV) pandemic presents a significant challenge to global tuberculosis (TB) control. Although more focus is being given on TB HIV co-infection as a major concern for public health, also other underlying factors such as Diabetes mellitus can compromise the immune status and has been associated with TB.<sup>3</sup>

For what is probably the first time, a major communicable disease is joining up with a major non-communicable disease. Prompting this reaction is the evidence, obtained in late 2010, that the burgeoning diabetes epidemic is the cause of a large number of new tuberculosis cases.<sup>1</sup>

### Impact of HIV on TB

An HIV infected person who is newly infected with TB bacilli is more likely to develop the TB disease as compared to an HIV non-infected person. The risk of developing TB in HIV infected person is many times higher as compared to the risk in HIV non-infected person. There are higher chances for death of HIV infected TB patients than HIV non infected TB patients during or after treatment for TB. The risk of recurrence of TB even after successful TB treatment is much higher in HIV-infected persons.

### Impact of TB on HIV

In a HIV-infected TB patient, the immune response to TB bacilli increases HIV replication. As a result of the increase in viral load in the body, there may be more rapid progression of HIV infection and patient starts developing symptoms of various opportunistic infections. Thus the health of the patient who has both diseases may deteriorate more rapidly than with HIV infection alone. In addition, TB treatment complicates ongoing HIV treatment because of pill burden, additional side effects, and drug-drug interactions. TB is a major cause of morbidity and mortality in PLWHA.

## OBJECTIVES

- 1) To know the occurrence of Type2 DM and HIV among TB patients.
- 2) To know the Bio social profile of TB patients.

## METHODOLOGY

A cross-sectional study was designed to study convenient sample of 200 diagnosed Tuberculosis patients (182 microbiologically diagnosed pulmonary TB and 18 extra-pulmonary TB patients) during period of three months (June 2012 to August 2012) as an when they presented to hospital. TB patients were screened for diabetes at the start of TB diagnostic Facility at the Designated Microscopic Center (DMC) and DOTS treatment Center located at C.G.Hospital attached to JJM Medical College, Davangere. Daily visits to Inpatient Wards were also made so as not to miss any Extra-Pulmonary Cases. Recent Blood Sugar values were recorded either from records wherever available, if unavailable, it was recorded using a Glucometer. Random Blood Sugar values were considered for diagnosing Diabetes Mellitus.<sup>5</sup>

All diagnosed cases of Tuberculosis who were 18 years and above and who consented for the study were subjected to an interview with a pre-tested and semi-structured questionnaire containing information regarding the distribution of HIV and DM was evaluated along with other socio-demographic and other risk factors.

Pulmonary TB was diagnosed by sputum smear microscopy. Extra-pulmonary TB diagnosed radiological/culture/PCR. Diabetes was diagnosed from history, previous records and blood examination as per ADA criteria (2010)<sup>6</sup> Contact history was defined as an adult with any form of active Tuberculosis and who has been in close contact with the patient over the past 2 years.<sup>7</sup>

**Ethical clearance:** The study was approved by ethical committee of JJM Medical College Davangere

**Statistical analysis:** Percentage and chi-square

## RESULTS

**Table 1: Percentage of co morbidities among Tuberculosis (TB) patients.**

	N	%
TUBERCULOSIS	200	
DIABETES MELLITUS(DM) with TB	28	14.0
HIV with TB	27	13.5
DM + HIV + TB	1	0.5



**Table 2: Sociodemographic and Risk Factors among HIV and DM co-morbid Tuberculosis Patients. Values in numbers(percentage)**

CHARACTERISTICS	TB + DM (n = 28)	TB + HIV (n = 27)	P value
<b>Time of HIV/DM Diagnosis</b>			
Before TB	18(64.3)	9(33.3)	p >0.05**
After TB	10(35.7)	18(66.7)	
<b>Duration of Co-morbidity</b>			
≤ 2 yrs.	13(46.4)	27(100)	p < 0.001**
> 2 yrs.	15(53.7)	0	
<b>Age mean(SD) 46.4 yrs (±10.48)</b>			
<45 yrs.	13(46.3)	15(55.6)	p >0.05**
>45 yrs.	15(53.7)	12(44.4)	
<b>Sex</b>			
MALES	27(96.4)	27(100)	P >0.05**
FEMALES	1(3.6)	0	
<b>Residence</b>			
RURAL	6(21.4)	21(77.8)	P <0.0001**
URBAN	22(78.6)	6(22.2)	
<b>Education</b>			
Illiterate /Below Primary	4(14.3)	9(33.3)	P< 0.05+
Primary or Higher	24(85.7)	18(66.7)	
<b>Employment Status</b>			
Unemployed	1(3.6)	1(3.7)	p >0.05+
Employed	27(96.4)	26(96.3)	
<b>Religion</b>			
Hindu	22(78.6)	21(77.8)	p >0.05**
Muslim and Other	6(21.4)	6(22.2)	
Overcrowding Present	6(21.4)	8(29.6)	p >0.05**
Contact History present	6(21.4)	10(37)	p>0.05**
<b>Tobacco / Alcohol intake (Men only)</b>			
Drank Alcohol	4(14.3)	20(70.1)	p<0.001**
Smoked/chewed tobacco	4(14.3)	23(85.2)	p <0.0001**

\*\* chi-square test with Yates' correction + Fisher's exact Test

**Table 3: Tuberculosis disease characteristics among DM and HIV Patients. Values in numbers (Percentage)**

CHARACTERISTICS	TB + DM (n = 28)	TB + HIV (n = 27)	P value**
<b>Type of Tuberculosis</b>			
Pulmonary	27(96.4)	23(85.2)	p>0.05
Extra-pulmonary	1(3.6)	4(14.8)	X <sup>2</sup> = 2.8
<b>Sputum Grading<sup>§</sup></b>			
3 +	(n=27) 14(51.9)	(n=23) 2(8.7)	p =0.001
2+ or Lower	13(48.1)	21(91.3)	X <sup>2</sup> = 10.75
<b>Treatment Category</b>			
New (Category I)	4(14.3)	11(40.7)	p>0.05
Re-treatment (Category II)	24(85.7)	16(59.3)	X <sup>2</sup> = 3.61
<b>Time Since First Attack<sup>++</sup></b>			
≤ 5 yrs	(n = 24) 20(83.3)	(n= 16) 11(68.7)	P>0.05
> 5 yrs	4(16.7)	5(31.3)	X <sup>2</sup> = 1.17

\*\* chi-square test with Yates' correction <sup>§</sup> only for sputum positive patients <sup>++</sup> Only Re-treatment cases.

Data analysis showed that out of 200 Tuberculosis patients included in the study, 28 patients (14%) had Diabetes Mellitus (DM) as co-morbidity, 27 (13.5%) had HIV as co-morbidity while 1 patient (0.5%) suffered from dual co-morbidity (DM+HIV). Our study showed 18 of 28 patients (64.3%) in Diabetes Mellitus co-morbidity group had been diagnosed before acquiring Tuberculosis while 18 (66.7%) of 27 patients were diagnosed to have HIV after acquiring Tuberculosis disease though the difference wasn't statistically significant (Table 2).

While all 27 patients in the HIV-TB group was suffering from the co-morbidity for  $\leq 2$  years, more than half (53.3%) in the DM-TB group suffered the co-morbidity for more than 2 years. Overall, of the 200 TB patients screened, majority (36.5%) were in the 45-54 years age group next to 35-44 years age group (25.5%) with 86.5% being male, 95.5% residing in rural areas >50% were illiterate or below primary school. 18.5% were unemployed nearly 80% were Hindus by religion. Among the Tuberculosis with co-morbidity group had a mean (SD) age of 46.4 yrs. ( $\pm 10.48$  yrs.) with majority (53.7%) of Diabetics were more than 45 years of age while 55.6% of HIV patients were younger than 45 years but this difference wasn't statistically significant. Though considered important individual risk factors for Tuberculosis disease like sex, employment status, religion, history of contact or overcrowding did not show any statistically significant difference between the diabetes mellitus or HIV group. Our study showed the diabetes co-morbidity group showed more urban residence (78.6% vs 22.2%,  $p < 0.001$ ) and were educated beyond primary schooling (85 vs 66.7%,  $p < 0.05$ ) compared to HIV co-morbidity group. The HIV co-morbidity group consumed more Alcohol (70.1% vs 14.3%,  $p < 0.001$ ) and used tobacco (85.2% vs 14.3%,  $p < 0.0001$ ) than the Diabetes co-morbidity group.

Table 3 shows tuberculosis disease characteristics among patients with co-morbidities of Diabetes Mellitus and HIV. Pulmonary was the most prevalent form of tuberculosis in both DM (96.4%) and HIV (85.2%) groups while Extra-pulmonary tuberculosis was more amongst HIV co-morbid group than DM group (14.8% vs 3.6%) though not statistically significant. Among the Pulmonary tuberculosis cases, majority (51.9%) of TB+DM co-morbidity patients had sputum grading of 3+ while significantly lower grading was seen in 91.3% among the HIV+TB co-morbid patient group ( $p = 0.001$ ) In both DM+TB and HIV+TB groups, re-treatment Category II was more

(85.7% vs 59.3%) as compared to new Category I tuberculosis which were more in HIV+TB group (40.7% vs 14.3%).

## DISCUSSION

One-fifth of the global TB incidence is from newly diagnosed cases within India; approximately 2 million people acquire TB yearly. Around 45 per cent of these incident cases will be individuals who have active TB, and are thus infectious to others, further increasing the high TB disease rates.<sup>8</sup> It is estimated that annually around 331,000 people in India die from TB.<sup>9</sup> The recent WHO report indicates that the prevalence of tuberculosis in India is 283 per 100,000 population with approximately 2.8 per cent of prevalent cases being problematic multi drug resistant (MDR) TB.<sup>9</sup>

Our study showed almost equal preponderance of Diabetes Mellitus and HIV co-morbidity amongst Tuberculosis patients (14% vs 13.5%). While in a study conducted in South India showed HIV prevalence of 31.8% over DM (8.9%).<sup>1</sup> In a study in Mumbai, tuberculosis was found to be the most commonly occurring illness in DM patients with 5.9 per cent of individuals in a cohort of over 8000 being co-morbidly affected<sup>10</sup>. Diabetes accounted for 14.8% Relative Risk (95% CI 7.1% to 23.8%) of incident pulmonary tuberculosis in India in 2000<sup>1</sup>. WHO Countries with a high prevalence of tuberculosis, like India, diabetes accounts for a greater proportion of tuberculosis cases than does HIV (23% vs 5% due to that due to HIV)<sup>11</sup>. While Hospital based HIV sero-prevalence studies amongst tuberculosis patients from different regions of India have shown a great variation – the prevalence rates varying from 0.4% - 28.1% have been reported<sup>12,13</sup>.

Our study showed majority patients (64.3%) in Diabetes Mellitus co-morbidity group had been diagnosed before acquiring Tuberculosis while two-thirds patients were diagnosed to have HIV after acquiring Tuberculosis disease. In another study 31% had not been diagnosed Diabetic before the survey. The diagnosis of diabetes preceded that of TB by an average of 5 years (range 1-9 years)<sup>14</sup> while our study showed 53.3% of DM+TB co-morbid patients were suffering from Diabetes for over 2 years. This might be due to the programmatic mechanisms existing in the country on HIV-TB link.

The mean age of the TB patients with co-morbidity was 46.4 yrs. ( $\pm 10.48$  yrs.) with majority (53.7%) of Diabetics were more than 45 years of age while 55.6%

of HIV patients were younger than 45 years .72.13% of the diabetic patients belonged to the age group of 41-60 years. Extra-pulmonary TB patients had a mean age of 34.62±12.9 years and 75% of the HIV patients belonged to the age group of 41-60 years.<sup>3</sup> Similar middle age preponderance was illustrated in other studies too<sup>11-15</sup>

In our present study, demographic factors sex, employment status, religion didn't show any statistical significance between Diabetes Mellitus (DM) or HIV co-morbid groups but the diabetes co-morbidity group showed more years of schooling and from urban residence compared to HIV co-morbidity group.

Environmental factors like history of contact (21.4% vs 37%) or overcrowding (21.4% vs 29.6%) did not show any statistically significant difference between the diabetes mellitus or HIV group. In a study conducted in Karachi, it was found that 38 % had a contact history and 69.3 % had overcrowding(e"3 persons).<sup>15</sup> According to a study at Civil Hospital, Lyari General Hospital and Ojha Institute of Chest Diseases, Karachi, in which 287 close contacts of 50 diagnosed cases of tuberculosis were included, 26 contacts (15.3%) were found to be suffering from TB.<sup>16</sup>

Alcohol and Tobacco emerged as significantly associated with the HIV-TB co-morbid group than DM-TB group ( $p < 0.001-0.0001$ ). similar findings were reported in WHO framework targeting Tuberculosis-diabetes link.<sup>17</sup>

Characteristics of Tuberculosis disease in our study showed higher pulmonary tuberculosis in both the co-morbidity groups, but the Diabetes Mellitus co-morbid TB patients recorded higher sputum grading. Extra-pulmonary tuberculosis were higher in HIV co-morbid TB patents. In another study by Catherine R Stevenson et. al. showed 18.4% (12.5% to 29.9%) of people with pulmonary tuberculosis (both smear-positive and smear-negative) have diabetes, and that in the smear positive group diabetes prevalence is 23.5% (12.1% to 44%).<sup>1</sup>

## CONCLUSION

Our study tried to explore the role of co-morbidities affecting tuberculosis disease. Almost equal proportions suffered from either co-morbidity. Though more importance is being given to HIV-TB co-infection, we cannot overlook DM, which has shown higher

preponderance in the present study compared to HIV among TB patients. The rising prevalence of DM in high TB burden countries may adversely affect TB control. Diabetes might not be in the same risk factor league as HIV but the 8% of new cases of active tuberculosis attributable to diabetes amounts to more than 700 000 cases per year worldwide—cases that would not have occurred in the absence of diabetes more specific and sensitive diagnostic tests may be warranted if resources are available. Screening for comorbidities in patients with tuberculosis or diabetes is really necessary Diabetes contributed 25% of the TB cases studied, whereas human immunodeficiency virus (HIV) infection contributed 5% or fewer.

As a risk factor, diabetes is certainly not in the same ballpark as HIV but it has a lot going for it as a target for us. It currently affects at least 5% of the world's population, or close to 380 million people. And that number is growing rapidly. What's more, like HIV-infected people, a large proportion of people with diabetes come to clinics, physicians' offices, health centres, and so on. They are therefore readily accessible to screening.

Integrating TB and diabetes control Programs worldwide would facilitate TB prevention among diabetes patients and is a public health priority in the upcoming 12<sup>th</sup> year plan.

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# Prevalence and Spectrum of Cardiac Disease in a Rural Populace of Coastal Andhra Pradesh

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## ABSTRACT

**Background:** By the year 2020 India will have more number of cardiac cases than any other country in the world. Epidemiological transition has brought about a significant change in the disease pattern in the last four decades. Studies regarding the prevalence of cardiac disease in this region are few.

**Objective:** The objective of this study was to examine the prevalence and pattern of cardiac disease in the rural population of coastal Andhra Pradesh.

**Method:** Under Rajiv Arogyasri, a community health insurance scheme 213 health camps were conducted in five districts of coastal Andhra Pradesh and 22508 subjects were screened for cardiac disease between December 2007 and November 2011. Cardiac screening included clinical examination, electrocardiography and echocardiography. After screening 1970 subjects were found to have cardiac disease and were admitted in the hospital for further investigations and treatment.

**Results:** The cardiac disease prevalence rate in this study was 8.75%. Coronary artery disease (CAD) was found in 73% of the subjects, Rheumatic heart disease (RHD) in 17%, Congenital heart disease (CHD) in 3.35%, Cardiomyopathy in 3.35%, Complete heart block in 2.74% and Pericardial disease in 0.41% subjects.

**Conclusion:** Cardiac disease prevalence rates were high in the rural population of coastal Andhrapradesh. Coronary artery disease accounted for 3/4ths of the disease burden followed by rheumatic heart disease. Congenital heart disease, cardiomyopathy, conduction abnormalities and pericardial disease together contributed for 10% of the cardiac disease.

**Keywords:** Prevalence, Cardiac Disease, Andhra Pradesh

## INTRODUCTION

By the year 2020 India will have more number of cases with cardiac disease than any other country in the world<sup>1</sup>. Epidemiological transition has brought about a significant change in the disease pattern in the last four decades bringing coronary artery disease in to the forefront. While coronary artery disease is

burgeoning, Rheumatic heart disease still remains a major cause of morbidity and mortality and accounts for a large number of cardiac admissions in developing countries including India<sup>3</sup>. In fact India contributes to 25-50% of the global burden of rheumatic heart disease. Half of the cases of infective endocarditis and substantial proportion of strokes in Asian countries are due to underlying rheumatic heart disease<sup>4</sup>. The burden of Congenital heart disease is also enormous due to high birth rates and affects 8-10 per 1000 livebirths<sup>5</sup>. Statistical data regarding less common cardiac conditions like cardiomyopathy, conduction abnormalities and pericardial disease is scarce in India. The increase in coronary artery disease burden is due to rapid economic development, urbanization, changing lifestyles, aging population and abnormal

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Apolipoproteins (ApoB/ApoA) in Indians<sup>6</sup>. Development in India is not uniform and despite rapid economic growth, poverty, income inequalities, overcrowding and lack of accessibility to quality medical care have increased in many parts of the country contributing to high prevalence of RHD<sup>3</sup>. There is paucity of data on the prevalence of cardiac disease in different parts of India. and the prevalence rates may not be uniform through out the country as the dietary habits, life styles, cultural practices and medical facilities differ in a vast country like India<sup>1</sup>. Urban, rural differences in the prevalence of cardiac disease were seen in most of the studies and risk factor levels may also vary in different parts of the country. Major differences in cardiac disease mortality rates in different Indian states were reported varying from 75–100/one lakh population in sub-Himalayan states of Nagaland, Meghalaya, Himachal Pradesh and Sikkim to a high of 360–430/one lakh population in Andhra Pradesh, Tamil Nadu, Punjab and Goa<sup>7</sup>. Given that cardiac disease is already a major problem in India and is likely to be substantially more common in the future, much larger prevalence and cohort studies involving more number of individuals should be conducted and these studies should be geographically representative. Identifying high risk populations will help in judicious use of limited health resources. There is shortage of good quality comparable epidemiological data in India. There is an urgent need for new epidemiological research in India<sup>8</sup>. Collaboration among investigators and standardization of study protocols across the country will enable pooling of data and better study outcomes. The objective of this present study was to examine the prevalence and spectrum of cardiac disease in the rural populace of coastal Andhrapradesh.

## METHOD

Under the Rajiv Arogyasri (A community health Insurance scheme sponsored by the government of Andhra Pradesh for people below poverty line in the state) 213 health camps were conducted by GSL medical college in rural primary health centers covering a population of 30000, in five districts of coastal Andhra Pradesh over a period of 4 years from December 2007 to November 2011. 22508 subjects were screened for cardiac disease by cardiologists and senior physicians with experience in cardiology. Cardiac screening included history and clinical examination followed by necessary investigations like electrocardiogram and echocardiography at the field

level. Informed consent was obtained from all the participants. Age, gender and anthropometric measurements like height, weight and body mass index were recorded for all subjects. History of Hypertension, diabetes, smoking and coronary heart disease were obtained from relevant subjects. All subjects were clinically examined for signs and symptoms of cardiac disease followed by electrocardiogram and echocardiography. Subjects with cardiac disease were admitted in the hospital and underwent further investigations like haemogram, blood urea, serum creatinine, fasting and post prandial blood glucose, lipid profile, X ray chest, colour doppler study and exercise stress test. The criteria for the diagnosis of coronary heart disease were: (1) History of angina or myocardial infarction and or on drug treatment for coronary heart disease (2) ECG changes suggestive of Q-wave changes (Minnesota codes 1-1-1 to 1-1-7) or ST-segment depression (Minnesota codes 4-1 to 4-2) or T-wave changes (Minnesota codes 5-1 to 5-3)<sup>9</sup>. Congenital heart disease and Rheumatic heart disease were diagnosed using echocardiography and colour Doppler study. Cardiomyopathy was diagnosed after excluding other known causes of cardiac failure. Complete heart block was diagnosed from ECG interpretation. Hypertension was diagnosed when the subject's Bloodpressure was > 140/90 mm Hg or already on antihypertensive medication. Diabetes was diagnosed when the fasting blood glucose was more than 126mg /dl or post prandial blood glucose >180 mg/dl or if the subject was already on oral hypoglycemic agents or Insulin. Individuals were classified as nonsmokers (never smoked) and smokers (ex-smokers plus current smokers). An early morning fasting blood sample was taken for estimating lipid profile. Total cholesterol to HDL cholesterol ratio >4.5 was taken as dyslipidemia. A BMI more than 25kg/ m<sup>2</sup> was considered as over weight..

## RESULTS

All analyses were performed using SPSS software trail Version 16.0 and MS-Excel 2007. Fisher's exact test was used to examine differences with categorical variables. Values are presented as mean ( $\pm$ SD). For all statistical analyses,  $P < 0.05$  was considered statistically significant. Of the 22508 subjects screened 1970 of them were found to have cardiac disease. The prevalence rate for cardiac disease in rural coastal Andhrapradesh in this study was 8.75%. 57.6% of the subjects were males and 42.4% were females. 1443 subjects (73.52%)

had Coronary artery disease, 333(16.9%) had rheumatic heart disease, 66(3.35%) had congenital heart disease, 66(3.35%) had cardiomyopathy, 54(2.74%) had complete heart block and 8 (0.41%) had pericardial disease(Figure-1). The mean age of the coronary artery disease(CAD) subjects was 54.5±10 years. 65.7% were males and 34.3% were females. Hypertension was found in 65.7% patients, diabetes mellitus in 33.2%, smoking in 42.4%, dyslipidemia in 30.8% and BMI more than 25kg/M<sup>2</sup> was seen in 28% cases. The mean age of the rheumatic heart disease(RHD) subjects was 28.7±5.4 years ,80.48% were females and 19.52% were males. Mitral valve disease was the predominant lesion

occurring in 94% of cases. Mitral valve was pliable in 142(42.64%) cases and non pliable in 171(57.36%)cases.Double valve disease was seen in 6% cases. The mean age of the congenital heart disease(CHD) subjects was 10.5±2.42 years,50%were males and 50% were females. The mean age of the cardiomyopathy subjects was 49±7.2 years,79% were males and 21% were females. The mean age of the subjects with complete heart block (CHB) was 59.07±6 years, 87% were males and 13% were females. The mean age of the subjects with pericardial disease was 33.25 ± 4.12 years,75% were males and 25%were females(Table-1).

**Table-1: Age and Sex distribution of the study population**

Cardiac disease	Male	Female	MeanAge(yrs)	Total	percentage
CAD	942(65.7)	501(34.3)	54.5±10	1443	73.52%
CRHD	65(19.51)	268(80.49)	28.7±5.4	333	16.9%
CHD	33(50)	33(50)	10.5±2.42	66	3.35%
CARDIOMYOPATHY	52(79)	14(21)	49±7.2	66	3.35%
CHB	47(87)	7(13)	59.07±6	54	2.74%
PERICARDIALDISEASE	6(75)	2(25)	33.25 ± 4.12	8	0.041%

CAD: Coronary artery disease,CRHD: Chronic rheumatic heart disease, CHD: Congenital heart disease, CHB: Complete heart block,

**Table 2: Distribution of cardiac disease in different age groups.**

Age	CAD	CRHD	CHD	CHB	CARDIOMYOPATHY	PERICARD	Total1970
0-10	0	0	15 M 18 F	0	0	0	33
11-20	0	12 M 35 F	12 M 6 F	0	0	2 M	67
21-30	6 M 1 F	23 M 90 F	2 M 4 F	0	2 M 3 F	2 M	133
31-40	68 M 5 F	13 M 77 F	3 M 2 F	6 M 1 F	8 M 3 F	0	187
41-50	204 M 88 F	9 M 54 F	1 M 1 F	12 M 3 F	12 M 2 F	0	387
51-60	324 M 204 F	8 M 12 F	0	7 M 3 F	18 M 5 F	0	584
61-70	236 M 181 F	0	0	14 M 0	12 M 1 F	1 M	445
71-80	86 F 21 F	0	0	8 M 0	0	0	115
81-90	18 M 1 F	0	0	0	0	0	19

CAD:Coronary artery disease,CRHD:Chronic rheumatic heart disease, CHD:Congenital heart disease,CHB:Complete heart block,Pericardial:Pericardial disease.

**Table 3: Association between risk factors and CAD in Different age groups**

Study Variables	25-34-18(1.2)	35-44-192(13.4)	45-54-451(31.2)	55-64-483(33.5)	65-74-274(19)	75-84-25(1.7)	P Value
Hypertension	11	135	259	352	178	14	0.0000
Diabetes Mellitus	4	50	160	174	85	7	0.1062
Smoking	0	110	192	210	89	7	0.0000
DyslipidemiaHDL:TC>4.5	4	75	117	178	71	11	0.0002
BMI =>25kg/m2	11	50	128	132	92	7	0.0212
Creatinine>1.5mg/dl	0	14	64	103	60	4	0.0000
LV DysfunctionEF<50	7	117	309	309	213	14	0.0000

CAD: Coronary artery disease, BMI :Body mass Index ,HDL: High density cholesterol, TC: Total cholesterol, EF:Ejection fraction.

**Table 4:Profile of Congenital Heart Disease in Costal Andhrapradesh**

Age group	ASD	VSD	PDA	TOF	Bicuspid aortic valve	Ebstein's Anamoly	TGA	PS
0-10	10	8	4	4	2	1	2	2
11-20	6	6	3	2	1	0	0	0
21-30	4	2	0	0	0	0	0	0
31-40	4	1	0	0	0	0	0	0
41-50	2	0	0	0	0	0	0	0
51-60	2	0	0	0	0	0	0	0

ASD; Atrial septal defect,VSD: Ventricular septal defect, PDA:Patent ductus arteriosus, TOF: Tetralogy of Fallot, TGA:Transposition of great arteries PS: pulmonary stenosis

## DISCUSSION

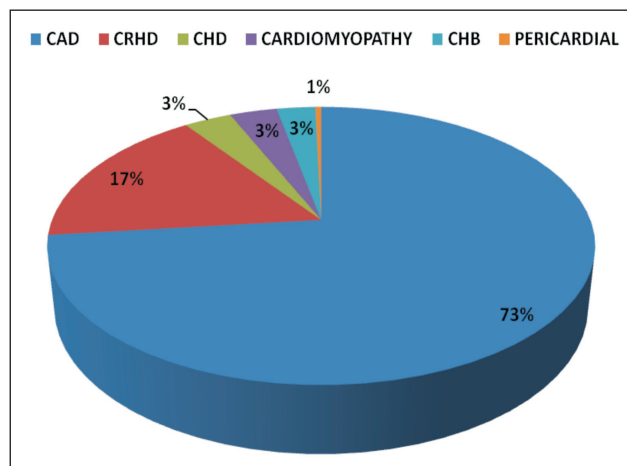
There are few Population based epidemiological studies regarding the prevalence of cardiac disease in India and particularly from Andhrapradesh. This study focused on the prevalence and spectrum of cardiac disease in the rural population of costal Andhra Pradesh. The cardiac disease prevalence rate in this study was 8.75% and coronary artery disease contributed for nearly 3/4<sup>th</sup> of the cardiac disease burden(Table-2). The mean age of the CAD population was 54.5±10 years and there was male preponderance. Seventy eight percent of the subjects were in the age group of 35 -64 years. This observation confirms the general impression that CAD occurs at a younger age in Indians compared to their counter parts in the west<sup>10</sup>. High prevalence of coronary risk factors in the studied population explains this increasing trend in CAD. From the Inter Heart Study it is evident that nine modifiable risk factors account for 90% of coronary artery disease burden in developing countries<sup>11,12</sup>. Significant association was seen between risk factors and coronary artery disease in this study except for diabetes (table-3).Low socio economic status of the studied population might be responsible for lack of association with this important risk factor.

Rheumatic heart disease was the second most common cardiac disease prevalent in this region accounting for 17% of the cardiac disease burden, and 80% of the affected subjects were females. The prevalence of RHD in this study was 14.8 /1000population. Contrary to the general view that RHD is on decline, this study shows that RHD is still a major cardiac problem in the rural population of Andhra Pradesh. A meta analysis report and few other studies suggest that there is no decline in the prevalence of RHD over the last 20 years<sup>4,13</sup>. In one study clinical examination revealed only 0.8 RHD cases per thousand population where as echocardiography revealed 20.4 cases of RHD per 1000 population<sup>14</sup>. The reported differences in the prevalence of RHD may be due to different diagnostic methods adopted in various studies or due to non uniformity of the populations studied. Congenital heart disease(CHD) and cardiomyopathy each contributed for 3.35% of cardiac disease. The prevalence of CHD in this study was 2.93/1000 patients. In community based studies CHD prevalence rates vary between 0.8-5.2/1000 patients. when compared with other studies in the country CHD rates in this study did not differ significantly from other studies<sup>15</sup>. Half of the CHD cases were seen in the first

decade of life and were equally distributed between males and females. Atrial septal defect and ventricular septal defect accounted for most of the cases followed by patent ductus arteriosus and tetralogy of Fallot. Bicuspid aortic valve, Transposition of great arteries and pulmonary artery stenosis were seen in two cases each and there was one case of Ebstein's anomaly (Table-4). Though profile of CHD varies with the age groups studied the observations in this study are similar to other studies in India.<sup>15,16</sup>. One interesting observation in this study was that Cardiomyopathies accounted for 3.5% of the cardiac disease. Dilated cardiomyopathy accounted for most of the cases in men and puerperal cardiomyopathy in women. Complete heart block was more common among elderly males accounting for 87% of the cases. Pericardial disease was seen in 8(0.41%) cases and tuberculosis was responsible for all the cases. This is perhaps due to Higher prevalence of pulmonary tuberculosis and HIV in India.

### CONCLUSION

It is evident from this study that coronary artery disease was the leading cause of cardiac disease accounting for 3/4<sup>th</sup> of the disease burden. This study also shows that contrary to the general impression, RHD is not on decline in the rural populations. CHD prevalence rates are comparable with national average prevalence rates. Cardiomyopathies and conduction abnormalities were found to be significant contributing factors for cardiac morbidity and mortality. Pericardial disease in this study was solely due to tuberculosis.



CAD:Coronary artery disease,CRHD:Chronic rheumatic heart disease, CHD:Congenital heart disease,CHB:Complete heart block,Pericardial:Pericardial disease.

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**Conflict of Interest:** We declare that there is no conflict of interest.

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# KAP Study on Second Hand Smoke among Pregnant Mothers Attending Tertiary Care Rural Hospital

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## ABSTRACT

**Background:** Second hand smoke (SHS) released from the burning end of cigarette and exhaled mainstream smoke. When inhaled by pregnant mothers, it can cross the placenta and increased risk of neonatal and perinatal morbidity and mortality. On literature search we could not find out data on exposure to SHS during pregnancy in India which seems to be the household disaster for her.

**Method:** Questionnaire was administered to pregnant mothers attending the clinic regarding their exposure status and knowledge on SHS. Focus group discussion (FGD) was arranged for mothers who failed to take any preventive efforts to avoid SHS to explore the barriers.

**Results:** All of study belongs to low socio-economic status, 87% were exposed to SHS in family and only 11% know the exact effect of SHS on fetus. Most of them heard of SHS from Televisions and very few were informed by the health care providers. 79% had not taken any preventive efforts for same. Main barriers recognized were the ignorance, low status in family and unfavorable social environment.

**Conclusion:** Non smoking pregnant women in India are often exposed to SHS and their preventive actions are very weak.

## INTRODUCTION

Secondhand tobacco smoke, known as Environmental tobacco smoking (SHS), is a combination of mainly side stream smoke released from the burning end of a cigarette and also from partly exhaled mainstream smoke. Secondhand smoke can cause an adverse effect on the nonsmoker's cardiovascular system and increase the risk for lung cancer and coronary heart disease [1]. For pregnant women, toxic substances from secondhand smoke cross the placenta to affect the fetus directly, putting the infant at increased risk for neonatal and perinatal morbidity and mortality [1]. Numerous research studies in the United States and others have found that smoking and exposure to secondhand smoke among pregnant women is a major cause of spontaneous abortions, premature births, stillbirths, and many other complications such as placenta praevia, placental abruption, and a shorter gestation period. [2]

Both smoking during pregnancy and secondhand smoke exposure by the pregnant mother increases the risk of sudden infant death syndrome (SIDS). [1] According to a meta-analysis of published studies, tobacco use is responsible each year for 19,000 to 141,000 spontaneous abortions; 1,900 to 4,800 infant deaths caused by perinatal or pre-birth disorders; and 1200 to 2200 deaths from SIDS. [3] Nineteen studies done on effect of second hand smoke on fetus with no significant result when were pooled together to find out passive smoking increased the risk of still birth by almost one-quarter (23 per cent) and was linked to a 13 per cent increased risk of congenital birth defects.[4]

In India according to NFHS 3 report (2005-06) [5] though the current female smokers were only 1.4 % but they are exposed to Second hand smoke by their 32.7% male counterparts among whom 43% smoke 10 or more cigarette in one day. Of the estimated 1.1 billion smokers worldwide, about 182 million (16.6%) are in

India.<sup>[6]</sup> Major efforts had been devoted to education on adverse effect of smoking and smoking cessation programmes. In contrast significant and health consequences of exposure to SHS as well as knowledge and attitude of the community especially pregnant women of low socio-economic strata had received much lesser attention from researchers and public health educators. On literature search we could not find out data on exposure to SHS during pregnancy in India. Taking into consideration high smoking prevalence in males, their dominant role in family, absence of smoking restriction rules in family, SHS seems to be real disaster in household particularly for pregnant women. In order to carry out interventional programme it is important to know existing knowledge, attitude and behavior towards SHS exposure at home so further study was conducted.

### METHODOLOGY

Pregnant mothers attending the ANC clinic at Acharya Vinoba Bhave Rural hospital were the study participants. Study consisted of two phases. In phase 1, all the ANC mothers attending the outpatient department for regular health checkup during the study period November 11 to January 12 were administered the structured questionnaire after obtaining the informed verbal consent. Questionnaire contained the preliminary data on socio-demographic profile, presence of smokers in the household, knowledge of effect of second hand smoke on fetus, any preventive efforts taken. At the end of study period 312 pregnant mothers completed the questionnaire.

In phase 2, pregnant mothers who had not taken any efforts for smoke free environment at home and willing to talk freely on the barriers that prevent them from opposing men’s smoking at home were asked to participate. According to their convenience the day and time for focus group discussion was allotted. Care was taken to include 10-12 participants in each group and session lasted for not more than 60 minute. Likewise 4 groups were formed and all interviews were conducted in separate room and audio recorded, transcribed and translated from Marathi to English. The confidentiality and anonymity was maintained. Data analysis was done by SPSS 16 and manually in FGD under four domain- risk analysis, Self perception, Relationship issue and social influence, environment factor.

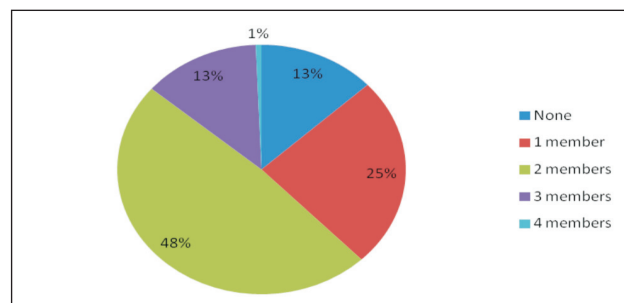
### RESULTS

Table 1 shows that 49.36% were between 21-25 yrs, 54.81% and 42.31 % were laborers and house wife respectively, 46.79% had education up to secondary level, and 49.04 % belong to class 4 according to Prasad classification.

Fig 1 shows that 77, 151, 41, and 2 participants had 1, 2, 3 and 4 members respectively smoking in family while 41 had no smoking members. 51.9% know of SHS don’t know the consequences while only 11% were aware of it as in table 2. As in fig 2, 173 participants obtain information from TV, 18 from Health worker, only 5 from their doctors. Fig 3 shows that only 19 participants tried to restrict smoking at home and 39 walk outside room. Only 4 out of 19 got success in their efforts but in all of them this issue had raise the quarrel shown in table 3. Results for FGD organized in table 4.

**Table 1: Socio- Demographic profile of participants (312)**

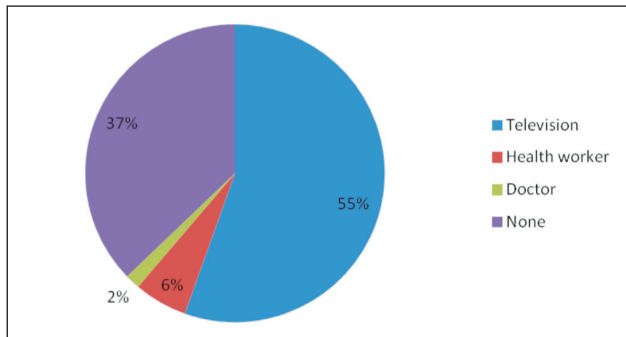
Age (yrs)	No. of participants	Percentage
18-20	24	7.7
21-25	154	49.36
26-30	87	27.88
31-35	38	12.18
>35	9	2.88
<b>Occupation</b>		
Laborer	171	54.81
House wife	132	42.31
Other	9	2.88
<b>Education</b>		
Illiterate + primary	2 + 67	0.64 % + 21.47 %
Secondary	146	46.79
Hsec & graduate	97	31.09
<b>Social status</b>		
III	121	38.78
IV	153	49.04
V	38	12.18



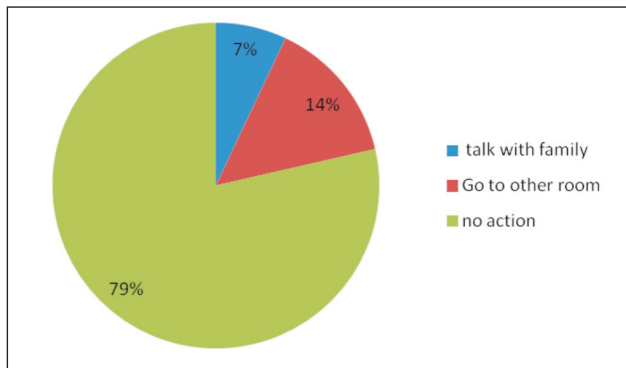
**Fig. 1. Presence of smoking in household**

**Table 2 : Knowledge of effect of Second hand smoke on fetus**

Knowledge of effect of SHS	No. of participants	Percentage
Aware	34	10.9 %
Had some effect but don't know	162	51.92%,
Totally ignorant	116	37.18%



**Fig. 2. Distribution according to source of information on effect of SHS on fetus**



**Fig. 3. Distribution of participants according to preventive efforts taken for second hand smoke**

**Table 3: Consequences of those who opposed the smoking at home (19)**

	No. of participants	Percentage
Stopped	4	21.05 %
Ignored	15	78.95 %
Quarrel	19	100 %

**Table 4: Themes and ideas emerged during FGD**

Domain	Themes
Risk appraisal	Ignorance of effect of SHS to fetus
	False sense of security for other children being healthy
	Very minor issue to raise a concern and fight
	In womb it can't get exposed to SHS

**Table 4: Themes and ideas emerged during FGD (Contd.)**

Domain	Themes
Self perception	Feeling of helplessness to bring change
	Dependent on husband so have to accept situation
	No rights to talk on such issues
	Rearing a child is their sole responsibility
Relationship issue and social influence	Quarrel with husband, in laws etc
	Husband will not support as he is addicted
	Opposition means disrespect to them
Environment factor	No legislation for smoke free environment at home
	Easily available cigarette
	All males in family smoke (peer pressure)
	Stressful environment ,smoking relieves tension
	Extrovert women are criticize in community
	Male dominancy

**DISCUSSION**

Mean age of study participants was 24.38 ± 3.36 yrs. This study reveals the high SHS exposure of pregnant women (86.85%) as in other counties [7, 8] while no data is available regarding SHS in India. This was expected because of high smoking prevalence among males in India, all study participants belong to low social class, which we have done purposefully, as this women are mostly suppressed while approximately half of them had 2 members smoking in household which means there may not be enough space to avoid SHS. However according to WHO report toxic gases and particulate matter of SHS remain suspended in air of room, attached to surface of furniture or wall long after smoking has ceased. [9] As revealed by study the respondents had limited knowledge on effect of SHS on fetus except few (11%).Majority of them were aware of some consequences on fetus but could not describe even one condition. Most of them came to know of SHS from Television which is most popular media but none of them received information of particular hazardous effect on fetus from any sources, not even from doctors. This fact also plays a role for such tolerant behavior towards SHS as only 7 % of them had raised voice regarding stoppage of smoking at home. It is far worse in India than in American countries where at least half

of the respondents tried restriction at home. [7] Preventive effort was successful in only 4 household out of 19.

In depth interview was taken of those who did not took any step to avoid SHS to explore the reason for such behavior. The main issue was their ignorance regarding effect of SHS on fetus. The women seemed to accept the situation and bear it. The social and cultural acceptance of smoking, low status of women in family, not ready to compromise the family harmony was among the other barriers we came across. Many women also think that child bearing is their sole responsibility and don't want to trouble the husband.

### CONCLUSION

Non smoking pregnant women in India are often exposed to SHS and their preventive actions are weak. SHS is important obstetric and public health problem and deserve the urgent attention. Health education program should also focus on effect of SHS on fetus emphasizing to couples, in laws etc. Health workers and primary care physician could play important role since physician delivered cessation effort is proven to be successful.[13 Ockene Jk, Kristeller J, Pbert L, et al, The physician delivered smoking intervention project: can short term intervention produce long term effect for general outpatient population, Health psychology, 1994;13:278- 81] Such efforts should focus on improving the knowledge, attitude regarding exposure to SHS and suggesting strategies to limit exposure to SHS for themselves and children, thus empowering them to be more assertive when exposed to SHS.

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# Comparative Study of Various Statin Combinations in Dyslipidaemias

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## ABSTRACT

Hyperlipidaemia results from a disorder in the synthesis and degradation of plasma lipoproteins. Dyslipidaemias have genetic and other causes, and are often associated with high fat diet. The lipids that are of relevance in hyperlipidaemias are cholesterol, an essential component of cell membranes and a precursor of steroid hormone synthesis, and triglycerides, an important energy source. They are transported in the blood as lipoproteins. This study involved 120 patients (both male and female) aged between 30 to 80 years, presenting for treatment in the medical outpatient department of GSL General Hospital. The patients were divided into two groups namely Group A and Group B. Group A patients are those who are taking Atorvastatin 10mg with Fenofibrate 160mg and Group B patients are those who are taking Atorvastatin 10mg and Ezetimibe 10mg as Fixed dose Combinations. After thoroughly analyzing results it was understood the patients with Dyslipidaemias had significantly higher lipid profile levels when compared to post treatment values and their statin combinations therapies resulted in significantly lower mean lipid profile values, which was well correlated with the decrease in total cholesterol, Triglycerides, LDL, VLDL and increase in HDL cholesterol levels.

**Keywords:** Dyslipidaemias, Ischemic Heart Disease, Hyperlipidaemias, Fenofibrate, Atorvastatin, Ezetimibe

## INTRODUCTION

Dyslipidaemia is a form of a disorder in the synthesis and degradation of plasma lipoproteins. Dyslipidaemias have genetic and other causes and are often associated with fat diet. The cardiovascular diseases obviously are the forerunners of ischemic heart disease, stroke, and sudden cardiac death. Dyslipidaemia is a common feature associated with hypertension. The key features of the dyslipidaemias associated with hypertension and elevated triglycerides and reduced HDL uncontrolled hypertension and presence of complications can come further changes in the lipid profile.

Entry of combination therapies offering targeted forms of treatment<sup>5</sup>

The Framingham Study<sup>1</sup> found a 9% increase in death from cardiovascular disease for each 10mg/dl (0.26 mmol/l) rise in total plasma-cholesterol concentration.

Low plasma concentrations of HDL-cholesterol (below 1mmol/l or 40 mg/dl) are generally associated with increased risk of IHD, whereas high concentrations are protective<sup>4</sup>

Hyperlipidaemia may result from a number of underlying defects and various methods have been used for classification<sup>2</sup>

**Non pharmacological approach:** Lifestyle modifications are the first step for decreasing the risk for atherosclerosis like consist of healthy diet (low fat + high roughage), weight control, increased physical activity, and smoking cessation. Clinical guidelines recommended drug therapy to be started concurrent with lifestyle changes in patients with IHD or in patients having LDL greater than 130mg/dl.

**Pharmacological approach:** Against hypercholesterolemia.

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**First line therapy:** More effective in lowering LDL-C, increasing HDL-C.

- 1) HMG CoA reductase inhibitors (vastatins): Atorvastatin, Simvastatin, Lovastatin, Pravastatin, and Rosuvastatin.
- 2) Bile Acid-Binding Resins: Cholestyramine, Colestipol, Colesevelam.
- 3) Inhibitors of Intestinal Absorption of Cholesterol: Stanol esters, Ezetimibe.

**Second line therapy:** More effective in lowering TG, VLDL.

- 1) Activators of lipoproteins Lipase (LPL) (Fibrates):
- 2) Inhibitors of the Secretion of Apo-B100 containing Lipoproteins: Niacin (nicotinic acid)
- 3) Miscellaneous agents: Probucol, Gugulipid, Omega 3 FAs.

### Atorvastatin

**Pharmacodynamics:** Partially inhibits HMG-CoA reductase, the rate limiting step of cholesterol synthesis. This induces LDL receptor formation and removal of LDL cholesterol from blood.

### Pharmacokinetics

**Absorption:** Atorvastatin is rapidly absorbed after oral administration. Cmax occur in 1-2 hrs, the absolute bioavailability is 14% and systemic availability is 30%.

**Distribution:** Mean volume of distribution is 381 liters. It is 98% plasma protein bound <sup>6</sup> A blood/Plasma ratio of 0.25.

**Metabolism:** Atorvastatin is extensively metabolized to ortho and para hydroxylated metabolites. Atorvastatin metabolized by cytochrome p450 3A4 consistent with increased plasma concentration by co-administration with Erythromycin like enzyme inhibitors.

**Excretion:** Atorvastatin is eliminated primarily in bile following hepatic and/or extra hepatic metabolism. However the drug does not appear to undergo enterohepatic circulation. Mean elimination half life is 14 hrs less than 2% of dose is recovered in urine.

**Therapeutic uses:** Lowered LDL-cholesterol 20-60% depending on doses and drugs. Raises HDL-C 5-

10%. However, at higher doses ( $\geq 40$  mg) can lower HDL-C, lowers TG's 15-25%.

**Side Effects:** Abnormal LFT's, Myositis/Myalgias, Rarely Rhabdomyolysis with acute renal failure may develop.<sup>3</sup> Toxic epidermal necrolysis apparently caused by Atorvastatin has been reported <sup>7</sup>

### Ezetimibe

**Pharmacodynamics:** Selectively inhibits the intestinal absorption of cholesterol and related Phytosterols.

### Pharmacokinetics

Ezetimibe is administered orally, its absolute bioavailability cannot be determined because of its aqueous insolubility; the oral absorption ranges from 35-60%. Mean peak concentrations are reached within 1 to 2 hrs, exclusively bound ( $>90\%$ ) to plasma proteins. The co-administration of food with ezetimibe has no effect on the extent of absorption.

**Therapeutic uses:** Decreases the delivery of intestinal cholesterol to the liver, thereby reducing hepatic cholesterol stores and increases the clearance of cholesterol from the blood rather than inhibiting cholesterol synthesis. Reduces LDL by 18% TG by 5% and apolipoprotein B by 16%.

**Side Effects:** Well-tolerated with few adverse reactions similar to placebo.

### Fenofibrate

**Pharmacodynamics:** Reduces VLDL synthesis and induces lipoprotein lipase.

### Pharmacokinetics

Fenofibrate is readily absorbed from G.I.T. It is rapidly hydrolysed to its active metabolite which is 99% bound to plasma albumin. Its peak plasma concentration is reached in 4-8hrs. The plasma half life is 20-22hrs. Fenofibric acid is excreted predominantly in the urine-60-90%, mainly as glucuronide conjugation, 5-25% in faeces. It is not removed by haemodialysis.

**Therapeutic uses:** Best triglyceride reducing drugs lowers 50% or more in many patients. Raises HDL 15%, reduces CHD patients with low HDL, high TG's.

**Side Effects:** Nausea and skin rash.

## MATERIALS AND METHOD

This study involved 120 patients (both male and female) aged between 30 to 80 years, presenting for treatment in the medical outpatient department of GSL General Hospital, Rajahmundry, Andhra Pradesh. The patients were divided into two groups namely Group A and Group B. Group A patients are those who are taking Atorvastatin 10mg with Fenofibrate 160mg and Group B patients are those who are taking Atorvastatin 10mg and Ezetimibe 10mg as Fixed dose Combinations.

The study was conducted over a period of one year i.e. from July 2008 to August 2009.

### Inclusion Criteria

- The patients included are above 18 years of age, any race, and any gender.
- The patients must have the following fasting parameters:
  - LDL-C > 100 mg/dL and < 250 mg/dL.
  - TG level  $\geq$  100 mg/dL and < 400 mg/dL.
  - HDL-C < 30 mg/dL (men) and < 40 mg/dL (women).
- The patients must have one or more of the following:
  - Treated or untreated hypertension defined as blood pressure (BP)
  - 130 mmHg  $\geq$  85 mmHg (systolic / diastolic).
  - Waist circumference > 88 cm (35 inches) for women or > 102 cm (40 inches) for men.
  - Fasting glucose defined as  $\geq$  100 mg/dL but  $\leq$  125 mg/dL.
- The patient has, in the opinion of the investigator, a life expectancy greater than 6 months.
- Female patients must have a negative pregnancy test prior to study enrollment
- Female patients of child bearing potential must agree to practice an effective barrier method of birth control for the duration of the study.
- Patient must be willing to observe the Step I Diet recommended by the NCEP throughout the study.

- Patient must be willing to participate in the study and to complete all follow-up assessments.

### Exclusion Criteria

- A patient has a known hypersensitivity to Fenofibrate, Ezetimibe, or Atorvastatin.
- Patient has a history of pancreatitis or cholelithiasis or a history of gastric or duodenal ulcer within 3 months of study entry.
- Patient has hematologic, digestive, or central nervous system disorder including cerebrovascular disease or degenerative disease that would limit study evaluation or participation.
- Patient has had a myocardial infarction, coronary bypass surgery, or angioplasty within 6 months of study entry.
- Patient has unstable or severe peripheral artery disease within 3 months of study entry.
- Patient has unstable angina pectoris or uncontrolled cardiac arrhythmias.
- Patient has coagulopathy (PT or PTT > 1.25 times control).
- Patient has known impairment of renal function (serum creatinine > 1.5 mg/dL), dysproteinemia, nephrotic-range proteinuria, or other renal disease.
- Patient has active or chronic hepatobiliary or hepatic disease (subjects with AST or ALT > 2 times the upper limit of the central laboratory reference range).
- Patient is pregnant or lactating.
- Patient is receiving hormonal therapy.
- Patient has a known history of thyroid disease or other endocrine abnormality.
- Patient has a history of diagnosed hereditary or acquired myopathy.
- Patient is known to be HIV positive.
- Patient has a history of mental instability, drug or alcohol (as defined by greater than 14 drinks per week) abuse, or subject has been treated for severe psychiatric illness, which, in the opinion of the investigator, may interfere with optimal participation in the study.

- Patient has received a solid organ transplant.
- Patient has a clinically significant, unstable, uncontrolled disease that could be adversely affected by study participation.
- Patient is unwilling or unable to consent to enter the study.

After a detailed history of signs and symptoms routine physical examination was done followed by routine investigations which included ECG, Chest X-Ray, Haemoglobin, TC, DC, ESR, RBS, Urine analysis.

5 ml of venous blood was collected for the biochemical analysis.

### FINDINGS

In this present study 106 patients who were hyperlipidemic between thirty to eighty years of age were taken. Out of 106, 49 were given Atorvastatin plus Fenofibrate (Group A) and 57 patients were given Atorvastatin and Ezetimibe (Group B). Measurements of HDL, LDL, VLDL, Triglycerides and total cholesterol were performed in both the groups. The results of this study were analyzed using SPSS software (statistical package of social studies).

Data was expressed as mean values ± standard deviation (SD). Standard deviation has been taken to indicate whether the variation of difference of an individual from the mean is by chance. Statistical analysis was performed applying independent sample "ANOVA" test to the data of independent samples for Equality of means between the groups & Levenes Test for Equality of variances within the group. The probability value (P) <0.05 was considered as statistically significant because such a difference could commonly occur due to chance and the factor under study may have no influence on the variables.

#### Mean values of total cholesterol in Group A and Group B

The mean serum total cholesterol levels in the study Group A (A+F) initial 238.2, at 3months 226.1 and at 6months is 210 that implies significantly lowering of total cholesterol levels following treatment. And that of group B (A+E) were 237.8, 222.4, and 201.2 which shows a p < 0.05.

#### Mean values of triglycerides in Group A and Group B

The mean serum triglyceride levels in the study Group A (A+F) initial 275.9, at 3months 243.5 and at

6months is 225 that implies significantly lowering of triglyceride levels following treatment. And that of group B (A+E) were 181.5, 169.2, and 156.4 which shows a p < 0.05.

#### Mean values of HDL in Group A and Group B

The mean serum HDL levels in the study Group A (A+F) initial 30.9, at 3months 33.1 and at 6months is 35.4 that implies significantly raise of HDL levels following treatment. And that of group B (A+E) were 39.2, 40, and 42.5 which shows a p < 0.05.

#### Mean values of LDL in Group A and Group B

The mean serum LDL levels in the study Group A (A+F) initial 156.9, at 3months 145.2 and at 6months is 130.2 that implies significantly lowering of LDL levels following treatment. And that of group B (A+E) were 164.9, 152.9, and 142.2 which shows a p < 0.05.

#### Mean values of VLDL in Group A and Group B

The mean serum VLDL levels in the study Group A (A+F) initial 57.2, at 3months 48.9 and at 6months is 43.5 that implies significantly lowering of VLDL levels following treatment, which shows a p < 0.05. And that of group B (A+E) were 39.2, 38, and 35 which shows a p > 0.05 which is not statistically significant.

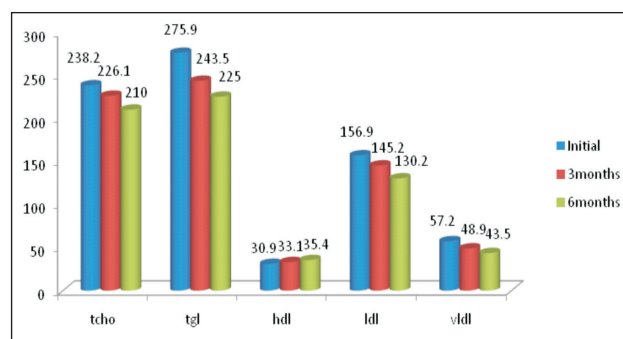


Fig. 1. Mean values of Group A (ATORVASTATIN+FENOFIBRATE) at initial, 3months, and 6months:

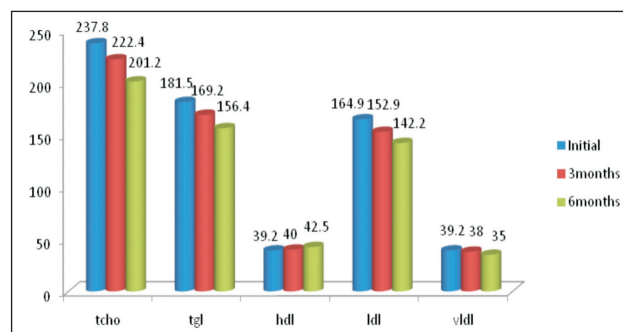


Fig. 2. Mean values of Group B (ATORVASTATIN+EZETIMIBE) at initial, 3months, and 6months:

### **Alteration in Lipid Profile in Group A (A+F) and Group B(A+E)**

The mean total cholesterol in Group A (A+F) at initial, 3months, and 6months was 238.2±5.89, 226.1±5.37, and 210±4.91 respectively, ( $p < 0.05$ ).

The mean total cholesterol in Group B (A+E) at initial, 3months, and 6months was 237.8±5.03, 222.4±4.55, and 201.2±3.95 respectively, ( $p < 0.05$ ).

The mean triglycerides in Group A (A+F) at initial, 3months, and 6months was 275.9±4.99, 243.5±5.52 and 225±4.86 respectively, ( $p < 0.05$ ).

The mean triglycerides in Group B (A+E) at initial, 3months, and 6months was 181.5±6.14, 169.2±5.45 and 156.4±4.79 respectively, ( $p < 0.05$ ).

The mean HDL in Group A (A+F) at initial, 3months, and 6months was 30.9±0.82, 33.1±0.71, and 35.4±0.64 respectively, ( $p < 0.05$ ).

The mean HDL in Group B (A+E) at initial, 3months, and 6months was 39.2±1.27, 40±1.04, and 42.5±1.01 respectively, ( $p < 0.05$ ).

The mean LDL in Group A (A+F) at initial, 3months, and 6months was 156.9±5.57, 145.2±3.43, and 130.2±2.79 respectively, ( $p < 0.05$ ).

The mean LDL in Group B (A+E) at initial, 3months, and 6months was 164.9±4.79, 152.9±4.09, and 142.2±3.58 respectively, ( $p < 0.05$ ).

The mean VLDL in Group A (A+F) at initial, 3months, and 6months was 57.2±1.67, 48.9±1.42, and 43.5±0.95 respectively, ( $p < 0.05$ ).

The mean VLDL in Group B (A+E) at initial, 3months, and 6months was 39.2±1.92, 38±1.39, 35±1.15 respectively, ( $p > 0.05$ ).

From the above data it is evident that the mean serum total cholesterol, triglycerides, LDL, VLDL shows significant decrease in case of group A than in group B, but HDL levels shows increase in both groups. In Group B, the VLDL level shows statistically insignificant figures.

### **CONCLUSION:**

The present study was conducted on 106 patients attending the outpatient medical department, GSL General Hospital from July 2008 to August 2009.

Individuals divided into two groups, Group-A and Group-B randomly.

For Group-A cases Atorvastatin with Fenofibrate given daily for 6months and Group-B cases Atorvastatin with Ezetimibe given daily for 6 months and Levels are estimated.

Total cholesterol, Triglycerides, VLDL, LDL, HDL levels were noted before hypolipidaemic agents and 3months and 6 months hypolipidaemic agents therapy.

After thoroughly analysing results it was understood the patients with dyslipidaemias had significantly higher lipid profile levels when compared to post treatment values and their statin combinations therapies resulted in significantly lower mean lipid profile values, which was well correlated with the decrease in total cholesterol, Triglycerides, LDL, VLDL and increase in HDL cholesterol levels.

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# A Descriptive Study of Desire for More Children in Uttar Pradesh

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## ABSTRACT

**Introduction:** In our society, children are considered as an important part of the families. Most of the couples expect children to act as their successor as well as the preserver of new generation. Most of the married couples want their own children and they proceed to bear and rear them.

**Objective:** The objective of this paper is to study the desire for more children pertaining to demographic and socio-economic characteristics of households in Uttar Pradesh.

**Result:** Out of total respondents 45.2% have more than two children. However, 38.4% and 19.9% of respondents have less than and exactly two children respectively. Among the respondents having less than two children 92% showed desire for another child, however around 52% among the respondents have exactly two children. Out of total sample selected, 80% of population resided in rural areas while 20% in urban areas. 37% of the couples residing in urban areas have desire for another child compared to 54% in rural areas. The education status of women can reduce the demand of additional child and in maintaining family size. The regression coefficient of no education and middle class education are 0.607 and 0.269 respectively with reference to category (Highest education of ever married women). The odds ratio corresponding to no education and middle class education are 1.836 and 1.309 respectively which indicate the desire for additional child is inversely proportional to educational level. Among the religious groups, 84% of respondents are Hindus and 16% are non-Hindus. Through NFHS-2, probability of contraceptive use is higher in Hindus than non-Hindus and the results are statistically significant. The logistic regression coefficient corresponding to the numbers of living children below 2 and above 2 are 1.534 and -1.300 respectively and are statistically significant. Number of living children exactly 2 is considered as reference category because in order to achieve the replacement level fertility the number of living children should not exceed 2. The odds ratios of below 2 and above 2 children are 4.637 and 0.273 respectively. The results indicate that women who were having less than 2 children have higher and women having more than 2 children have lower desire for additional children with respect to women having 2 children.

**Conclusion:** The desire for additional child is more in women having no formal education, women of SC/ST category, having female children, last child died, non-Hindus, low standard living index and rural areas. Therefore, the positive impact of family planning programme and importance of smaller family norm should be included in the curriculum of education especially in the secondary level and motivational activities should be targeted to reduce these differentials.

**Keywords:** NFHS, SPSS, UNFPA, DHS

## INTRODUCTION

The population explosion predicts disaster for humanity. The population control measures are used for reducing the birth rate <sup>5</sup>. The world population crossed 6 billion just before the end of the 20th century. The present estimates are for the population to reach

8-12 billion before the end of the 21st century, at the rate of 3 per second <sup>6</sup>. The consequences of such a large population will be that about half of the people will live in poverty and at least one-fifth will be severely undernourished. The main factors affecting the global human population is fertility. The current growth rate



is 1.3%. The rate is small but acts on a much larger population base, the absolute number of new people being added to the population is approximately 90 million per year. The stabilization of population will require a reduction of the fertility globally.

Uttar Pradesh, the most populous State of India, is home for 166.20 million (Census 2001) people or one sixth of the country's population, encompassing an area of 240,928 square kms, it is the fourth largest State covering 7.6 % of the country's geographical area. The decadal growth rate of the state is 25.85% (against 21.54% for the country) during the decade 1990-2001. Although the growth rate for the country is decreasing in last three decades but the growth rate of U.P. is still increasing. The total fertility rate has declined dramatically from 6.3 children per women in 1990-91 to 3.88 in 2005-06, a decline of 48% over a 15-years period.

According to census 2001, the literacy rate of Uttar Pradesh is 57.4% and male & female literacy rate is 70.23% and 42.98% respectively, showing a large gap of 27.25 % in gender literacy. The main reasons for decreased female literacy are distance of schools from residence, involvement in household work and social commitments.

There remains substantial scope for further fertility declines. Fertility can fall further when more women become able to prevent unwanted births and over look the sex preference with the help of socio-economic and cultural changes. The educated parents realize that having more children decreases their standard of living<sup>3</sup>.

The demographic research has shown that socio-economic and cultural factors influence fertility through biological and behavioral mechanisms such as the use of contraceptive which has a direct effect on fertility<sup>1</sup>. As a result of the low contraceptive use, many women of reproductive age who want to stop or postpone child bearing are not able to do so because there is a high unmet need for contraception in Uttar Pradesh<sup>4</sup>.

The previous research has revealed that the various factors influencing the fertility intentions of women were demographic, socioeconomic and program factors. Using DHS data illustrated that age of women, number of living children, place of residence, education and exposure to media play an important role with respect to fertility intentions of women<sup>[1]</sup>. The child mortality and couples' expectation about

child survival conditions as well as their preferences for a single sex, usually son also plays a vital role in fertility intentions of women<sup>2</sup>. Several other studies have illustrated knowledge, approval and use of family planning as important factors influencing fertility intentions<sup>[5]</sup>.

## OBJECTIVE

The purpose of the present paper is to study the desire for more children pertaining to demographic and socio-economic characteristics of households in Uttar Pradesh. Although we have confined our study relating to data of Uttar Pradesh only, the related techniques can be easily applied to data sets of other states also.

We computed regression analysis to determine the independent effect of socioeconomic and demographic characteristics on the binary dependent variable (desire for a child). The main motive of the analysis is to recognize the factors which are highly affected on demand for a child of respondent that is currently-married woman in their reproductive age-group (15-49 years). For this we used statistical technique known as multiple binary logistic regression analysis.

## MATERIAL AND METHODOLOGY

In this study, we used data from the NFHS (1998-99). In Uttar Pradesh, NFHS-2 was a state representative sample survey with 9292 ever-married women aged 15-49 years, in 8682 household. In this analysis only 8906 eligible women who are able to bear children were considered. The women under sterilization, declared in-fecund, divorced, widowed etc. were not considered for the study.

The regression coefficient can be obtained with the help of maximum likelihood estimation from the log likelihood function by SPSS. Since the demand variable coded as one and zero as demand for another child and no demand for another child, positive regression coefficient shows demand for another child and negative regression coefficient shows demand for no additional child.

## MULTIVARIATE ANALYSIS

In the multivariate analyses of desire for children the likelihood of wanting to have more children are estimated by binary logistic regression model.

**DEPENDENT VARIABLE**

This study examines dependent variable i.e. demand for another child. The desired fertility is measured by a variable indicating whether a married woman wants to have more children. In order to determine the impact of socio-demographic characteristics of individuals, logistic regression models are used. The dependent variable is a dichotomous response variable that was assigned the

value 1 if the respondent demanded for additional children and 0 if there is no demand of additional children.

**INDEPENDENT VARIABLE**

The independent variables used were education, religion, type of place of residence, contraceptive use, number of living children, ethnicity, living son, last child and standard living index.

**Table 1: Categories for the variable used in the computation of demand for children in U.P.**

Variable	Categories
Number of living children (X <sub>1</sub> )	0=Below two, 1=Exactly two, 2=Above two
Religion (X <sub>2</sub> )	1=Hindu, 0=Non Hindu
Education (X <sub>3</sub> )	0=No education, 1=Middle education, 2=Higher education
Type of place of residence (X <sub>4</sub> )	0=Rural residence, 1=Urban residence
Standard of living index (X <sub>5</sub> )	0=Low, 1=Middle, 2=High
Caste (X <sub>6</sub> )	0=Schedule/ tribal caste, 1= Other backward caste, 2= Upper caste
Contraceptive use (X <sub>7</sub> )	1=Yes, 0=No
Last child (X <sub>8</sub> )	0=Male, 1=female
Living son (X <sub>9</sub> )	0=Below two, 1=Exactly two, 2=Above two
Living daughter (X <sub>10</sub> )	0=Below two,1=Exactly two, 2=Above two

**RESULTS**

Table 2 shows descriptive statistics with desire for another child. There are 45.2% respondents of total selected who have more than two children. However, 38.4% and 19.9% of respondents have less than two children and exactly two children respectively. Among

the respondents having less than two children 92% showed desire for another child. However, it is around 52% among the respondents who have exactly two children. The proportion of desire for child by the respondents is comparatively low.

**Table 2: Descriptive statistics and cross-tabulations with desire for another child for the selected respondent**

Background of characteristics	Percentage (%)	Proportion wanting another child (%)	Number of women
<b>Number of children</b>			
Below two	34.8	0.92	1908
Exactly two	19.9	0.52	1091
Above two	45.2	0.17	2477
			5476
<b>Total son</b>			
Below two	63.5	0.72	3475
Exactly two	20.5	0.17	1125
Above two	16.0	0.5	876
			5476
<b>Total daughter</b>			
Below two	65.7	0.62	3601
Exactly Two	18.2	0.32	994
Above Two	16.1	0.22	881
			5476

**Table 2: Descriptive statistics and cross-tabulations with desire for another child for the selected respondent (Contd.)**

Background of characteristics	Percentage (%)	Proportion wanting another child (%)	Number of women
<b>Place of residence</b>			
Urban	20.0	0.37	1097
Rural	80.0	0.54	4379
			5476
<b>Caste</b>			
Schedule caste /tribe (SC/ST)	22.8	0.55	1246
Other backward caste (OBC)	29.7	0.52	1624
Upper caste (UC)	47.6	0.46	2606
			5476
<b>Religion</b>			
Hindu	85.1	0.51	4659
Non Hindu	14.9	0.43	817
			5476
<b>Education</b>			
No education	65.6	0.50	3591
Middle education	20.2	0.52	1117
Higher education	14.2	0.47	777
			5476
<b>Standard living index</b>			
Low	28.7	0.52	1571
Middle	52.9	0.52	2899
High	18.4	0.42	1006
			5476

Out of total sample selected, 80% of population reside in rural areas while 20% in urban areas. 37% of the couples residing in urban areas have demand for another child as compare to 54% in rural areas.

Table 3 categories as, the first column gives the various characteristics included in the analysis, the second column gives the regression coefficients and third column gives the odds ratios of each covariate relative to reference category.

The education status of women can reduce the desire for additional child and in maintaining family size. The regression coefficient of no education and middle education are 0.607 and 0.269 respectively

with reference category (highest education of ever married women). Middle education shows significant result but no education is insignificant. The odds ratio corresponding to no education and middle education are 1.836 and 1.309, respectively, which indicate that the demand of additional child is higher in these groups as compared in the group with higher educational level. The regression coefficient corresponding to non-Hindus is 0.341 and the results are statistically significant. The odds ratio corresponding to non-Hindus is 1.406. The results indicate that the demand for additional child is significantly 1.406 times higher in Muslims as compared to Hindus.

**Table 3: Logistic regression estimates of the odds ratios [Exp (â)] of background characteristics of married women of reproductive age group (M<sub>1</sub>) and those of reproductive age having two children (M<sub>2</sub>).**

Background characteristics	M <sub>1</sub>		M <sub>2</sub>	
	Regression coefficient	Regression coefficient	Odds ratio	Odds ratio
<b>CASTE</b>				
Schedule caste /tribe (SC/ST)	0.614**	1.847	0.964**	2.621
Other backward caste (OBC)	0.275*	1.317	0.210	1.234
Upper caste (UC)	-	1	-	1
<b>CONTRACEPTIVE USES</b>				
Yes	-0.674**	0.509	-1.011**	0.364
No	-	1	-	1
<b>LEVEL OF EDUCATION</b>				
No education	0.607**	1.836	0.603*	1.828
Middle education	0.269	1.309	0.183	1.201
Higher education	-	1	-	1
<b>RELIGION</b>				
Hindu	-	1	-0.145	0.870
Non-Hindu	0.341*	1.406	-	1
<b>LAST CHILD SURVIVAL STATUS</b>				
Alive	-	1	-	1
Death	0.436*	1.456	0.869*	2.383
<b>STANDARD OF LIVING INDEX</b>				
Low	0.515	1.673	0.402	1.495
Middle	0.443	1.557	0.200	1.221
High	-	1	-	1
<b>NUMBER OF LIVING CHILDREN</b>				
Below two	1.534**	4.637	-	-
Exactly two	-	1	-	-
Above two	-1.300**	0.273	-	-
<b>TYPE OF PLACE OF RESIDENCE</b>				
Rural	-	1	-	1
Urban	-0.569**	0.566	-0.889**	0.411
<b>LIVING SON</b>				
Below two	1.441**	4.225	-	-
Exactly two	-	1	-	-
Above two	-1.047**	0.351	-	-
<b>LIVING DAUGHTER</b>				
Below two	-0.214	0.807	-	-
Exactly two	-	1	-	-
Above two	-0.375*	0.687	-	-
<b>LAST CHILD</b>				
Male	-	1	-	-
Female	0.260*	1.297	-	-
<b>TWO CHILD WITH SEX</b>				
MM	-	-	-2.143**	0.117
MF	-	-	-1.435**	0.215
FM	-	-	-1.421**	0.241
FF	-	-	-	1

\*\* Indicate significant at p <.001, \*Indicate significant at p <.05

The regression coefficient corresponding to urban women is -0.569 and is statistically significant. Therefore rural women are considered as reference category and its odds ratio coefficient is 0.566. The results indicate that demand of additional child is much higher in rural women than urban.

Logistic regression analysis was conducted to assess the effect of demand of child on the use of contraceptive by current married women after allowing for potential confounders, for this reason we included this variable in our model. The odds ratio corresponding to contraceptive use is 0.509. The odds ratios corresponding to contraceptive use is  $(1-0.509)*100=49.1\%$  lower to demand of additional child compared to non contraceptive users.

Considering upper caste as reference category the regression coefficients of eligible women corresponding to caste that is schedule caste or schedule tribe (SC/ST) and other backward caste (OBC) are 0.614 and 0.275. Except SC/ST the results are not statistically significant. The odds ratio corresponding to SC/ST and OBC are 1.847 and 1.317 respectively. The result indicates that the demand for additional child among ever-married women under SC/ST and OBC are 1.847 and 1.317 times higher than that of upper caste (reference category).

The logistic regression coefficients of living sons corresponding to below 2 and above 2 are 1.441 and 1.047 respectively. They are statistically significant. Exactly 2 living sons are reference category because ever-married women want up to 2 sons. The odds ratios corresponding to below 2 and above 2 are 4.225 and 0.351 respectively. This result indicates that the demand for additional child below 2 sons group is 4.225 times higher than in the group with exactly 2 living sons and eligible women have above 2 children that is  $(1-0.351)*100=64.9\%$  lower demand of additional child as compare to reference category (exactly 2 living sons).

The sex of the last child is all the more important for creating balance or imbalance in sex composition of children. The regression coefficient of last child girl 0.260 was found statistically significant. The odds ratio of last child as female is 1.297 compared to who have last child as boy.

The regression coefficient of standard of living index of eligible women corresponding to low and middle level is 0.515 and 0.443. The results illustrate that the ever-married women of low level and middle

level have more desire for additional child and the results are statistically not significant. The odds ratio corresponding to low and middle level is 1.673 and 1.557, respectively. It indicates that the ever-married women of low level and middle level have higher demand of additional child as compared to high level of standard of living index.

## CONCLUSION

This study was done to know the desire for more children pertaining to demographic and socio-economic characteristics of households in Uttar Pradesh. The results suggest that desire for additional child in middle education group of women is higher and it is highest in no education as compared to highly educated group. When we consider those females who already have two living children, the desire of additional child is higher in SC/ST, having female children, no education, last child dead, non-Hindus, low standard living index and rural areas compared to reference category.

Therefore, the efforts should be made to increase the overall literacy with special emphasis on female literacy. The positive impact of family planning programme and importance of smaller family norm should be included in the curriculum of education.

The desire for more children is significantly higher among women having less than two children. Therefore, within the educational groups, social, economic and other cultural changes drastically affect the value of children to reduce fertility rates. So, the transition to replacement level can be improved by accelerating family planning programme and providing primary health care and the policy makers should be hassled on such sectoral enhancement.

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**Conflict of Interest:** None

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# Prevalence of Anemia, Morbidity and School Absenteeism among Lower Primary School Children of Davangere City

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## ABSTRACT

**Background and Objectives:** Anemia is estimated to affect one half of school children in developing countries such as India. Anemia, exerts its toll not only in terms of morbidity such as easy fatigability, dizziness and shortness of breath, but is also known to cause school absenteeism.

**Objectives:** 1. To assess the prevalence and severity of anemia, and morbidity among anemic lower primary school children of Davangere City. 2. To know school absenteeism in relation to anemia and morbidity.

**Method:** Cross sectional study on Lower Primary School children (6-11yrs) was carried out from December 2010 to March 2011.

**Results:** 1925 Lower Primary School children (6-10 years) of Davangere city were studied for prevalence of anemia. Anemia prevalence was 58.6%, it was more in girls (64.7%) than in boys (52.4%) and significantly decreased with age in both sexes. (25.1% )were mildly anemic, ( 20.5%) were moderately anemic and (12.9%) severely anemic. Significant difference in morbidity rates and school absenteeism between different grades of anemia were noted.

**Conclusion and Recommendations:** High prevalence of anemia was noted among lower primary school children. Anemia has increased morbidity leading to increased school absenteeism in significant proportions. Thereby effective school health checkups for early diagnosis and interventions in the form of health education to school authorities, parents and school children regarding anemia, nutrition and timely treatment by periodic deworming of all children and iron and folic acid supplementation to anemic children should be strongly recommended.

**Keywords:** Lower Primary School, Anemia, Prevalence, School Absenteeism, Morbidity

## INTRODUCTION

Nutritional anemia is a major world wide public health problem.<sup>1</sup> Iron deficiency is the most common cause of nutritional anemia in the world.<sup>2</sup> Iron deficiency anemia is a major nutritional problem in India and is widely prevalent among special groups in the community such as under five's, women in reproductive age and elderly people.<sup>3</sup>

Nutritional anemia is also common in school children of 5-15 years . During school years a child has to develop physical, motor and mental abilities to cope up for adolescent and adult life. Iron Deficiency Anemia impairs these abilities which are required for the learning achievements for example examination performance and school attendance of children in the school.<sup>4,5</sup> Various nutritional deficiencies and parasitic infections in children can also cause IDA.<sup>6</sup> Studies by various authors have been reported on prevalence of anemia and its consequences among school children.<sup>7,8</sup>

To understand the phenomenon of anemia and its relation to morbidity patterns and absenteeism among school children, the current study "Prevalence of Anemia, Morbidity And School Absenteeism among

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Lower Primary School children of Davangere city" was undertaken.

These 400 children were selected by simple random sampling method.

### OBJECTIVES

1. To assess the prevalence and severity of anemia, and morbidity among anemic lower primary school children of Davangere city.
2. To know school absenteeism in relation to anemia and morbidity.

### Study period

1. The study for prevalence of anemia was done from December 2010 to January 2011.
2. School absenteeism was obtained from their respective class registers in June 2011.

### METHODOLOGY

**STUDY AREA:** Davangere city .

### STUDY POPULATION

Lower Primary School (LPS) children of Davangere City. During 2010 there were 93 registered LPS of which 49 were government schools and 44 private schools as per the school list provided by BEO. Total population of LPS children was 19,249.

### Tools used

1. Pre tested and pre structured proforma
2. Portable weighing machine
3. Kit containing paediatric stethoscope, measuring tape, pen torch, hand board.
4. Sahlis haemoglobinometer.

### Study design

Endeavour of the present study was

- 1) To assess the prevalence and severity of anemia, and morbidity among anemic, lower primary school children of Davangere city.
- 2) To know school absenteeism in relation to anemia and morbidity.

### SAMPLING TECHNIQUE

Stratified, Simple random sampling.

### Sampling size

#### To estimate the prevalence of anemia

10% of LPS population i.e. 1925 children were investigated for Hb levels. To obtain this 10% of the total 93 schools, i.e. 10 schools (6 Government, 4private) were selected. Six government schools were selected by taking every 8th government school from the list. Four private schools were selected by taking every 10th private school from the list.

Pertaining to the above mentioned objectives the study was conducted in 2 Stratas

**Strata I :** Cross sectional study to assess the prevalence and severity of anaemia.

During pilot study school children who suffered from mental retardation, or any other serious systemic diseases were excluded from the current study.

#### Selection of sub sample for study of morbidity, absenteeism

**Strata II :** Class attendance of previous 3 months to assess school absenteeism of sampled anemic and normal children.

The sub sample was calculated as follows

$$n = \frac{\chi^2 NP(1-P)}{c^2(N-1) + \chi^2 P(1-P)} \quad \chi^2 = \text{Chi-square value for 1 degree of freedom}$$

at some desired probability level. This is

3.84 at 0.05 level

N = Population size 19249

P = 50% (0.5) prevalence of anemia lowest in studies

C = confidence interval of one choice (95% CI) = 0.05

$$= \frac{3.84 \times 19249 \times 0.5 \times 0.5}{(0.05)^2 \times 19248 + 3.84 (0.5) (0.5)}$$

$$= 400$$

### METHOD OF DATA COLLECTION

- 1) Record based information was collected regarding age of the child, parent's occupation, education and income.
- 2) By oral questionnaires to the children regarding symptoms of illness
- 3) Height and weight measurement
- 4) Hb% estimation by Sahli's method<sup>9</sup>

**Ethical clearance**

The study was approved by ethical committee of JJM Medical College Davangere

**Analysis**

The collected information was compiled, tabulated and analysed for results by using SPSS software package.

**RESULTS AND DISCUSSION**

**Population coverage**

1925 Lower Primary School children drawn from 10 schools of Davangere city were assessed for anemia.

**Table I : Distribution of lower primary school children by Age and Sex**

Age in years	Boys		Girls		Total	
	Number.	%	Number.	%	Number.	%
6	175	42.8	233	57.1	408	21.2
7	190	48.5	201	51.4	391	20.3
8	205	53.8	176	46.1	381	19.8
9	204	51	196	49	400	20.8
10	194	56.2	151	43.7	345	17.9
Total	968	50.3	957	49.7	1925	100

Out of 1925 students studied 968 (50.3%) were boys, 957 (49.7%) were girls.

Age of our students ranged from 6 to 10 yrs. 408 (21.2%); 391 (20.3%); 381 (19.8%);

400 (20.8%); and 345 (17.9%) were of 6, 7, 8, 9 and 10 years respectively.

**Prevalence of anemia**

One thousand nine hundred and twenty five Lower Primary Schools children of Davangere city were assessed for anemia on age specific WHO criteria with a cut off point of Hb <12gm% (WHO standards)<sup>10</sup>.

**Table II: Prevalence of anemia :**

No.of children examined	Anemic children	Prevalence
1925	1128	58.6

Out of 1925 children examined, 1128 were anemic at the time of study. Thus the prevalence of anemia was 58.6% among LPS.

**Table III: Distribution of anemia among LPS children by age and sex**

Age in years	No.of children examined	Girls		No.of children examined	Boys	
		Anemic children			Anemic children	
		No.	%		No.	%
6	233	211	90.5	175	155	88
7	201	145	72	190	130	68
8	176	110	62	205	115	56
9	196	90	46	204	70	34
10	151	64	42	194	38	20
Total	957	620	64.7	968	508	52.4

X<sup>2</sup>=136.802 df=4 p<0.001HS

X<sup>2</sup>=223.002 df=4 p<0.001HS

Prevalence of anemia was higher in girls (64.7%) than in boys (52.4%) in all age groups. The decrease in the prevalence by age was significant both in boys

(p value 0.001) and girls (p value < 0.001 HS). is similar to Verma M. study of Punjab school children<sup>11</sup>

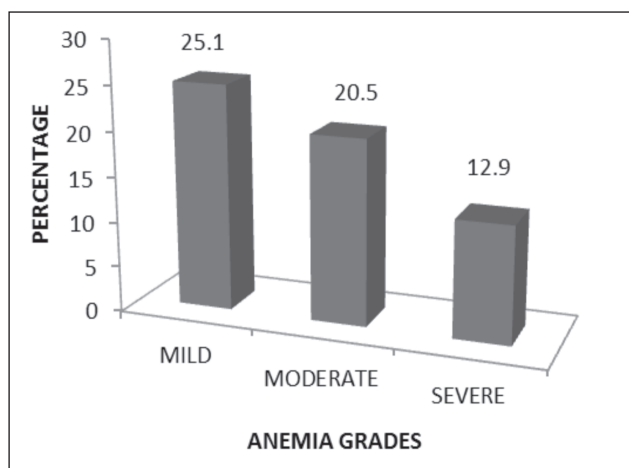


Fig. 1. Distribution of anemia among LPS children by severity:

Out of 1925 children examined, 484 (25.1%) were of mild degree, 394 (20.5%) moderate and 250 (12.9%) were of severe degree.

Table IV: Common symptoms among 400 Anemic children

Symptoms	Present	Percentage
A) General weakness	305	76
B) Easy fatigability	358	90
C) Worms in stool	380	95
D) Blood in stool	170	43
E) Loose motions	250	63
F) Ear infections	307	77
G) Fever/cold	345	86
H) Eye infection	138	35
I) Chronic illness	104	26
J) Hospitalization	73	18

Passing worm in stools (95%) and easy fatigability (90%) were the most common symptoms followed by repeated attacks of fever / cold (86%) ear pain (77%), general weakness (76%).

Table V: Distribution of common symptoms by severity of anemia

Symptoms	Mild	Moderate	Severe	Total
A) General weakness	89(29)	173(57)	43(14)	305
B) Easy fatigability	118(33)	180(50)	60(17)	358
C) Worms in stool	140(37)	180(47)	60(16)	380
D) Blood in stool	29(17)	81(48)	60(35)	170
E) Loose motions	10(4)	180(72)	60(24)	250
F) Ear infections	93(30)	154(50)	60(20)	307
G) Fever/cold	108(31)	177(51)	60(18)	345
H) Eye infection	37(27)	40(29)	60(44)	137
I) Chronic illness	6(6)	51(49)	47(45)	104
J) Hospitalization	17(23)	19(26)	31(51)	73

Number in parenthesis indicate percentage

Hospitalization was more (51%) among the severely anemic than in mild (23%) and moderately anemic (26%).

Table VI: Morbidity rate per child

Status of Anemia	Rate / child	Min. No. of symptoms	Maximum No. symptoms
Mild	4	3	5
Moderate	6.6	6	7
Severe	9	8	10

It was observed there was a gradual increase in the morbidity rate from 4 per child in the mildly anemic to 6.6 among the moderately and to 9 per child among the severely anemic children.

Table VII : School absenteeism among Normal and Anemic LPS children

	Absenteeism								Total
	A(<25%) (<18days)		B(<25-50%) (19-36days)		C(50-75%) (37-54days)		D(>75%) (>55days)		
	No.	%	No.	%	No.	%	No.	%	
Normal	670	84	98	12.2	18	2.2	11	1.3	797
Anemic	34	8.5	145	36.2	147	36.7	74	18.5	400
Total	704		243		165		85		1197

X<sup>2</sup>=673.638 p<0.0001

Among the normal children majority 84% of them reported school absenteeism of less than 25% (<18 days) in the preceeding 3 months of school attendances. However among the anemic children,(36.7%)of them reported absenteeism of 50 – 75%(35 days – 54 days) This difference in school absenteeism between the normal and anemic children was statistically highly significant

## DISCUSSION

In developing regions of the World anemia affects one half of school age children and the prevalence of anemia in 5-12 years is estimated to be 46% with the highest rates found in Africa (49.8%) and Asia (58%).Estimates based on WHO global database suggest that 5.9% of school aged children in



industrialized countries and 48% in developing countries are anemic.<sup>12</sup> The present study has identified a high prevalence of anemia (58.6%) among lower primary school children it was more (64.7%) in girls than boys (52.4%). As the age advanced, prevalence decreased. (89%) in 6 years, 70% in 7 years, 59% in 8 years, 40% in 9 years and 30% in 10 years of age. Anemia cuts all class and education barriers. It is seen that anemia has increased morbidity among the children leading to increased school absenteeism in significant proportions and it may affect negatively their academic performance as several mechanisms linking anemia to altered cognition are possible.<sup>13</sup> Morbidity rate per child and school absenteeism has significantly increased in anemic children with increasing severity of anemia. As morbidity from infectious diseases is increased in iron deficiency population, of all ages because of adverse effects of iron deficiency on the immune system.<sup>14</sup> Anemia is the biggest cause of school dropouts in India.<sup>15</sup> Its importance as a public health problem in school aged deserves greater attention not only because of its deleterious effects, which include lower school achievements due to impaired cognitive development, fatigue and poor attention span, and increased morbidity because of reduced resistance to infection, but also because of large number of school age children affected.<sup>16</sup>

School age forms a critical time in the development of human beings and the school setting provides a strategic point of entry for improving child health, self-esteem, life skills and behaviour.<sup>17</sup> Hence anemia which evolves slowly must be detected in early phases and treated immediately with the following recommendations

#### Short term

- 1) To distribute iron and folic acid tablets, (small) along with mid day school meal programmes to all anemic Lower Primary School Children.
- 2) Immediate care to routine morbidities of Lower Primary School Children, for which school teachers must be trained and class teachers must be made responsible.
- 3) Immediate referral of the needy morbid Lower Primary School Child to the pediatrician should be made by the school teachers. For this the pediatricians along with Urban MOH can be attached to LPS depending upon the availability of pediatricians and appropriate remuneration can be given if pediatrician is a private consultant.

#### Long term recommendation

- 1) Knowledge regarding healthy life style and healthy food consumption including green leafy vegetables and other iron rich foods should be encouraged and inculcated to the school children through curriculum and teachers should also be trained.
- 2) Necessary measures to be taken to educate the public (mainly mothers and children) to build healthy future generation by creating awareness to combat anemia by modifying the food at home for both anemic and normal children.

#### LIMITATIONS

- 1) Other nutrients such as Iodine which affects on morbidity, school absenteeism were not being considered either clinically or biochemically.
- 2) Social factors such as private and extra tuitions, and special influences while evaluating the children for attendance and exam performance could not be analyzed due to lack of information.

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# Influence of Obesity Indices on the Variance of Blood Pressure among College Girls of 18-24 years of Agra

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## ABSTRACT

**Background:** Obesity is not an immediate lethal disease itself, but it is a significant risk factor associated with serious non-communicable conditions like hypertension. Therefore, attention should be taken in to account as prevention is better than cure.

**Objective:** To examine the Body Mass Index(BMI) and Waist to Hip circumference Ratio(WHR) measurements as indices of obesity and their influence over blood pressure(BP) of college going girls of Agra.

**Method:** A cross sectional study was conducted among 400 college going girls aged 18-24 years from undergraduate and postgraduate sections. Height, weight, waist circumference, hip circumference, systolic and diastolic BP was recorded. The partial correlation coefficient was used to quantify the association between BMI and WHR with systolic and diastolic BP. Linear regression analysis was used to assess the influence of BMI & WHR on the variance of systolic and diastolic BP.

**Results:** The prevalence of overweight and obesity was 18.5% and 4.5% respectively. 45.5% of the subjects had normal weight and 31.5% were underweight. 11.5% of the participants had WHR  $\geq 0.85$ . Partial correlation controlled for age revealed a significant association between BMI and WHR. Stepwise linear regression analysis revealed that both BMI and WHR were independently correlated with both systolic and diastolic blood pressures.

**Conclusion:** The present results suggest that, of the subjects studied; those with either higher BMI or central adiposity distribution are potential candidates for developing hypertension.

**Keywords:** *Body Mass Index, Hypertension, Overweight, Obesity, Central adiposity*

## INTRODUCTION

The prevalence of overweight and obesity is increasing worldwide at an alarming rate. According to WHO (2002)<sup>1</sup> obesity has reached epidemic proportions globally, with more than 1 billion adults as overweight - at least 300 million of them clinically

obese. Rapidly changing diets and lifestyles are fuelling the global obesity epidemic.<sup>2</sup> Although in countries like India, which is multi-ethnic having multi socio-economic levels, is typically known for high prevalence of under nutrition, significant proportions of overweight and obese now coexist with the undernourished.<sup>3</sup>

It has been predicted that cardiovascular diseases will be the most important cause of mortality in India by the year 2015.<sup>4,5</sup> It is therefore, the aim of this study to report on the prevalence of overweight and obesity and their relationship with blood pressure for the prediction of cardiovascular disease risk factors in college going girls of Agra.

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## MATERIAL AND METHODS

We conducted a cross sectional study in Agra (urban & rural) among 400 college going girls aged 18-24 years between November 2009 to December 2009 to know the prevalence of overweight and obesity and its influence on the variance of blood pressure. The prevalence data for calculating the sample size for this study, was taken from a study conducted by Augustine & Poojara (2003)<sup>4</sup>. Thereby assuming a prevalence of overweight & obesity 24%, with an allowable margin of error of 20% of prevalence, the minimum sample size calculated for the study was 316, using the formula ( $n=4pq/L^2$ ) where  $p$ = prevalence,  $q=1-p$  and  $L$ = allowable error of prevalence. For the sample to be more representative and adjusting for non response error, somewhat larger sample size than the calculated i.e. 400 subjects were taken.

We adopted a multistage stratified random sampling procedure. For the selection of colleges, a list of colleges was obtained from Agra University. Colleges were divided into two educational levels, undergraduate and postgraduate. The colleges were then numbered, and two colleges, one undergraduate and the other postgraduate, were chosen randomly from each geographical region (urban & rural). After reaching the concerned college, written informed permission was sought from the head of the institution. The subjects were selected from each college by a systematic random sampling procedure from college records. All experiments were performed in accordance with relevant guidelines and regulations and informed verbal consent and cooperation was sought from all subjects prior to their participation in the study. The research described was compliant with basic ethical standards.

### Anthropometrical measurements

For the assessment of overweight and obesity, anthropometrical measurements were taken using standard apparatus with the subjects wearing light clothing and without shoes. Weight was measured in the upright position with a weighing scale to the nearest 0.1 kilogram (kg). Each day the scale was calibrated with a standard weight. Height was measured to the nearest 0.5 cm. All measurements were taken using a non-stretching tape. Body mass index (BMI) was calculated as weight (kg) divided by height squared ( $m^2$ ) to estimate overall body fat distribution and was classified into four categories according to WHO.<sup>1</sup> Thus, underweight was defined as BMI < 18.5,

normal weight as BMI 18.5-24.9, overweight as BMI 25 – 29.9 and obesity as BMI  $\geq 30.00$  Kg/ $m^2$ . Waist was measured horizontally at the level just above the uppermost border of the iliac crest at a normal minimal respiration. Hip was measured as the maximum circumference over the buttocks. Central obesity was calculated and defined on the basis of WHR. The cut-off value for central obesity was considered  $\geq 0.85$ .

### Blood pressure measurement

Blood pressure (BP) was measured using the standard mercury sphygmomanometer on the right arm with a subject in the upright sitting position following at least 5 minutes rest. The procedures were explained briefly and demonstrated to them. Three readings of the BP of each girl were taken, maintaining an interval of 2 minutes between readings. The mean of 3 readings was reported. Using the recently published "The Seventh Report of Joint National committee on Prevention, Detection, Evaluation and Treatment of High blood Pressure (JNC-VII) criteria"<sup>6</sup> hypertension defined as systolic blood pressure (SBP)  $\geq 140$  mmHg and diastolic blood pressure (DBP)  $\geq 90$ mmHg.

### Statistical analysis

Statistical analysis was carried out using the statistical program available in SPSS version 16.0 (Statistical package for social sciences) which is among the most widely used programs for statistical analysis in social science. The parameters taken were analyzed statistically to find out the mean, median, standard deviation and range for the anthropometric measurements and systolic and diastolic blood pressure (Table 1). Partial correlation coefficient was used to quantify the association between independent variables (BMI and WHR) and dependent variables (SBP and DBP). Linear regression analysis was used to assess the influence of BMI and WHR on the variance of SBP and DBP. All tests for statistical significance were two tailed and significance was selected at P-value <0.05.

## RESULTS

Based on WHO International Standard definition for BMI (2002), a descriptive analysis revealed 18.5% of the study population as overweight, 4.5% as obese, 45.5% as normal weight and 31.5% as underweight (Figure 1). Anthropometric and blood pressure characteristics of the subjects are shown in Table 1. The

results revealed that at the WHR cut-off point recommended for central obesity in women (WHR  $\geq$  0.85 cm), abdominal adiposity was present in 11.5 % (46 out of 400) of the subjects (Table 2). Further analysis of this table shows that out of 45.5% study subjects who were normal (BMI  $\geq$ 18.5 and  $<$ 25), 8.8% had a higher waist-hip ratio. This proportion increased as the BMI increased. It was 24.3% in overweight (BMI  $\geq$ 25) subjects and 66.7% among obese (BMI  $\geq$ 30) (Table 2).

Inspection of the data obtained for the hypertension, indicated that 11(2.75%) subjects of the study population had high systolic as well as high diastolic blood pressure ( $\geq$ 140/90mmHg). All these 11 participants had high BMI as well high WHR (Table 2). Partial correlation controlled for age revealed strong positive correlation between BMI and WHR ( $r = 0.62$ ,  $P < 0.0001$ ) (Figure 2). The scattered points at left-top corner of the graph have been attributed to the so called 'Asian Indian Phenotype' metabolically obese, characterized by normal BMI but greater central obesity as shown by high WHR.

Results of the partial correlation coefficient controlled for age, indicated a significant positive correlation between SBP and DBP ( $r = 0.90$ ,  $P < 0.0001$ ). Likewise, partial correlation revealed that, there were significant correlation between the independent and dependent variables (Table 3). BMI was positively correlated with SBP ( $r = 0.80$ ,  $P < 0.0001$ ) and DBP ( $r = 0.75$ ,  $P < 0.0001$ ) respectively. Similarly, positive correlation was found between WHR and SBP ( $r = 0.73$ ,  $P < 0.0001$ ) and between WHR and DBP ( $r = 0.71$ ,  $P < 0.0001$ ). Stepwise linear regression models were fitted for each SBP and DBP as the dependent variable and BMI and WHR as the independent variables controlled for age to determine the influence of BMI and WHR on the variance of SBP and DBP. In this study, BMI was generally correlated with SBP more strongly (regression coefficient 1.009, SE 0.061,  $p = 0.0001$ ) than DBP (regression coefficient 0.686, SE 0.055,  $p = 0.0001$ ). Significant results also were found for WHR as an independent positive correlate to SBP (regression coefficient 50.307, SE 5.941,  $p = 0.0001$ ) and DBP (regression coefficient 45.570, SE 5.370,  $p = 0.0001$ ). In general, BMI and WHR were found to be correlated more strongly with SBP ( $R^2 = 75.7\%$ ,  $p = 0.0001$ ) than DBP ( $R^2 = 68.3\%$ ,  $p = 0.0001$ ).

**Table 1: Anthropometric and Blood Pressure characteristics of studied subjects**

Variables	Median	Mean	S.D	Range
Age (y)	19.00	19.51	1.64	18-24
Height (m)	1.53	1.51	0.076	1.34-1.70
Weight (kg)	49.50	49.26	6.11	40.10-71.89
BMI(kg/m <sup>2</sup> )	20.70	21.63	4.33	16.05-34.50
Waist circumference(inch)	27.00	27.22	4.15	20-38
Hip circumference(inch)	35.06	35.01	3.36	28.17-43.68
WHR	0.77	0.77	0.044	0.70-0.88
SBP (mmHg)	116	118	7.16	108-140
DBP (mmHg)	76	76	5.67	68-90

WHR = Waist-to-hip ratio; BMI = Body mass index; SBP = Systolic blood pressure;

DBP = Diastolic blood pressure

**Table 2: Distribution of hypertensive subjects graded by BMI and WHR**

BMI (n)	WHR $\geq$ 0.85		HYPERTENSIVE	
	No.	%	No.	%
<18.5 (126)	-	-	-	-
$\geq$ 18.5&<24.9 (182)	16	34.8	-	-
$\geq$ 25&<29.9 (74)	18	39.1	4	36.4
$\geq$ 30 (18)	12	26.1	7	63.6
TOTAL(400)	46	100	11	100

WHR = Waist-to-Hip Ratio



**Table 3: Correlation Matrix between the independent and dependent variables**

VARIABLE	BMI	WHR	SBP	DBP
BMI	–	0.62	0.80	0.75
WHR	0.62	–	0.73	0.71
SBP	0.80	0.73	–	0.90
DBP	0.75	0.71	0.90	–

BMI = Body mass index; WHR = Waist-to-hip ratio; SBP = Systolic blood pressure; DBP = Diastolic blood pressure

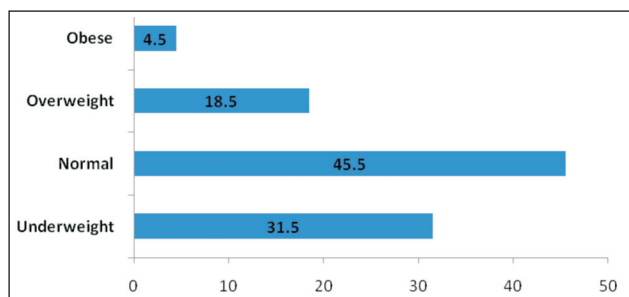


Fig. 1. Prevalence of obesity according to Body Mass Index (WHO, 2002)

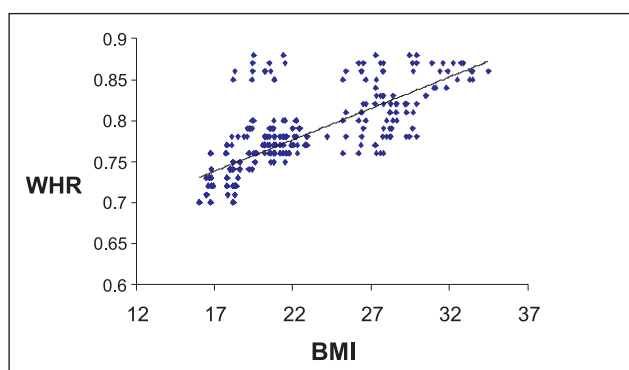


Fig. 2. Relationship between BMI and WHR (r=0.62, p<0.0001) (BMI = Body Mass Index, WHR = Waist-to- Hip Ratio)

### DISCUSSION

The aim of this study was to provide data on the prevalence of overweight and obesity and their associations with blood pressure among college going girls. Earlier studies on Indian populations<sup>7-9</sup> also showed a greater prevalence of coronary heart disease and risk factors in urban subjects. BMI and WHR were used in the present study for two reasons. First, due to simplicity and reproducibility of height, weight, hip and waist circumferences measurements and second, because both have been recognized as important indicators for estimating cardiovascular disease risk factors, in particular their positive association with hypertension. National Family Health Survey-3 (NFHS-3)<sup>10</sup> showed 2.8% obese women with BMI  $\geq 30$  and 12.6% overweight with BMI 25-30 among both

urban and rural Indian female population as estimated from 15 to 49 years of age population.

The results of the present study demonstrated that the overall prevalence of overweight and obesity were 18.5% and 4.5% respectively among 18-24 years of age college female population. In addition, 11.5% of the participants had waist-to-hip circumference ratio  $\geq 0.85$ . Central obesity is an important risk factor for the development of metabolic syndrome and hence for diseases like hypertension and diabetes. Though BMI measures overall obesity with good relationship to fat content, it neglects body fat distribution. The waist-hip ratio “catches” the central obesity.<sup>11</sup> Central obesity does not always go hand in hand with overweight/obesity. It is noteworthy that >70% of overweight subjects did not show central obesity. On the other hand, nearly 9% of non overweight girls showed central obesity.

Significant positive association between either BMI or WHR with SBP and DBP was found in the present study. The independent association between BMI and either SBP or DBP is in line with the study done by Gupta et al.<sup>12</sup> Similarly, the results of this study that described the independent relationship between WHR and either SBP or DBP are consistent with previous reports.<sup>13</sup> High prevalence of underweight (31.5%), relatively lower prevalence of overweight (18.5%) and mean BMI of 21.63 in the present study is in concordance with a study done in West Bengal.<sup>14</sup>

The Union Health Ministry of India in association with the Diabetes Foundation of India, the All-India Institute of Medical Science (AIIMS), Indian Council of Medical Research, the National Institute of Nutrition and 20 other health organizations has released new guidelines<sup>15</sup> for prevention and management of obesity and metabolic syndrome which was earlier proposed by WHO in 2000.<sup>16</sup> If they would have been taken into account as against WHO proposed criteria, the prevalence of general obesity would have been much higher (23% obese and 19.5% overweight). The revised

guidelines would benefit additional 15-20 per cent (6-8 crores) of the Indian population as they have, on average, a lower body mass index (BMI) threshold than those of European descent for the risk of diabetes to increase.<sup>17</sup> It is remarkable that such large mass of people would benefit with simple changes in guidelines, and that in turn, would lead to substantial prevention of diabetes and heart disease.

### CONCLUSION

The prevalence of central obesity was observed higher than by WHO criteria of BMI. The study emphasizes the need for using the WHR for assessing the problem of obesity especially in community where the majority of the population is thin as traditionally measured by BMI. BMI was found to be a useful index for the prediction of high blood pressure; WHR also correlates well with SBP and DBP. The present results suggest that of the subjects studied; those with either higher BMI or central adiposity distribution are potential candidates for developing hypertension. Our results also throw a limelight on the necessity to institute effective prevention and health promotion programs targeting younger age groups.

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# Assessing the efficacy of Mettler Release Technique (MRT) and Neural Mobilization Technique (Butler) on Median Nerve Mobility

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## ABSTRACT

The aim of this study was to compare the effects of Mettler's Release Technique (MRT) with Butler's Neural mobilization in subjects (n=20 each) showing positive signs when subjected to ULTT 1 (modified). All the subjects were Right handed dominant people, in whom affected side was the Right UL & the Left UL was treated as the control limb. Results showed that Butler's technique is 62.8% more effective in comparison to MRT which is 38.2% effective, ( $p < 0.001$ ). However, when the same subjects were re-evaluated within a week's time, the reversal of the effects obtained was observed more in subjects who underwent Butler's Neural Tissue Mobilisation. Both the techniques showed improvements, thus proving that both structures are important for the optimal functioning of the body. Thus, a combined treatment program will be more beneficial.

**Keywords:** *Mettler's Release Technique (MRT), Butler's Neural Tissue Mobilisation technique, Median nerve*

## INTRODUCTION

Soft tissue injuries have not gained significant attention in the education of most of the orthopedic surgeons. It tries to intertwine medical and surgical specialties. Therefore, many patients suffering from soft tissue injuries are either treated by a general, a rheumatologist, an orthopedic surgeon or a physiotherapist. Butler<sup>2</sup> describes a strong relation between the surrounding somatic tissue and the neural tissue. At many instances pain is usually due to soft tissue restrictions and adhesions, arising either from tight and shortened, overloaded and overstretched muscles, or areas of fascial adhesions in which movement is not possible without the restriction of pain sensitive structures<sup>3</sup>. There can be a definite reduction in the chance of recurrence, with the interplay of treatment of pain, dysfunction and structures involved<sup>4</sup>. Physiotherapy treatment aims at relieving symptoms of the patient using a variety of treatment modalities inclusive of manual therapeutic techniques, an array of exercises and electrotherapeutic methods. David Butler<sup>2</sup> had put forward a point that is, the use of multi-factorial approach to patient examination and management as a whole.

In recent times, many studies have been done and have shown satisfactory results of different types of manual therapy used in treating symptoms caused due to nerve entrapments in subjects showing positive signs when subjected to Upper Limb Tension Tests (ULTT)<sup>6</sup>. On the other hand there are also studies that show no significant improvement in the symptoms of the patients on application of manual therapy techniques<sup>7</sup>.

The overall experience in the work and learning in the field of manual therapy is now being widely accepted with on-going experiments and publications involving various types of manual therapy techniques used in a multiple cases<sup>8</sup>. An appropriate bridge from theory to practice involves the process of evidence-based research. Physiotherapist can perform best if they combine clinical expertise with the best available clinical evidence as a path to answer clinical questions, create more effective & efficient diagnoses, and to improve upon treatment approaches.<sup>9</sup> Paul Mettler began to experiment with a new manual therapy technique.<sup>10, 11</sup> Experimentation has led to refinement & some impressive clinical outcomes as documented through videotape, thermography, and SF-36

satisfaction surveys. Mettler's release technique (MRT) has provided a treatment approach with broad applications pertaining to almost any region of the body secondary to its clinical effectiveness & theorized mechanism. As explained by Paul<sup>10, 11</sup> this results in reduction of pain, decreased muscle spasm and quite often measurable increase in joint range of motion. The results are proposed to be effective, immediate and long-lasting.

### The Neural Influence

Adverse neural tension is an abnormal response to mechanical stimuli of neural tissue. David Butler<sup>2</sup> suggested such injuries usually involve both neurological as well as orthopedic structures. A therapist requires thorough understanding of anatomy for accurate palpation procedures<sup>13</sup>. Neurodynamic assessment and treatment approach allows physical test of the dynamics and associated sensitivity of the nervous system. Bob Elvey discovered that maximal tension placed on the cervical nerve roots, brachial plexus, and peripheral nerves involved a certain upper extremity positioning at multiple joint angle.<sup>14</sup> This position is known as a 'base test' with a median nerve bias & consists of scapular depression, shoulder abduction and external rotation, elbow extension, forearm supination and wrist/finger extension with ulnar deviation. The research for upper extremity neurodynamics testing and treatment is enhancing. Although the research related to the MRT and soft tissue restrictions is non-existent. There are some studies that look at the patho-physiology and anatomy of the nervous system and significance as it relates to the upper extremity and rehabilitation.<sup>15, 16</sup> The importance of understanding the neural tissue and how it functions is fundamental to our knowledge. It is also important that researchers address the whole system in the upper extremity to include the skin and connective tissue. To a great extent today's research as it linked to myofascial tissue and skin has stemmed from studies looking at immobilization or direct trauma to the connective tissue at a macro and micro level. This research has led to 3 important ways that fascia can become dysfunctional and lead to painful musculoskeletal symptoms—trauma, chronic strain, and immobility<sup>17</sup>. The extent of this research is small compared to muscle or nerves, but it works as a guide for the researcher to reach out for other contributors of pain. The MRT technique imparts an opportunity

to delve deeper into the fascial and skin enigma as it concerned with pain dysfunction in the upper extremity; and perhaps more importantly, a new treatment approach. Due to the dearth of clinical and scientific research related to fascia & the skin, the author developed a research question, "How does MRT compare to a more universally accepted treatment technique such as upper extremity neural mobilization in terms of immediate and long term effectiveness?"

**Aim:** To compare the effects of Mettler's Release Technique (MRT) with Butler's Neural mobilization in subjects showing positive signs when subjected to ULTT 1 (modified)<sup>18</sup>

**Objectives:** Firstly, to find out efficacy of Mettler Release Technique (MRT) on adverse tension on the median nerve. Secondly, to find out the efficacy of Butler's neural mobilization on adverse tension on the median nerve. To compare the effects of MRT and Butler on adverse tension on the median nerve. Lastly, to find and compare the reversal of the effects MRT and Butler.

**Design:** 30 subjects were selected for the study, with right handed dominance, showing positive signs when subjected to ULTT 1 (modified)<sup>15</sup>

**Materials Use:** A Plinth, Universal Goniometer.<sup>19</sup>

**Inclusion Criteria:** Subjects showing any one of the normal responses on being subjected to modified ULTT 1, bilaterally<sup>19</sup>.

**Exclusion Criteria:** Any recent (3 months) musculoskeletal injury to the upper limbs and cervical spine. Patients presenting with any present or past neurological problems, patients suffering from diabetes mellitus & subjects showing negative signs of dermal stretch when subjected to modified ULTT 1.

**Methodology:** All the subjects underwent the test procedure for fulfilling the inclusion criteria following which they were randomly assigned to the two groups for treatment.

Test Procedure comprised of modified<sup>18</sup> ULTT 1 as described by by Keanneally et al (1988)<sup>19</sup>, was used. The final position attained is the same as explained by Butler (Figure 1.)





Fig. 1. Neural Tissue, modified ULTT 1

Keeping the fingers in full extension, wrist extension was added as the last component. The subjects were made to understand the normal responses<sup>19</sup> to test procedure prior to the experiment. They were instructed to inform the therapists when they experienced the first symptom during the test. When the subjects informed about pain or any other sensation experienced, the therapist noted the angle of wrist extension which was adopted by the subjects at that point of time. The Outcome measure included of the range of wrist extension<sup>20a</sup> where patient complained of first symptom of pain noted with the help of a standard goniometer<sup>20</sup>. Right limb taken as the experimental group and the left limb being the control group. Treatment procedure comprised of *Butler*<sup>18</sup> technique where the patient lied in supine position on plinth.

The second group received *MRT*<sup>12</sup>. The actual application of *MRT* is far from haphazard and arbitrary. The initial examination procedure involved finding the dermal-fascial restrictions in the direction in which adhesions or inappropriate collagen formation had formed. A thorough and well-established subjective evaluation helped guiding us to areas of investigation and possible structure involved. Once the area of interest was identified, the use of bilateral hands, fingers, and/or thumbs were used to specifically address the mobility of the skin and underlying fascia for passive elastic properties.

Treatment was an extension of assessment and evaluation. Now that a directional restriction had been located, a bilateral equal and opposite tension was applied to the dermal-fascial tissue band. (Figure 2)



Fig. 2. Mettler's Technique of Mobilisation

## FINDINGS

Statistical analysis was done using SPSS 16 version. The key variable of interest in our study was the range of wrist extension where the symptoms were produced first. The right wrist extension range of motion served as our manipulated variable and the left wrist extension range of motion as our control variable. Each treatment technique for all subjects demonstrated an increase in right wrist extension noted immediately and after one weeks time with little variation noted in the left wrist. We did not control for left upper extremity range of motion with splinting.



Fig. 3. Wrist extension ROM with Universal goniometer

From our study it can be ascertained that Mettler's Release technique was extremely significant in treating



adverse tissue tension on median nerve in our subjects with a p value of less than 0.05 at 95% confidence limits, (Table- 1, 2).

The results were also consistent when the subject was re-evaluated at the end of one week (Table- 1, 2).

It is also evident that Butler’s technique too is significant in relieving subject’s symptoms and

increasing the range of motion at the wrist joint which is evident from the change in angle of range of motion at the right wrist joint recorded immediately, (Table 3, 4) However, when subjects were evaluated for range of motion at the wrist joint after one week, it was noted that there was a significant change only in the ones subjected to Mettler’s release technique, (Tables- 7, 8)

**Table 1: Within-Subjects Factors— Measure: MRT**

	Mean	Std. Deviation	N
PRE	33.33	13.880	30
POST1	56.93	14.061	30
POST2	52.93	14.338	30

**Table 2 : Pair-wise Comparisons— Measure: MRT**

(I) factor1	(J) factor1	Mean Difference (I-J)	Std. Error	Sig. <sup>a</sup>	95% Confidence Interval for Difference <sup>a</sup>	
					Lower Bound	Upper Bound
1	2	-23.600*	.594	.000	-25.110	-22.090
	3	-19.600*	.367	.000	-20.533	-18.667
2	1	23.600*	.594	.000	22.090	25.110
	3	4.000*	.452	.000	2.851	5.149
3	1	19.600*	.367	.000	18.667	20.533
	2	-4.000*	.452	.000	-5.149	-2.851

**Table 3 : Within-Subjects Factors— Measure: Butler’s**

	Mean	Std. Deviation	N
PRE	31.07	12.542	30
POST1	62.93	13.455	30
POST2	53.83	12.975	30

**Table-4: Pair-wise Comparisons— Measure: Butler’s**

(I) factor1	(J) factor1	Mean Difference (I-J)	Std. Error	Sig. <sup>a</sup>	95% Confidence Interval for Difference <sup>a</sup>	
					Lower Bound	Upper Bound
1	2	-31.867*	.403	.000	-32.891	-30.842
	3	-22.767*	1.703	.000	-27.094	-18.439
2	1	31.867*	.403	.000	30.842	32.891
	3	9.100*	1.758	.000	4.633	13.567
3	1	22.767*	1.703	.000	18.439	27.094
	2	-9.100*	1.758	.000	-13.567	-4.633

**Table 5: Group Statistics**

	GROUP	N	Mean	Std. Deviation
PRE	1	30	33.33	13.880
	2	30	31.07	12.542
POST1	1	30	56.93	14.061
	2	30	62.93	13.455
POST2	1	30	52.93	14.338
	2	30	53.83	12.975

**Table-6: t-test for Equality of Means**

	t	df	Sig. (2-tailed)	Mean Difference
PRE	.664	58	.510	2.267
	.664	57.415	.510	2.267
POST1	-1.689	58	.097	-6.000
	-1.689	57.888	.097	-6.000
POST2	-.255	58	.800	-.900
	-.255	57.431	.800	-.900

**Table-7: Group Statistics**

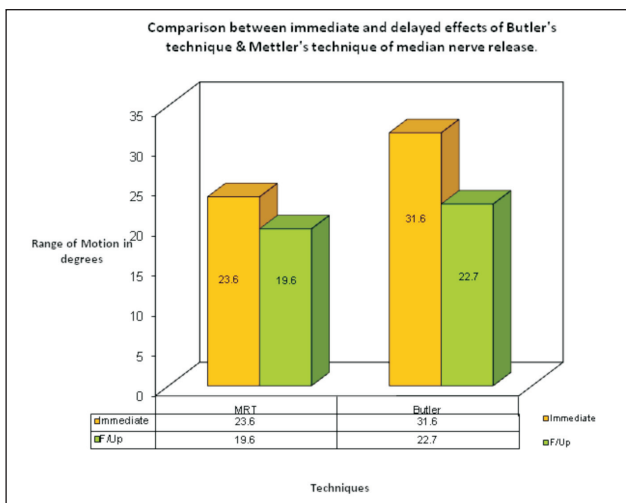
	GROUP	N	Mean	Std. Deviation
DIFF1	1	30	23.6000	3.25470
	2	30	31.8667	2.20866
DIFF2	1	30	19.6000	2.01032
	2	30	22.7667	9.32806

**Table-8: t-test for Equality of Means**

	t	df	Sig. (2-tailed)	Mean Difference
DIFF1	-11.511	58	.000	-8.26667
	-11.511	51.036	.000	-8.26667
DIFF2	-1.818	58	.074	-3.16667
	-1.818	31.688	.079	-3.16667

**Table: 9 Effects of treatment techniques measured as improvement in range of wrist extension**

Range of movement at Wrist joint							
Technique	Average Range of Wrist Extension in degrees (n=30)						
	Right wrist					Left wrist	
	Pre	Post 6 seconds	Immediate Difference	After 1 wk	F/Up Difference	Pre	Post
MRT	33.33333	56.93333	23.6	52.93333	19.6	31.66667	32.2
Butler's	31.06667	62.93333	31.86666667	53.83333	22.766667	31.26667	31.96667



**DISCUSSION**

From the study it is evident that the group given Myofascial release (MRT) showed an improvement in

range of wrist extension. MRT releases these adhesions by means of the process of hysteresis i.e. heat is released when the adhesions are broken down<sup>24,25</sup>. A hold is maintained while giving this technique, which helps to realign the fibres further, and bring about a structural change<sup>24,25</sup>. In the process, erythema is caused which in turn improves the blood supply to the area and the nerves<sup>25</sup>. Also on giving Butlers Mobilization an improvement was seen during giving the treatment, the nerve was made to glide passively at all the joint levels. This brought about restoration of normal mechanics of the connective tissue after injury lessens the possibility of the nerves being entrapped in their surrounding connective tissue<sup>26</sup>. Therefore, it is evident that the nervous system can be trained to lengthen<sup>27</sup>. Individually, both the techniques show highly significant results in improving the ranges of

wrist extension immediately after the treatment. However after a week, when reversal of effects was noted; MRT showed less reversal as compared to Butler's. In Butler's treatment, the results were due to the gliding movement of the nerves and the relative movement with its connective tissue thereby causing no structural change. In MRT though a structural change was brought about by breaking down of the adhesions formed, thus improving the nerve gliding followed by release the nerve entrapment in them.

### CONCLUSION

From this study it is observed that both Mettler's Release Technique (MRT) and Butler's neural mobilization are equally effective in treating adverse tension on the median nerve. However, neither of the treatment techniques supersedes the effects in treatment. Nevertheless, on comparing the immediate effects and the late effects between both the treatment techniques Mettler's Release technique is found to be more effective than Butler's neural tissue mobilization.

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# A Study of Anaemia among Adolescent Girls in Rural Area of Belgaum District, Karnataka, South India

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## ABSTRACT

**Background:** Adolescence is a transitional period between childhood and adulthood. India's population has reached one billion mark, out of which 21% are adolescents. The present study was conducted to estimate the prevalence and socio-demographic factors associated with anaemia among adolescent girls.

**Materials and method:** This one year community based cross-sectional study was done at village Peeranwadi, PHC Kinaye, Belgaum. Four Hundred (400) adolescent girls were selected randomly. Information on socio-demographic variables were recorded. Haemoglobin estimation by cyanmethaemoglobin method was done for every participant in the study.

**Results:** Majority (82.25%) had age between 10 to 14 years and mean age of study population was 12.9±2.06 years and 98.5% were literates. Of 400 adolescent girls, 51% had attained menarche. The mean height, weight and BMI was less among 10 to 14 years compared to 15 to 19 years (p=0.000). In this study 15 (3.75%) were married and of them 60% were pregnant and all had registered for antenatal care. Prevalence of anaemia was 75% and 49.75% had mild, 20.75% had moderate and 4.5% had severe anaemia.

**Conclusion:** Adolescent girls constitute an important segment of the population. Their health status influences their reproductive functioning - pregnancy outcomes, birth weight, pregnancy wastage etc. In the present study almost three fourth of girls were anaemic. Iron supplementation programmes specially meant for adolescent girls need to be introduced. Further, emphasis on improvement of nutritional status of adolescent girls through counselling and health education is needed.

**Keywords:** Adolescent Girls; Anaemia; Socio-Demographic Factors

## INTRODUCTION

The term adolescence is derived from latin word 'adolescere' meaning to 'grow, to mature'.<sup>1</sup> Adolescence is a transitional period between childhood and adulthood and very crucial since these are formative years in the life when major physical, psychological and behavioural changes take place.<sup>2</sup>

India's population has reached one billion mark, out of which 21% are adolescents.<sup>1</sup>

The health of adolescents is also important by virtue of their large number. Realizing the importance, World Health Organization (WHO) has chosen the theme of WHO Day in 1985 "Healthy youth – Our Best Resources" for development of adolescents. The Federation of Obstetrics and Gynecology Society of India (FOGSI) dedicated the year 1999 to adolescent girl to highlight various problems faced by her.<sup>3</sup>

In a country like India due to various customs and common beliefs, girls within the family especially older ones receive less nutrition, health care and education. In a family with limited resources, the female child is more likely to be neglected. The added burden of

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menstrual blood loss (normal/abnormal) precipitate the crisis too often. Practice of early marriage also makes them highly susceptible to anaemia which further worsens due to the pregnancy and lactation. About 46% of girls get married below the legal age of marriage and 16% of women in the age group of 15 to 19 years become pregnant.<sup>4</sup> Out of 10 million pregnant adolescents and adolescent mothers in India, one in six girls aged 13 to 19 years begin childbearing.<sup>5</sup>

According to study carried out by International Centre for Research on Women (ICRW), anaemia in adolescent girls was identified as the largest nutritional problem. The prevalence of anaemia is reported to be disproportionately high in developing countries that is, 55% in India, 42% in Nepal, 32% in Cameroon and 48% in Guatemala.<sup>4</sup>

According to United National International Children's Emergency Fund (UNICEF) (2002)<sup>6</sup> and NFHS 3 (2007)<sup>7</sup> prevalence of anaemia was 55% and 52.88% in adolescent girls of India respectively.

Anaemia in adolescent girls is of particular interest because it results in poor pregnancy outcomes, particularly low birth weight, may also limit school achievement and work productivity.<sup>8</sup> Hence the present study was planned to assess the magnitude of problem of anaemia in adolescent girls and its association with other socio demographic factors.

## METHOD

This one year community based cross sectional study was undertaken at village of District Belgaum, Karnataka.

The study was approved by Institutional Ethics Committee, Jawaharlal Nehru Medical College, Belgaum. Four hundred (400) adolescent girls of 10 to 19 years were randomly selected. After obtaining a written informed consent, the interview was conducted at the residence of the girls using standardized data collection instruments. It included the information on socio-demographic variables. Haemoglobin estimation by cyanmethaemoglobin method was done for every participant in the study. For the purpose of analysis adolescent girls were categorized into early and late adolescents.<sup>8</sup> For the comparison of anthropometric data NCHS and NHANES standards were used.<sup>9,10</sup>

The statistical analysis was done using SPSS statistical software applying chi-square test and student 't' test.

## RESULTS

The mean age among the study population was  $12.9 \pm 2.06$  years (Table 1). Majority (73.5%) of them were Hindus and 394 (98.5%) were literate (Table 1). In the present study, 360 (90%) were currently studying, 11 (2.8%) were house wives and 29 (7.2%) were doing domestic work. Of the 400, 360 (90%) were currently studying, six (6%) were illiterate and 34 (8.5%) were school dropouts.

Among 400 girls, 385 (96.25%) were unmarried and 15 (3.75%) were married. With regard to socio economic status, 8 (2%) belonged to class II, 50 (12.5%) belonged to class III, 92 (23%) belonged to class IV and 250 (62.5%) belonged to class V (Table 1). 51% had attained menarche and 51% of them attained menarche by age of 11 years. The mean age of menarche was  $13.00 \pm 2.15$  years. Of the 15 (3.75%) married girls, nine (60%) were pregnant and all nine pregnant women were registered for antenatal care (ANC) care, either in government or private hospital.

In the present study, 317 (79.2%) fathers and 270 (67.5%) mothers of adolescent girls were literates. 115 (28.8%) fathers were educated up to primary level, 137 (34.2%) up to high school and 65 (16.2%) up to college while, 151 (37.8%) mothers were educated up to primary school, 103 (25.8%) up to high school and 16 (4%) up to college.

The overall mean weight of the study population was  $29.5 \pm 8.08$  Kgs with range being 15 Kgs to 55 Kgs and mean height was  $138.60 \pm 29.54$  cms with range minimum being 102.50 cms to maximum 165 cms. Adolescent girls between the age 10 to 14 years were more stunted (63.82%) as compared to 15 to 19 years (40.84%) based on less than third percentile of NCHS standards ( $p=0.0003$ ) (Table 2). Adolescent girls between the age 10 to 14 years were more thin (60.79%) as compared to 15 to 19 years (39.43%) based on less than fifth percentile of NHANES standards ( $p=0.0009$ ) (Table 2).

In the present study mean height, weight and BMI was less among the adolescent girls aged between 10 to 14 years compared to 15 to 19 years ( $p=0.000$ ).

Over all prevalence of anaemia in adolescent girls was found to be 75%. Majority of them had mild anemia (49.75%) followed by moderate (20.75%) and severe (4.5%) anaemia (Graph).

Among adolescent girls between the age 10 to 14 years, 75.98% were anaemic while in the age between 15 to 19 years 70.43% were anaemic ( $p=0.326$ ). (Table 3)

In this study out of 300 adolescent girls with anaemia, 250 (62.5%) belonged to class V, 92 (23%) class IV, 50 (12.5%) Class III and eight (2%) class II. Prevalence of anaemia was marginally high among class V (76%) as compared to class IV (75%), class III 72% and class II (62.5%) ( $p=0.792$ ) (Table 4).

In this study 329 (82.25%) adolescent girls belonged to the age group of 10 to 14 years out of which 250 (62.50%) were anaemic. Among them 68 (20.66%) had mild, 166 (50.45%) had moderate and 16 (4.86%) had severe grades of anaemia and majority belonged to Class V (52%) ( $p=0.408$ ).

In this study 71 (17.75%) adolescent girls belonged to the age group of 15 to 19 years out of which 50 (12.50%) were anaemic. Among them 15 (21.12%) had mild, 33 (46.47%) had moderate and two (2.81%) had severe grades of anaemia and majority belonged to Class V (10.5%) ( $p=0.474$ ). Prevalence of severe anaemia was highest in girls belonging to class V in both the groups.

In this study 204 (51%) girls had attained menarche and 196 (49%) girls had not attained menarche. Prevalence of anaemia was higher in girls who had not attained menarche that is 78.06% as compared to girls who had attained menarche ( $p>0.166$ ).

In the present study, out of 300 adolescent girls with anaemia, 85 (21.25%) adolescent girls were taking vegetarian diet and 315 (78.75%) had mixed diet. Prevalence of anaemia was higher in girls on mixed diet that is 239 (75.9%) as compared to vegetarian girls 61 (71.8%) ( $p>0.438$ ).

**Table 1. Demographic characteristics (n=400)**

Demographic characteristics	Study participants	
	Number	Percentage
<b>Age</b>		
10 to 14	329	82.25%
15 to 19	71	17.75%
<b>Education</b>		
Illiterate	6	1.50%
Primary School	278	69.50%
High School	105	26.25%
Collegiate education	11	2.75%
<b>Socio economic status (Modified B. G. Prasad's Classification)</b>		
I	0	0
II	8	2
III	50	12.5
IV	92	23
V	250	62.5

**Table 2. Association of stunting and thinness with age**

Parameters	10 to 14 years		15 to 19 years		p value
	No	%	No	%	
Height for age < 3 <sup>rd</sup> percentile	210	63.82%	29	40.84%	0.0003
BMI for age < 5 <sup>th</sup> percentile	200	60.79%	28	39.43%	0.0009

**Table 3. Association of age with anaemia**

Anaemia	Age 10 to 14 years		Age 15 to 19 years	
	Number	Percentage	Number	Percentage
Present	250	75.98	50	70.43
Absent	79	24.02	21	29.57
Total	329	100	71	100

$\chi^2 = 0.965$

df = 1

p=0.326

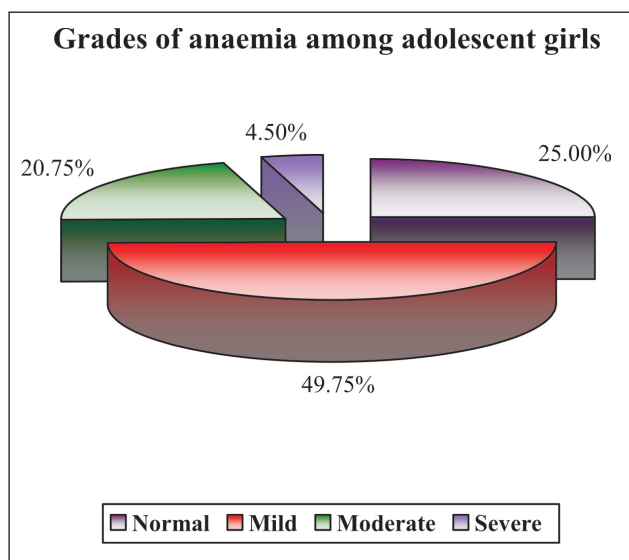
**Table 4. Association of anaemia with socioeconomic status**

Socio-economic status	Anaemia					
	Present		Absent		Total	
	No.	%	No.	%	No.	%
Class I	00	0.00%	00	0.00%	00	100%
Class II	05	62.50%	03	37.50%	08	100%
Class III	36	72.00%	14	28.00%	50	100%
Class IV	69	75.00%	23	25.00%	92	100%
Class V	190	76.00%	60	24.00%	250	100%
Total	300	75.00%	100	25.00%	400	100%

$\chi^2=1.040$

Df=3

p=0.792



and Guinea. India, in fact, beats even sub-Saharan Africa with the highest underweight adolescent girl population of 47% in age group of 15 to 19 years.<sup>11</sup>

The most common causes among the school dropouts in this study have been domestic work (38.23%), opposition by parents (41.17%) and marriage (8.82%). According to NFHS-2,<sup>12</sup> the most common causes for not attending school have been, education not considered necessary (13.17%), not interested in studies (15.8%), involvement in domestic work (24.5%) and did not afford fee (24.5%). According to UNICEF Report 2011, school attendance dropped from 86% at primary level to 64% for secondary schooling. For girls, school attendance dropped sharply as they move from primary to secondary school - from 83% to 59%.<sup>11</sup>

**DISCUSSION**

Nearly one fourth of India’s population comprises of adolescents representing a vibrant human resource. Hence it is of utmost importance to strengthen efforts and formulate innovative strategies to channelize adolescents’ energies in a constructive direction.

A recent UNICEF’s State of the World’s Children 2011 report says more than half (56%) of adolescent girls in India are anaemic. The appalling nutritional figures for adolescents put India in the company of least developed nations such as Congo, Burkina Faso

In the present study 15 (3.75%) were married. Among them four (1%) married before 18 years of age and 11 (2.75%) married after 18 years of age. Among the married adolescents more than half of them were pregnant. According to UNICEF Report 2011, 43% of girls were married off before the age of 18 and more than half of them gave birth before they turned adults and 6000 adolescent mothers die every year. India also displays very glaring gender disparities. While 30% of boys between the ages of 15 and 19 years are anaemic, 56% girls in the same age group suffer from the condition.<sup>11</sup>

In this study majority of adolescent girls were anaemic (75%) and of them 46.75% had mild anemia, 20.75% had moderate and 4.5% had severe anaemia. Study<sup>13</sup> from Rural Medak reported prevalence of anaemia as 81% (mild 63.2%, moderate 12.5% and severe 5.3%). Other studies<sup>14</sup> conducted in Bangladesh, Indonesia, Nepal, Mynamar, Srilanka report prevalence of anemia as 43%, 25.8%, 42%, 26.4% and 40% respectively. Whereas study<sup>15</sup> conducted in Tamilnadu reported 30% prevalence of anaemia. According to UNICEF Report 2011 India's appalling figures include, 56% girls are anaemic, on par with Congo, Burkina Faso and Guinea. A very high prevalence of anaemia in this study could be due to lower socio-economic status and nutritional deficiency among adolescent girls.

Various studies<sup>16,17</sup> have reported significant association of sociodemographic parameters like age, religion, socio-economic status, diet, menarcheal status, literacy status of parents with anaemia. However in the present study these sociodemographic parameters have not shown any statistically significant association with anaemia ( $p > 0.05$ ). In both the age groups, percentage of girls with severe anaemia has been more in class V socioeconomic group indicating that nutritional deficiency, ignorance could be the reasons for severe anaemia. Haemoglobin status of moderately and severely anaemic girls in both age groups if not corrected may expose them to high risk pregnancy in future.

Adolescent girls constitute an important segment of the population. Their health status influences their reproductive functioning – pregnancy outcomes, birth weight, pregnancy wastage etc. In the present study almost three fourth of girls were anaemic. Their status of anaemia is likely to worsen during pregnancy leading to complications including post partum haemorrhage. Iron supplementation programmes specially meant for adolescent girls need to be introduced for both school going and non school going girls. Further, emphasis on improvement of nutritional status of adolescent girls through counselling and health education is needed.

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**Conflict of Interest :** Nil

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# Comparative Analysis of the Health Status in Commuting and Non Commuting Rural Population in the Periphery of Mumbai

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## ABSTRACT

**Objective:** An important objective of epidemiological research is to identify risk factors for diseases or for the health status of a specific population. This epidemiological study was set up to determine the difference in the health status in commuting and non commuting rural population in the periphery of Mumbai, India.

**Method:** In 2013 a regional, non-interventional prospective two arms (1:1) cohort study was initiated. The exploratory analysis was performed on demographic and clinical data of the study cohort which comprised of adult subjects in the range between 20 and 60 years of age. Trial population was defined as commuters and non commuters whereby commuting indicated travel to work place for more than 2 hours daily (one way). Outcome variables included physical measurements, biochemical parameters and mental health. Data were analyzed by descriptive statistical methods.

**Results:** There were no significant differences between commuters and non commuters with reference to hematology, blood pressure, pulse rate, and mental health measurement. However, significantly higher number of commuters showed out of range values for fasting blood glucose (FBG), oral glucose tolerance test (OGTT), and triglycerides. Similarly there was a clear difference in body mass index (BMI) and waist / hip ratio between commuters and non commuters, indicating overweight and obesity in commuting group.

**Conclusion:** Findings of this study showed that commuting affects specific parameters related to the health status, which in long term might cause cardiovascular disorders. In particular commuting was related to an increase in lipid levels, impaired glucose tolerance, and increase adiposity as indicated by elevated BMI and waist / hip ratio.

**Keywords:** Health Status, non-Interventional, Commuters, non Commuters, Biochemical Parameters, Physical Measurements, Mental Health

## INTRODUCTION

In the developed as well as developing world commuting has become part of the daily life for most people. It is a widely accepted fact that commuting

induces stress and affects health status, while walking or cycling has beneficial effects on health. Many authors have shown the relation between commuting, fatigue and stress<sup>1,2,3,4,5</sup>. Also authors have shown the link between increased absenteeism and commuting<sup>6,7</sup>. However, there are only very few studies determining the effect of commuting on health status of concerned subjects. Studies showed public transportation was significantly negatively associated with overweight and obesity among men<sup>8</sup>. Association was seen between commuting and negative health outcome<sup>9</sup>. Still, there is no clear evidence if in general a positive or negative influence on the commuter's health can

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be stated and on which health parameters commuting might have an impact, either positive or negative. In parallel there are no research data in this field available about India, which is a rapidly developing country. This study aims to determine potential differences in the health status between commuting and non commuting subjects of the selected study population in Karjat, a rural area in the periphery of Mumbai. Commuting was defined as travelling for more than 2 hours by train or bus daily whereas non commuters work locally. Karjat counts a population of 184,420, out of which 139,011 people are in rural where as 45,409 people are in urban areas. In the rural areas the big majority is working in the agriculture as marginal workers<sup>10</sup>.

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. The study protocol and the subject information and consent form were reviewed and approved by a local Ethics Committee.

### METHOD

The epidemiological project was designed as a regional, non-interventional two arms (1:1) prospective cohort study. The geographic area of Karjat was chosen as this area is well recognized as living place for a commuting and non commuting community and therefore qualified for the purpose of this study. Female and male subjects in the age between 20 and 60 years without being diagnosed with a serious ongoing illness qualified for enrollment. The study involved one visit to the Primary Health Care Center in Karjat City where the study was conducted. After obtaining consent study subjects underwent initial physical examinations in order to determine the subject's eligibility. After enrollment subject's date of birth, gender, height, and weight were documented. In addition the Body Mass Index (BMI) and the waist hip ratio were calculated by the local study team and data about smoking habits and alcohol consumption as well as any relevant medical history and use of concomitant medication(s) was recorded. Venous Blood was withdrawn under aseptic conditions for evaluation of hematology parameters and glucose and blood lipid values. Prior to closing the study for the individual study participant, a questionnaire (GQH 12<sup>®</sup>) related to mental health in general was completed by each subject and attached to the subject's Case Report Form (CRF). Subject data were collected manually and first recorded in a paper CRF by the investigator on site,

before they were entered in the electronic database system SecuTrial<sup>®</sup>, version 4.4.0.8. Verification of data in the database was conducted on the manually completed CRFs. Statistical analyses were performed using SAS<sup>®</sup> statistical software, version 9.3. The analysis followed a detailed analysis plan approved prior to database closure.

### RESULTS

The planned number of subjects to be included was 150. During the study conduct, a total of 154 participants were enrolled. Due to failure in the inclusion and exclusion criteria 2 participants were excluded from the analysis. All study subjects were of Indian race. As shown in Table 1 out of the 152 subjects, 73 male subjects were identified as male travellers and 42 as male non travelers\*. In total 37 female subjects were enrolled on the protocol from which 4 belonged to the travellers group and 33 to the group of non travellers.

**Table 1: Distribution between the genders in the two study groups** Frequency (%)

	Travellers	Non Travellers
Male	73 (48)	42 (27)
Female	4 (3)	33 (22)
Total	77 (51)	75 (49)

Only 5% of the commuting cohort and 16% of the non commuting control group reported about a medical history. The percentage of subjects who took regularly medication(s) was found to be 18% in the group of travelers and 16% in the non commuting control group.

**Table 2: Distribution between age groups**

Age Group	Travellers	Non Travellers
20-25	3	14
26-30	5	7
31-35	7	7
36-40	18	16
41-45	18	7
46-50	18	13
51-55	7	5
56-60	1	6

In order to identify possible implications based on the age of subjects, participants were allocated to age groups as listed in the adjoining Table 2. Slight differences could be confirmed in the age group 20 - 25 years of age as well as in age groups 41 - 45 and 46 - 50 years of age. However, exploratory analysis did

not reveal any relevant indication on outcome measures.

No significant differences could be determined in hematological observations as outlined in Table 3.

**Table 3: Number and percentage of subjects with elevated hematological values**

Hematology parameters	Travellers		Non travellers	
	No.	%	No.	%
n = total number of subjects	77	75		
n <sub>1</sub> = Hematology performed	28	51		
White blood cells	2	7.1	3	5.9
Red blood cell	8	28.6	15	29.4
Hemoglobin	10	35.7	22	43.1
Hematocrit	9	32.1	22	43.1
Mean corpuscular volume	6	21.4	9	17.6
Mean corpuscular hemoglobin	14	50	19	37.3
Mean corpuscular hemoglobin concentration	.	.	.	.
Red Blood Cell Distribution	3	10.7	12	23.5
Platelets	.	.	4	7.8
Neutrophils	5	17.9	12	23.5
Lymphocytes	3	10.7	7	13.7
Monocytes	.	.	.	.
Eosinophils	6	21.4	15	29.4
Basophils	.	.	.	.
Reticulocytes	.	.	.	.

Table 4 shows the difference in glucose levels and lipid parameters. Fasting blood glucose (FBG) out of range values were seen in 26% of travellers as compared to 16% in non travellers. Another important

parameter oral glucose tolerance test OGTT was seen to be out of range for 18.2% travelers vs only 9.3% non travellers. Triglyceride out of range values were seen in 87% in travelers vs only 44% in non travellers.

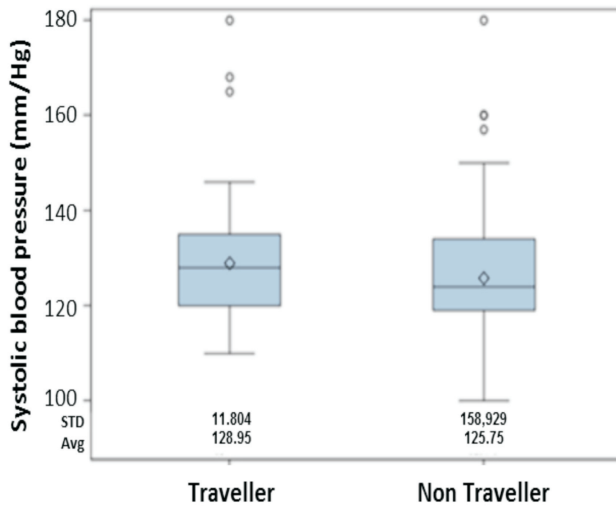
**Table 4: Number and percentage of subjects with elevated glucose level and lipid parameters**

Glucose/Lipid parameters	Travellers		Non Travellers	
	No.	%	No.	%
n= total number of subjects	77	75		
n <sub>2</sub> = Glucose and lipid parameters performed	77	75		
Fasting blood glucose	20	26	12	16
Oral glucose tolerance test	14	18.2	7	9.3
Total cholesterol	22	28.6	21	28
Triglycerides	67	87	33	44
Low-density lipoprotein (LDL)	16	20.8	16	21.3
High-density lipoprotein (HDL)	25	32.5	13	17.3
Very-low-density lipoprotein (VLDL)	26	33.8	32	42.7
LDL/HDL ratio	7	9.1	8	10.7
Cholesterol/HDL ratio	16	20.8	25	33.3

### Vital Signs

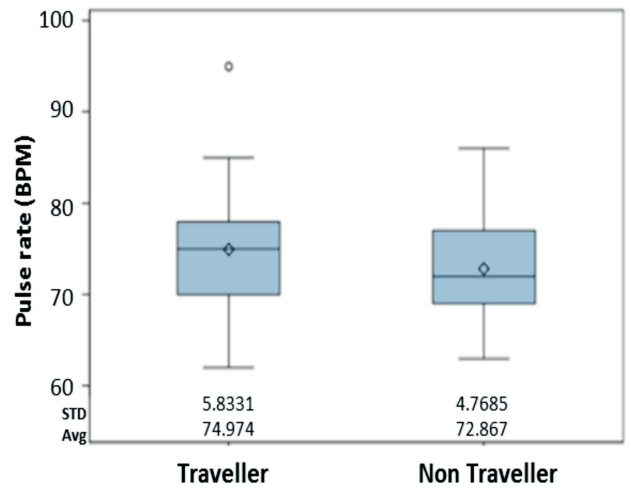
Looking at vital signs indicated lack of significant differences between the group of travellers and non travellers.

Graph 1: Distribution of the systolic blood pressure



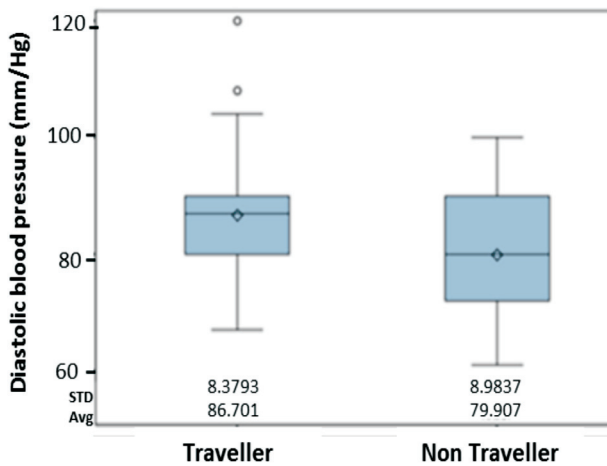
As shown in graph 1, the mean of the systolic blood pressure in the group of the travellers was 129 mmHg and the standard deviation was 11.8. The blood pressure in the non travellers group was nearly identical with a mean of 126 mmHg and a standard deviation of 15.9.

Graph 3: Distribution of the pulse rate



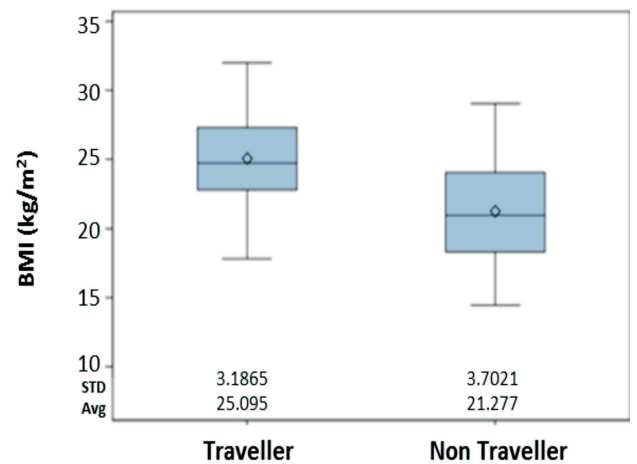
As shown in the graph 3, the mean of the pulse rate in the group of the travellers was 75 beats per minute (BPM) and the standard deviation was 5.8. The pulse rate in the non travellers group was almost similar with a mean of 73 beats per minute (BPM) and a standard deviation of 4.8.

Graph 2: Distribution of the diastolic blood pressure



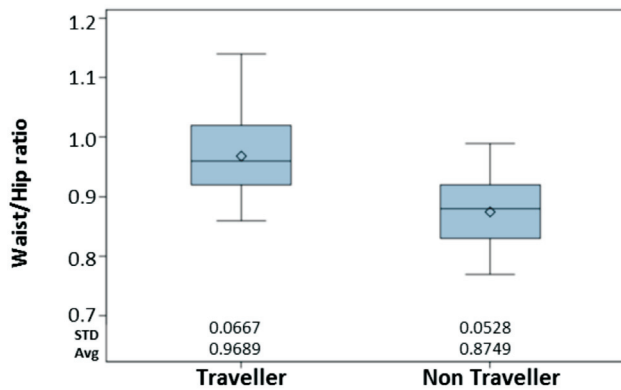
As shown in the graph 2, the mean of the diastolic blood pressure in the group of the travellers was 87 mmHg and the standard deviation was 8.4. The blood pressure in the non travellers group was nearly identical with a mean of 80 mmHg and a standard deviation of 9.0.

Graph 4: Distribution of the BMI



Graph 4 shows the distribution of the BMI among travellers and non travellers. The mean BMI of the travellers was 25 kg/m<sup>2</sup> (STD 3.2), which is classified as overweight while the mean BMI of non travellers was 21 kg / m<sup>2</sup> (STD 3.7) which is classified as normal<sup>11</sup>.

**Graph 5: Distribution of the waist/hip ratio**

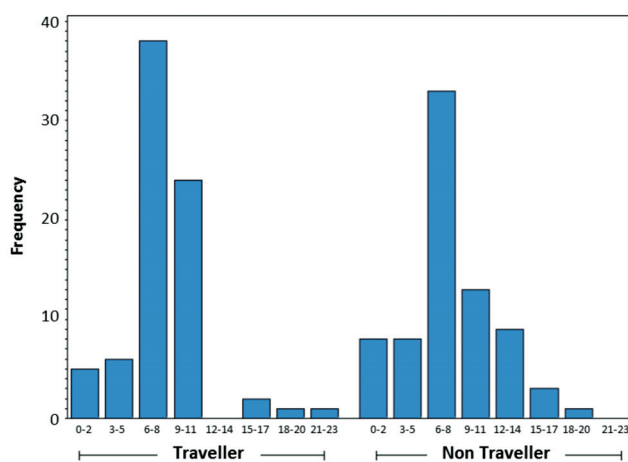


Graph 5 shows the distribution of the waist hip ratio among travellers and non travellers. The mean waist hip ratio in the group of travellers was 0.97 STD 0.07, which is indicative of abdominal obesity while the mean waist hip ratio in the group of non travellers was 0.87 STD 0.05, which is classified as no presence of abdominal obesity<sup>12</sup>.

**Quality of Life**

There was no difference visible in the data obtained in the quality of life questionnaire. The means and standard deviations of the groups were nearly identical with a mean of 6.8 and a standard deviation of 3.4 and 3.8.

**Graph 6: Distribution of the GHQ 12 Total score**



Graph 6 shows the distribution of the GHQ 12 total score. The majority of the participants had a total score of 4 -6, only 4 participants had a score above 15.

**DISCUSSION**

This study was done to determine the difference in the health status in commuting and non-commuting rural population. A daily commute of more than 2 hours was related to weight gain, increased triglycerides, elevated fasting glucose and impaired glucose tolerance in commuters when compared to non commuting people.

The gain in weight was seen as elevated body mass index as well as higher waist / hip ratio, classifying commuters as obese and overweight compared to non commuters.

Increased central obesity in commuters as evident by BMI and waist hip ratio can be understood by increased activation of the hypothalamic-pituitary-adrenal axis and insulin resistance due to stress<sup>13</sup>. Waist circumference has a stronger correlation with Blood glucose after 2 h of glucose ingestion indicating the risk for Type 2 Diabetes mellitus<sup>14,15</sup>. Also higher prevalence of impaired glucose tolerance as indicated by OGTT in commuters indicates the risk for Type 2 Diabetes mellitus<sup>16</sup>. Higher levels of serum triglycerides are indicative of the increased risk for coronary heart diseases in commuters<sup>17</sup>. It is also worth noticing the simultaneous presence of both elevated triglyceride level and high waist circumference in commuters which indicates the hypertriglyceridaemia waist phenotype. Studies have suggested that simultaneous presence of an increased waist circumference and elevated fasting triglyceride levels could be used as screening tool for identification of men characterized by features of metabolic syndrome<sup>18,19</sup>. Even though this study failed to show the effect of commuting on blood pressure, effects might be evident in the long term.

This study indicated: 1) Higher prevalence of obesity and overweight among commuters. 2) Higher risk of developing diabetes as evident by impaired glucose tolerance in commuters. and 3) Increased risk of coronary heart disease associated with increased triglyceride levels.

On the basis of these results the authors would like to suggest that an active lifestyle, good food habits,



leisure time physical activity, and regular health check up should be promoted for both commuters as well as non commuters to stay healthy and fit in today's busy and modern world.

The authors also feel that further research is necessary to understand the exact reasons for the difference in the metabolic parameters among commuters and non commuters.

#### **Remark from the authors in regards to limitations of research results**

- 1) Over-reporting or under-reporting associated with the completion of GQH12 Mental Health Questionnaire cannot be excluded.
- 2) The authors looked only at commuting as a stress factor for impact on the health status. Additional factors, such as diet, lifestyle etc. could also have an impact and should be considered for any future studies in this field of research.

\* commuters and travellers, non commuters and non travellers are used interchangeably

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# Comparative Evaluation of the effect of three Disinfectants and Water Immersion on Surface Hardness of Heat Polymerised Acrylic Resin - An in Vitro Study

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## ABSTRACT

**Objective:** To determine the changes in surface hardness occurring due to disinfection of denture base acrylic resins.

**Materials and Method:** 80 disc shaped test specimens (13 mm x 8 mm) fabricated from heat polymerised acrylic resin were subjected to Vickers' hardness test before and 15, 30, 60 and 90 days after disinfection in one of the test disinfectant solutions (1% sodium hypochlorite, 2% alkaline glutaraldehyde or 4% chlorhexidine gluconate) at room temperature for 10 minutes. The control specimens were stored in distilled water at room temperature without disinfection. Vickers' hardness test was performed on these control specimens after 15, 30, 60, and 90 days of storage in water.

**Result:** Mean values demonstrated a significant decrease in hardness after disinfection regardless of the disinfectant solutions used. However, this effect was reversed after 15 days of storage in water and continuous increase in hardness values for up to 60 days of water storage, after which no significant change was observed upto 90 days.

**Conclusion:** Chemical disinfection by immersion method significantly affects the hardness of heat polymerised acrylic resin tested. However, 4% chlorhexidine gluconate least affected the hardness of resin whereas 2% alkaline glutaraldehyde affected the hardness to a maximum. This effect was found to reverse after 15 days of storage in water.

**Keywords:** Vickers Hardness Number, Disinfection, Acrylic Resin, Water Immersion

## INTRODUCTION

Dentists, auxillary personnel and dental laboratory technicians may be exposed to a wide variety of harmful microorganisms during clinical and laboratory dental procedures. Prostheses in contact with oral tissues, saliva, and blood, when removed from patients' mouths at various stages of finishing,

polishing and repairing procedures may be contaminated by pathogenic microorganisms which may be transmitted through direct or indirect contact or through the aerosol during trimming, finishing, and/or polishing procedures.<sup>1</sup>

Prostheses and dental appliances should be disinfected in both the dental office and laboratory and before being inserted intraorally, to eliminate cross contamination.<sup>2</sup> However, frequent immersion of acrylic resin in disinfectants may affect the mechanical properties of the material. One property which changes to a significant level is hardness. Hardness measurements have been successfully used as an indirect method of evaluating polymerization depth of resin based materials and the degree of conversion

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of conventional heat polymerizing and self curing acrylic resins. In addition, hardness has been used to predict the wear resistance of dental materials.<sup>3</sup>

The aim of this study was to evaluate the effect of disinfectant solutions (4% chlorhexidine, 2% glutaraldehyde and 1% sodium hypochlorite) and water immersion (15, 30, 60, 90 days) on the surface hardness of heat polymerized acrylic resin.

## MATERIALS AND METHOD

Stainless steel dies measuring 13mm × 8mm, heat polymerized cross linked acrylic resin of pink colour, dental stone - type III, separating medium, silicon carbide, distilled water, 4% chlorhexidine, 2% glutaraldehyde and 1% sodium hypochlorite. The stainless steel dies were used [Figure 1] to fabricate dental stone dies which were flaked in the dental stone as per the internationally recommended standards [Figure 2]. Acrylic specimens were made using heat polymerized cross linked polymethyl methacrylate accordingly [Figure 3]. Polymerization of all the specimens was carried out according to the recommended polymerization cycle. Flasks were first placed in cold water in the acrylizing unit and heated till it reached a boiling point of 100°C. Heat was turned off for 20 min and it was reheated and boiled for 10 min. After the completion of polymerization, the flasks were bench cooled to room temperature for 10 minutes followed by immersion in cold water. The specimens were then retrieved by deflasking. For finishing, 150, 320, 600 and 800 grit silicon carbide were used. After polishing, all specimens were stored in distilled water for 48 hours. A total of 80 specimens were divided into 4 groups (A, B, C and D) of 20 specimens each.

**Group A:** Control specimens were maintained in water for 90 days. These specimens were periodically taken out from water at intervals of 15, 30, 60 and 90 days and were checked for hardness.

**Group B:** Specimens disinfected with 1% Sodium Hypochlorite.

**Group C:** Specimens disinfected with 2% Alkaline Glutaraldehyde.

**Group D:** Specimens disinfected with 4% Chlorhexidine Gluconate [Figure 4].

Each specimen of the test group was placed in the disinfectant solution for 10 minutes, for 4 consecutive cycles with a gap of 30 minutes between each

disinfection. After disinfection, the specimens were immersed in water for 3 minutes and blotted dry before testing on the hardness tester. After hardness testing the samples were placed for distilled water immersion and checked periodically, i.e., after 15, 30, 60 and 90 days.

Microhardness measurements were made for all specimens with a Vicker's Hardness Tester using a 50 gf load for 30 seconds [Figure 5]. The diagonals of the pyramid were pressed on the specimen by the Vicker's diamond indenter. Three consecutive measurements were made and noted. Vickers hardness number (VHN) was then calculated for each specimen.

In this test the surface of testing material was subjected to a standard pressure for a standard length of time by means of a pyramid shaped diamond. The diagonal of the resulting indentation was measured under a microscope [Figure 6] and the Vickers hardness value was read from a conversion table.

**The VHN was calculated using the following formula:**

$VHN = 1.854 (F/D^2)$ , with F being the applied load (measured in kilograms force), and  $D^2$  being the area of the indentation (measured in square millimetres).

The applied load is usually specified when VHN is cited. Disinfection of specimens was done as described above and microhardness tests were made again for all the specimens after disinfection and immersion in distilled water to prescribed time intervals, i.e., after 15, 30, 60 and 90 days using Vickers hardness tester. Values thus obtained were tabulated and subjected to statistical analysis using paired t test.

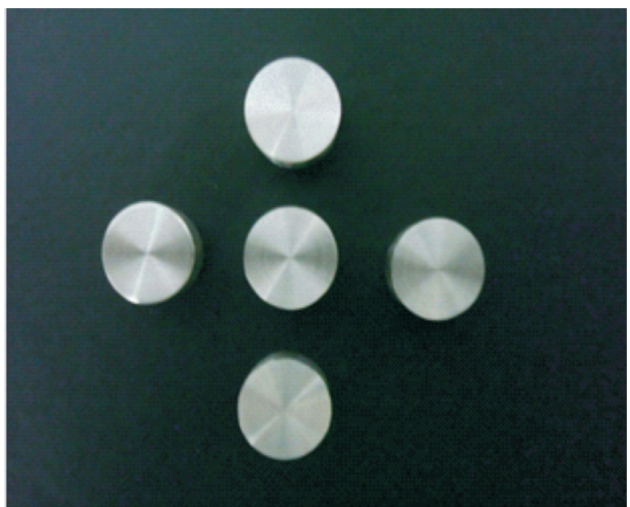


Fig. 1. Stainless steel dies



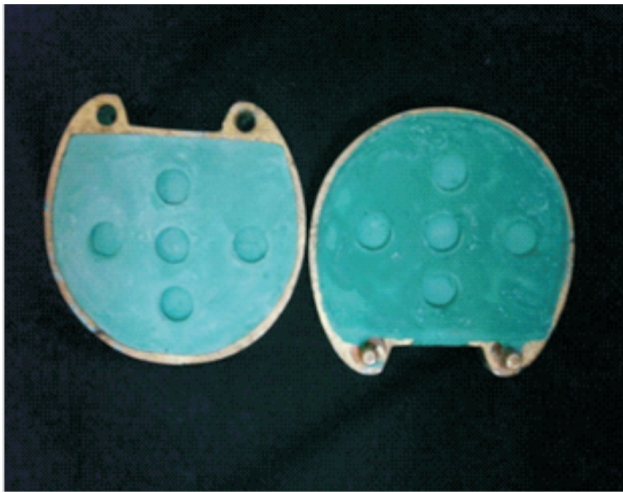


Fig. 2. Uniform mold spaces

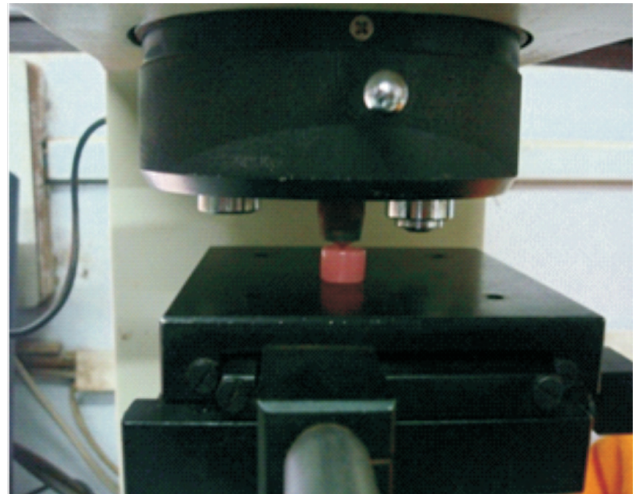


Fig. 5. Testing of specimen

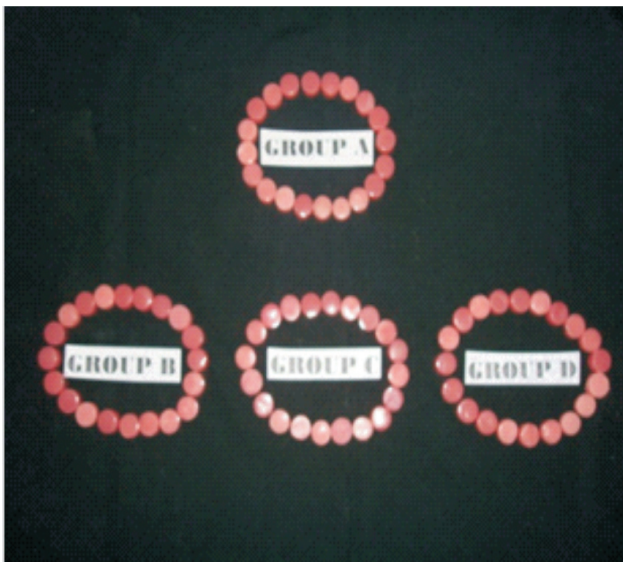


Fig. 3. Acrylic resin specimens

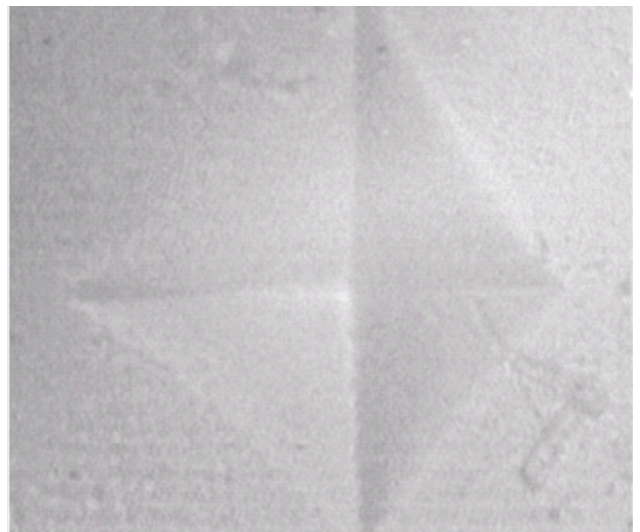


Fig. 6. Microscopic view of Indentation



Fig. 4. Acrylic specimens in disinfectants

## RESULTS

Heat polymerised acrylic resin specimens exhibited significant decrease in surface hardness values after disinfection, with all the three disinfectant solutions used. The hardness values decreased significantly with immersion in 2% glutaraldehyde followed by 1% sodium hypochlorite and 4% chlorhexidine gluconate respectively.

Heat polymerised acrylic resin showed significantly and progressively increased hardness with aging in water, regardless of the chemical solutions used for disinfection. A definite increase was observed after water immersion for 15 days. A gradual increase in hardness values was observed till 60 days after which no significant change was observed upto 90 days.



The 2 way ANOVA revealed significant differences in surface hardness values among denture base resin over time ( $p < 0.001$ ). When the repeated hardness measurements of the same specimens were compared before and after disinfection, a significant decrease ( $p < 0.001$ ) in hardness was observed after disinfection, regardless of the materials and disinfectant solutions used. However, the decrease in hardness resulting from

disinfection procedures was significantly reversed ( $p < 0.001$ ) after 15 days of storage in water. There were significant differences in surface hardness values among disinfectants and time interaction. All specimens exhibited a continuous increase in hardness values for up to 60 days of water storage, after which no significant change was noted (Tables I and II).

**Table I: Mean values and standard deviation of vickers hardness number of all the specimens with paired differences of the mean**

Time interval	Control Group (GROUP A)		1% Sodium hypochlorite (GROUP B)		2% Glutaraldehyde (GROUP C)		4% Chlorhexidine Gluconate(GROUP D)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Before disinfection	15.19	0.287	15.44	0.371	15.54	0.325	15.34	0.389
After disinfection	14.99	0.292	14.52	0.380	14.60	0.351	14.54	0.327
P.D	-0.2		-0.92		-0.94		-0.8	
After 15 days	16.20	0.416	16.05	0.526	16.17	0.523	16.26	0.432
P.D	1.21		1.53		1.57		1.72	
After 30 days	17.10	0.453	17.06	0.286	17.34	0.366	17.25	0.346
P.D	0.9		1.01		1.17		0.99	
After 60 days	18.20	0.365	18.10	0.325	18.45	0.315	18.32	0.299
P.D	1.1		1.04		1.11		1.07	
After 90 days	18.31	0.384	18.24	0.328	18.56	0.290	18.51	0.292
P.D	0.11		0.14		0.11		0.19	

**Table II: Comparison of mean of vickers hardness number (vhn) of all the specimens before and after disinfection using paired t-test**

Time interval	Control Group (GROUP A)	1% Sodium hypochlorite (GROUP B)	2% Glutaraldehyde (GROUP C)	4% Chlorhexidine Gluconate(GROUP D)
Mean value:Before disinfection	15.19	15.44	15.54	15.34
Mean value:After disinfection	14.99	14.52	14.60	14.54
Paired differences	-0.2	-0.92	-0.94	-0.8
t-value		0.08	0.12	0.34

## DISCUSSION

In the present study, the disinfectants used were 1% sodium hypochlorite, 2% alkaline glutaraldehyde and 4% chlorhexidine gluconate as these have been proved in earlier studies to be potent against a variety of microorganisms. Sodium hypochlorite is a readily available intermediate level disinfectant that has been shown to be effective against microorganisms including spores. Bell *et al*, 1989 demonstrated that sodium hypochlorite achieved complete disinfection against *Staphylococcus aureus*, *Candida albicans* and *E. coli* within 4 minutes. Glutaraldehyde is high level disinfectant and chlorhexidine gluconate is a highly effective disinfectant in presence of organic materials usually found on dentures.<sup>4</sup>

This study was an attempt to evaluate the effect of disinfectant solutions on the hardness of denture base resins after long term storage in disinfectants and water. Surface hardness of denture base resin is an important property. The hardness measurement tests are based on a material's resistance to indentation. Hardness has often been used as an index of the ability of a material to resist abrasion or wear. *In vitro* wear can reduce the life of dentures and resin teeth and thus increases patients' discomfort. High surface hardness of acrylic denture base results in reduced wear according to Craig and Powers, 2000.<sup>5</sup> Results of studies in the past have also shown decrease in hardness values of denture base resins after disinfection, as per Neppelenbroek *et al*, 2005.<sup>6</sup> This reduction in surface hardness of acrylic resin may be

due to structural changes in the polymer caused by the disinfectant solution.

For the material tested in our study, the decrease in hardness resulting from disinfection procedures was reversed after storage in water for 15 days. Investigators have demonstrated that after the completion of polymerization reaction, varying amounts of methyl methacrylate monomer still remained in the acrylic resin. Residual monomer content may adversely affect the mechanical properties of denture base resins owing to a plasticizing effect which reduces the interchain forces so that deformation occurs more easily under load during hardness tests according to Lee *et al*, 2002. Immediately after polymerization, 2 processes reduce the concentration of residual monomer, i.e., diffusion from the polymer and further polymerization at the site of polymer radicals in the matrix. Simultaneously, acrylic resin, being a polar material, effectively absorbs water by diffusion as per Braden, 1964 and Lamb *et al*, 1982.<sup>8,9</sup> Since water molecules act as plasticizers, the flow of long chain polymers can be facilitated. Therefore, in the present study, the mechanisms of monomer release and further polymerization may have overcome not only the plasticizing effect of water uptake but also the detrimental effects resulting from the disinfection procedures. After disinfection, the hardness of denture base resin increased gradually through 60 days of storage in water. There were no significant differences between hardness values after 60 and 90 days of water storage. The results were in agreement with a previous report by Moradians *et al*, 1982, who observed that after soaking an autopolymerizing resin for 1 month in water, an increase in hardness occurred which continued over a 2 month soaking period.<sup>10</sup>

### CONCLUSION

The present study suggests that chemical disinfection significantly affects the hardness of denture base resin tested. Out of the three disinfectants tested, 4% chlorhexidine gluconate least affected the hardness of resin whereas 2% alkaline glutaraldehyde influenced the hardness maximally. However, this effect was reversed after 15 days of storage in water.

### ACKNOWLEDGEMENTS

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# Long Term Safety and efficacy of Nd: YAG Capsulotomy for Posterior Capsule Opacification!

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## ABSTRACT

**Introduction:** To evaluate long term safety and efficacy of Nd: YAG laser capsulotomy in various subtypes of Posterior capsule opacification (Membranous, Fibrous, Fibro-membranous) after uneventful cataract surgery, over a post-operative period of up to three years.

**Method:** The prospective study included 235 cohorts with visually significant PCO, who underwent Nd: YAG laser capsulotomy following uneventful cataract surgery, after a quite post-operative period of 3 months. Patients were followed-up on first, third and seventh postoperative days, then weekly for two weeks, monthly for two months and every three months thereafter. On each follow up visit, Best corrected visual acuity (BCVA), Applanation tonometry, and Slit-lamp bio microscopic examination with +90D Lens and Indirect Ophthalmoscopy was performed.

**Results:** The statistic mean age was 60.4372. The range was (45-83). The mean interval between surgery and PCO formation was 12 months. The statistic mean follow up period was 30.130 months. Transient IOP elevation, Iritis, Vitreous prolapse and Retinal detachment, IOL pitting were the most commonly noted complications respectively. Frequency of Retinal detachment was 4.18 % (Table 1). The statistic mean period after Nd: YAG Laser capsulotomy and diagnosis of retinal detachment was 12.7 months.

**Conclusion:** Nd: YAG laser capsulotomy compromises on the integrity of posterior capsule and may be associated with vision threatening posterior segment complications like Cystoid Macular oedema and Retinal Detachment. There appears to be some correlation between amount of laser energy used and complications like IOP elevation and Iritis, however, it cannot be said whether any direct correlation exists between retinal detachment and extent of laser energy used. We need to be cautious in doing capsulotomies in patients with pre-existing retinal diseases. Therefore, it is best advised to limit the amount of laser energy delivered to the eye to prevent complications.

**Keywords:** Nd: YAG LASER, Intra ocular Lens (IOL), Posterior Capsule Opacification (PCO), Retinal Detachment (RD)

## INTRODUCTION

According to World Health Organization, Cataract is responsible for 48% of world blindness and is the most common cause of avoidable blindness and a public health problem <sup>1</sup> in India. Expectations of patients receiving modern cataract surgery are becoming similar to patients with refractive surgery; they expect almost perfect result, often emetropia.

An opacity may occur in the posterior capsule of lens after successful cataract surgery and IOL implantation, referred to as posterior capsule opacification (PCO or after cataract). This opacity is

the most common visually disabling sequel of modern cataract surgery.<sup>2</sup> Sundelin and Sjostrand have defined visually significant PCO as a decrease in post-operative best corrected visual acuity by two Snellen lines<sup>3</sup>.

In a important meta-analysis of all published articles on PCO, Schaumberg et al (1998) noted that rate of PCO remains unexpectedly and unacceptably high, still over 25% during 5 year post-operative follow up.<sup>4</sup>

With technological and surgical advancements there has been a reduction in the incidence of PCO to less than 10 %.<sup>5</sup>

Neodymium Yttrium-aluminium-garnet laser is currently the procedure of choice for treatment of fibrous PCO.<sup>6</sup> Some authors have recommended surgical peeling and aspiration for membranous PCO.<sup>7,8</sup>

A posterior capsulotomy can potentially increase risk of posterior segment complications in high myopes and patients with uveitis, glaucoma and diabetic retinopathy.<sup>9</sup>

Transient IOP elevation remains a common complication of Nd: YAG laser capsulotomy.<sup>10</sup> Vision threatening, although infrequently reported complication, is retinal detachment.<sup>11</sup> Myopia appears to be a risk factor for Nd: YAG laser induced RD.<sup>12,13</sup>

## MATERIAL & METHOD

The study was performed at Indira Gandhi medical college & hospital and Laser Eye Clinic Noida, India. A written consent was obtained from all patient based on Helsinki protocol. The local ethics committee and institutional review board approved the trial.

This prospective study included 235 consecutive cohorts with visually significant PCO, referred to Laser clinic for Nd: YAG laser capsulotomy, from March 2009 to December 2010 following cataract extraction for age related cataract. Patients with traumatic, paediatric cataract, diabetic retinopathy, posterior capsule rent, RD in fellow eye and past history of Vitreo-retinal surgery were excluded from the study.

As a rule, patients with PCO were considered for capsulotomy after a minimum period of 3 months following uneventful cataract surgery. Best corrected visual acuity (BCVA), Indirect Ophthalmoscopy, 90D examination and Slit-lamp examination was done in all patients. IOL fixation was noted after fully dilating the pupil.

Capsulotomy was performed using Abraham's Lens with Q-switched Nd: YAG Laser (Visulas YAG II<sup>plus</sup>, Carl Zeiss, Germany). The optical centre of the IOL was matched with the centre of the opening, not exceeding greater than 50% of optical zone. The initial energy levels (0.3 to 10 mJ) and the summated energy (Ó) were noted in each patient.

Patients were followed-up on first, third and seventh postoperative days, then weekly for two weeks, monthly for two months and every three months thereafter. On each visit, recording of BCVA,

IOP by applanation tonometry, slit lamp examination with 90D and Indirect Ophthalmoscopy was done. 21 patients were lost in follow up by two years and another 11 patients by three years.

Chi-square tests ( $\chi^2$ ) were used to analyse the data statistically as there were more than two variables in the study. The number of valid cases was 215. 'P' value was calculated at 1% and 5 % levels. 'P' value less than 0.001 at 1% and less than 0.005 at 5% implied that data was statistically significant. Factors likely to influence PCO development were analysed using Z statistic and Z value was calculated at 95% confidence interval.

## FINDINGS

The statistic mean age of patients was 60.4372. There was a slight preponderance of females in our study with a male female ratio of 0.733. The mean interval between surgery and onset of PCO was 12 months. The statistic mean follow up period was 30.130 months. An interesting observation made was that the summated energy level was least for in the bag fixated IOL'S whereas it was more for sulcus fixated and maximum for bag-sulcus fixated IOL'S.

The mean summated (total) energy for membranous PCO was 24.6±2.14 whereas mean summated energy for fibrous PCO was 84.09±6.17 (Table 4). A paradox was observed! The summated energy for Fibro-membranous PCO was higher (87.41±3.46) despite lower mean starting energy.

The most common complication was IOP elevation seen in 15.3 % cases (Table 1). All patients were given Apraclonidine 0.5 % eye drops three times daily for three weeks. 2 patients developed permanent rise of IOP and were referred to glaucoma clinic. Iritis was seen in 12 % cases and was associated with higher summated energy levels. All cases of Iritis resolved with topical instillation of corticosteroids.

Optical Coherence Tomography defined Cystoid Macular Edema (CME) was seen in 7.90 % cases. Damage to IOL in form of pitting was seen in 12.09 % cases. (Figure 5)

The frequency of retinal detachment was 4.18 %. (Figure 1, 2, 3 and 4) The statistic mean interval following capsulotomy and retinal detachment was 12.7 months. Only one patient with RD was myopic in our study. Only one patient with membranous type of PCO developed RD. Anterior hyaloid phase rupture was a common finding seen in 12.5% cases. (Table 1)



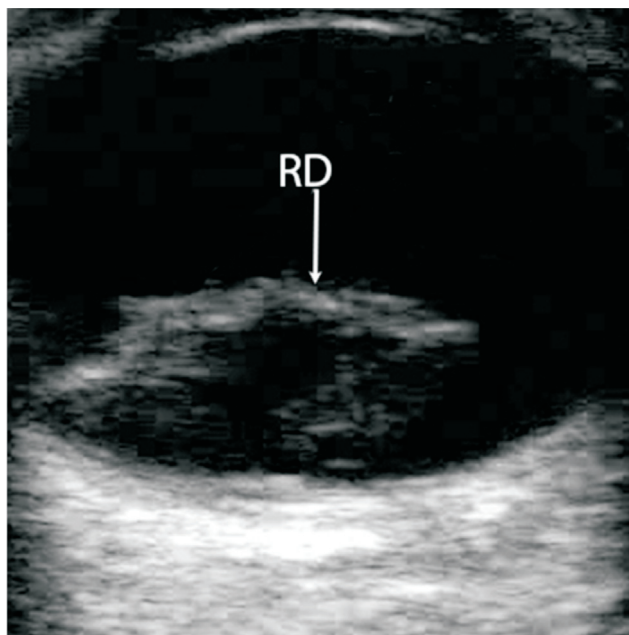


Fig. 1.

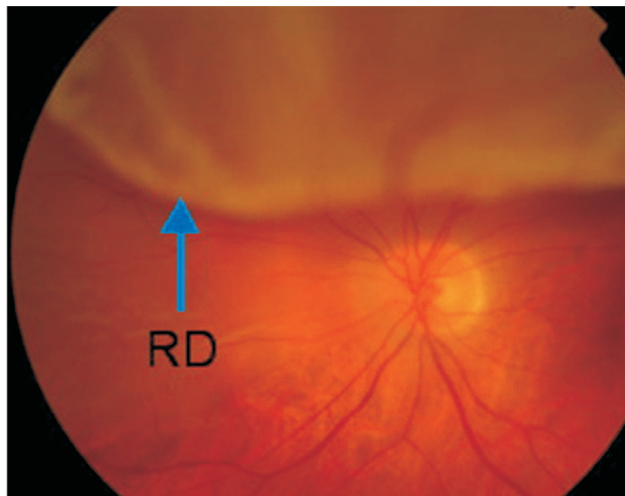


Fig. 4.

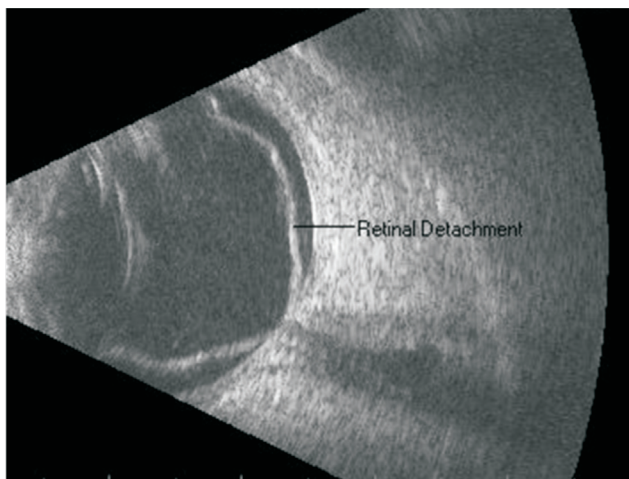


Fig. 2.

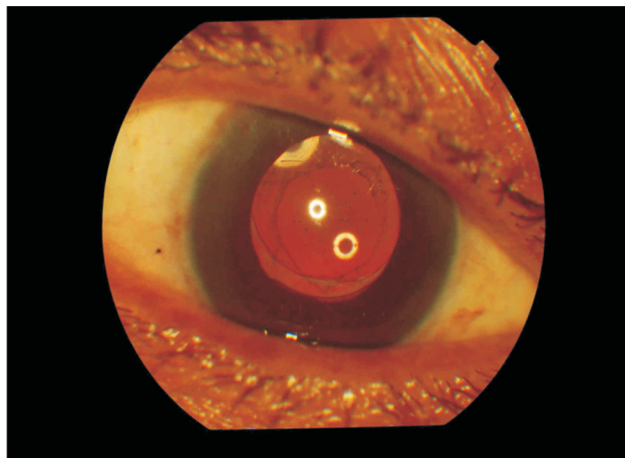


Fig. 5.

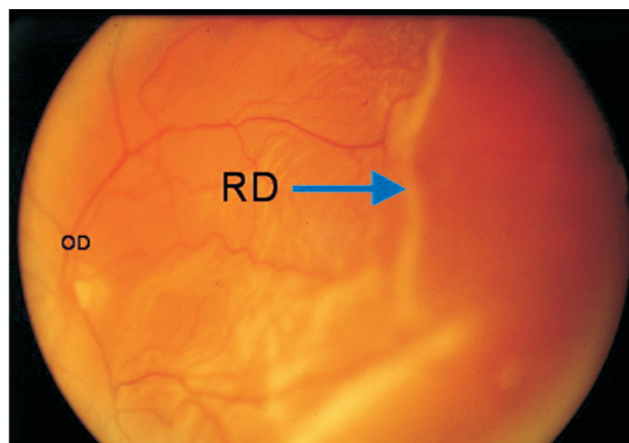


Fig. 3.

**Table 1. Incidence of Complications**

Complication	No of Cases = 235	Percentage
IOP elevation	33	15.3
Iritis	26	12
Retinal detachment	9	4.1
Hyaloid Phase rupture	27	12.5
IOL damage	26	12.09
CME (OCT defined)	17	7.90
Corneal burn	2	0.9

**Table 2. Incidence of Retinal Detachment.**

Authors	Year	Type of Study	RD frequency
Our study	2013	Retrospective	4.18 %
Powell et al	1995	Retrospective	0.8 %
Glacet- Bernard et al	1993	Retrospective	4.2 %
Steinhart et al	1991	Retrospective	0.9 %
Dardenne et al	1989	Retrospective	1.6 %



**Table 3. Percentage of patients at each level of laser energy.**

Energy Levels (mJ)	Membranous		Fibrous		Membranous+ Fibrous	
	N	%	N	%	N	%
0-25	24	55.6	0	0	6	7.7
26-50	16	36.3	42	37.2	17	21.8
51-75	4	9.1	37	32.7	23	29.5
76-100	0	0	15	13.2	12	15.4
101-200	0	0	13	11.5	10	12.8
>200	0	0	6	5.3	10	12.8
Total	44	100	113	100	78	100

**Table 4. Summated Energy Levels for type of PCO (mJ)**

	Initial Energy (mJ)	Summated Energy (mJ)
Membranous	1.9	24.6
Fibrous	3.2	84
Fibro-membranous	2.8	87.4

## DISCUSSION

Although with improvements in technique of surgery and IOL designs, there has been a reduction in capsulotomy rates worldwide. Nd: YAG lasers induce a significant financial burden on the health care system, which assumes significance in countries of the sub-continent.

Sex of the patient does not affect the predictability of posterior capsule Opacification post-operatively (Singh et al).<sup>14</sup> However, there was preponderance of females in our study.

Bhargava et al estimated mean energy levels for various sub types of PCO and found that membranous PCO required lower initial and summated energies.<sup>15</sup> Tetz et al<sup>17</sup> analysed energy levels for Nd: YAG Laser capsulotomy for PMMA IOL's and found that sulcus fixated IOL's required higher energy. In our study, both sulcus and sulcus-bag fixated IOL's required higher energy. A comparable result. Higher summated energy levels for bag-sulcus fixated IOL's could be explained by the fact that difficulty in focusing laser beam due to slight IOL tilt, required more number of shots to create capsulotomy.

Pitting is a relatively common complication of laser capsulotomy. Close proximity of IOL to posterior capsule in bag fixated lenses could account for pitting observed in bag fixation.

Auffarth et al<sup>17</sup> analysed energy levels for capsulotomy in a series of 172 patients and found that the average total energy used was 12.7 +/- 9.4 mJ. In

our study, the mean energy level for membranous PCO was 24.6 mJ, a comparable result. However in their study, 26 patients required a second a second Nd: YAG laser capsulotomy indicating Fibrous PCO requires more energy. In a study on 215 eyes with PCO, Bhargava et al found a mean summated energy of 22.4 mJ for membranous PCO.<sup>18</sup>

Fibro-membranous PCO requiring higher total laser energy despite lower starting energy (2.8 mJ) could be explained the fact that it was difficult to set the initial energy level. Fibro-membranous PCO has three zones namely fibrous, membranous and fibro-membranous junction. We set low energy level to fire shot at the fibro-membranous junction. This caused slight prolapse of anterior hyaloid phase, causing difficulty in focusing laser beam, and consequently, more energy to cut the fibrous part. We therefore advise to fire the shot of 3.2 mJ on fibrous part in case of fibro-membranous PCO.

Iritis and IOP elevation were the most commonly encountered complications with a frequency of 12 and 15.3% respectively, out of which 0.9% patients with Iritis had a past history of Uveitis. Remaining 11.6 % patients with Iritis had received higher laser energy. Waseem M and co-workers<sup>19</sup> noted IOP elevation in both low and high energy groups but IOP elevation was more common in high energy group. They concluded that patients undergoing Nd: YAG laser capsulotomy should receive minimum possible laser energy. An observation, similar to our study.

We are of the opinion that retinal detachment is an under reported complication of Nd: YAG laser capsulotomy. A long term follow up is required to know its actual frequency. The incidence of retinal detachment, in other retrospective studies, range from 0.8 to 4.2% (Table 2). A prospective study in Pakistan reports, frequency of RD to be 1.9%.<sup>20</sup> Pre-existing retinal diseases like lattice degeneration, posterior

vitreous detachment (PVD), posterior capsule rent (PCR) have been implicated as risk factors for development of RD.<sup>21</sup>

In our study, there were 10 myopic patients and 2 patients with PVD, but only one myope with fibrous PCO developed RD. On the contrary, only one patient with membranous PCO requiring less energy to create capsulotomy developed RD. Most retinal detachments occur within one year of Nd: YAG laser capsulotomy.<sup>22</sup> our statistic mean was 12.7 months. Since there was an adequate sample size and a statistic mean follow up of 30.18 months, these findings substantiate the fact Nd: YAG laser is associated with development of RD. However, it cannot be said whether RD is due to laser energy per se or it plays as an inciting factor in already weakened retina due to a lattice, PVD or VR traction. The first finding is supported by the fact that 8 cases in our study had Fibrous PCO with normal retina, requiring substantially higher laser energy to create capsulotomy, a statistically significant association. The second hypothesis was in some way supported by the fact that only one patient with membranous PCO developed retinal detachment as compared to 8 patients with fibrous PCO (normal retina) which required more laser energy to create a capsulotomy. Therefore, it is best advised to limit the amount of laser energy delivered to the eye to prevent complications.

### CONCLUSION

Lasers induce a significant financial burden and may affect allocation of health care resources in a developing country like India. We need to explore modalities to eradicate PCO or look for cheaper and safer modalities of PCO treatment. PCO still remains one of the most common causes of reduced visual acuity after uncomplicated cataract surgery.

It is recommended that laser should be set at lowest possible energy level and laser beam focused slightly beyond posterior capsule. In case of fibro-membranous PCO, initial shot should be fired at the fibrous portion.

Nd: YAG lasers compromises on posterior capsular integrity and disturbs the vitreous-retinal equilibrium.

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**Conflict of Interest:** None

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# Urinary Bladder Perforation by Migratory Copper T: A Case Report

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## ABSTRACT

A migrated Copper T could go unnoticed or can present with symptoms, depending on the organ of migration. Urinary bladder perforation by an IUD is a very unusual presentation. Here, we report a case, where the patient presented with urinary symptoms, which on further evaluation, proved to be caused by a Copper T that had eroded into the Urinary Bladder.

**Keywords:** IUCD/IUD, Copper T, Vesical Calculus

## INTRODUCTION

Intrauterine contraceptive devices like Copper T have attained widespread popularity, as a method of family planning. Copper T is considered to be highly efficient, easily available, inexpensive and associated with minimal side effects. Copper T insertion should be practiced by trained personnel since perforation most often occurs due to improper technique of insertion. The insertion should be followed by meticulous follow-up to identify a misplaced Cu T.

**Case Report 1:** A 27 year old lady presented to us with chronic pain in the lower abdomen and dysuria since 1 year. She also gave a history of UTI on several occasions, for which she had received treatment, but the symptoms persisted. She was para2, living 2 with 1 abortion. She had a Cu T 380 A inserted following the last delivery which was 3years ago. Patient had a MTP 2years ago (1year following Cu T insertion) with laparoscopic sterilization in the same sitting. The 3<sup>rd</sup> pregnancy was presumed to be following an expelled Cu T, since the Cu T threads were missing on pelvic examination. With the above background, we went ahead investigating the cause for her present symptoms, which is chronic pelvic pain associated with urinary symptoms. A midstream urine culture showed plenty of pus cells. Plain 'X' ray KUB showed a radio-opaque vesical calculus with an incidental finding of a Cu T. The calculus was located on the vertical limb of the Cu T. Laparotomy and cystotomy were performed to retrieve the Copper T and the calculus. Intra-operatively, the horizontal limb of Cu T covered with omentum, was found at the uterovesical junction. The vertical limb of Cu T was found to be partially perforating the bladder. Cystotomy was done

to remove the vesical calculus after cutting the vertical limb. The bladder was closed primarily and the patient had an uneventful post-operative period.



Fig. 1. Plain X ray KUB showing vertical limb of Copper T embedded On a radio-opaque calculus

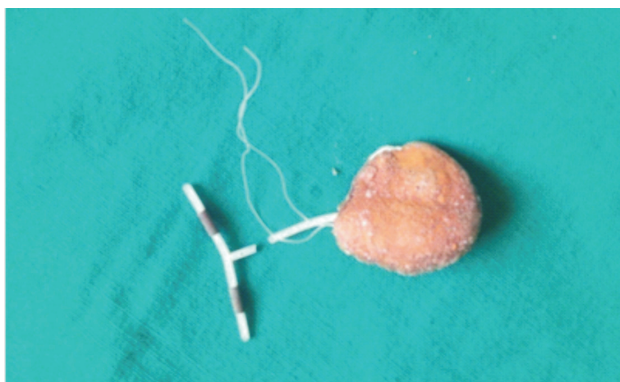


Fig. 2. Vesical calculus with the vertical limb of Copper T embedded in it. Horizontal limb found separately.



**Case Report 2:** A 30-year-old Gravida 2 para 1 living 1 woman, had a copper T inserted after the puerperal period, following her first LSCS. When she conceived for the second time, it was presumed to be following an expelled Copper T. Her antenatal period was uneventful. She came to R L Jalappa Hospital at term. She underwent a repeat LSCS. Intra-operatively, Copper T was found to be embedded in the omentum.

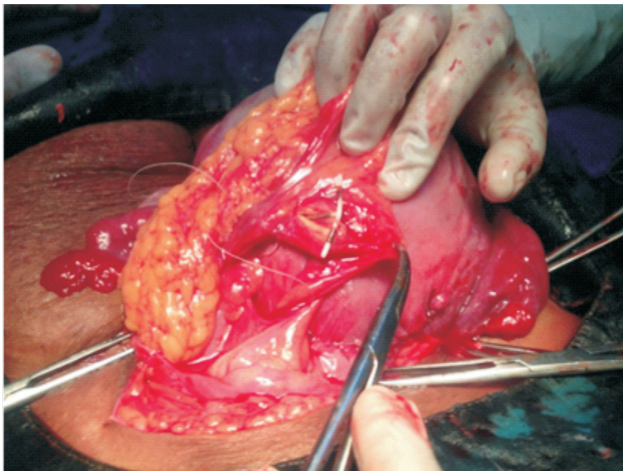


Fig. 3. Copper T found embedded in the omentum.

## DISCUSSION

Uterine perforation by an IUD, most often occurs at the time of insertion of the device. The most important factors for uterine perforation by an IUD are the consistency and flexion of the uterus, the type and the rigidity of the IUD and its inserter, and the amount of force exerted at insertion<sup>1</sup>. Perforation is more common when an IUD is inserted during puerperium or when the patient is still lactating. Primary iatrogenic uterine perforation usually occurs at the time of IUCD insertion but an IUCD may become embedded in the uterus and later be forced through the wall by spontaneous uterine contractions<sup>2</sup>. However, other possible translocatory mechanisms such as urinary bladder contractions, gut peristalsis and movement of peritoneal fluid may also play a significant role<sup>3</sup>.

Dalkon Shield and Lippes migration have also been reported<sup>4, 5</sup>. In a woman with an unretrieved intrauterine device, the possibility of migration of the device into the bladder should always be kept in mind<sup>6</sup>. Newer IUD's like LNG-IUS can also cause bladder perforation<sup>7</sup>.

IUCD migration into an extra-uterine site may remain asymptomatic for a long period. In our second case report, the Copper T in the omentum had remained asymptomatic and was just an incidental finding during LSCS. There have been reports of Copper T migration into the bladder resulting in secondary calculi formation<sup>8</sup>. Vesical calculi are uncommon in women. If a woman presents with vesical calculi and missing threads of Copper T on pelvic examination, IUD in the bladder should be kept in mind. Though successful endoscopic retrieval of Copper T has been reported, we resorted to the more traditional laparotomy in the first case because of the large size of the calculus.

Hence, the diagnosis of complete expulsion of Copper T requires ultrasound confirmation that the IUD is not in the uterus, followed by x-ray documentation that the IUD is not in the abdomen or pelvis either. A copper IUD is relatively easy to detect with ultrasound, as it gives a strong echo. The LNG IUD is more difficult to identify because only the proximal and distal ends of the vertical arms produce a detectable echo; this may or may not be enough to confirm the location of the device in the uterus. The LNG IUD produces a dark sonographic shadow, particularly on transvaginal ultrasound, that can also aid in its localization<sup>9</sup>.

## CONCLUSION

This case report re-emphasizes the need for careful IUCD insertion technique and the need for regular follow-up to avoid the complications associated with perforated IUCD. It also emphasizes the importance of a thorough investigation, in the event of a missing IUD.

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# Renal Artery Stenosis in Different Age Groups Undergoing Coronary Interventions

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## ABSTRACT

**Background:** Atherosclerosis has a common systemic pathogenesis and simultaneously affects multiple vascular beds. There is two fold increase in coronary artery disease (CAD) mortality with concomitant renal artery disease and survival correlates inversely with the severity of renal artery Stenosis (RAS).

**Aim:** The aim of this study was to estimate the prevalence of significant renal artery stenosis in different age groups undergoing coronary interventions.

**Method:** Subjects under going coronary angiography for Severe CAD were simultaneously screened for RAS by renal angiography and those with more than 70% stenosis were included in the study. Case records were reviewed for cardio metabolic risk factors(CRF) like hypertension, diabetes, smoking and dyslipidemia. Serum creatinine levels, left ventricular ejection fraction and the number of coronary arteries affected was also recorded. Cardio metabolic Risk factor prevalence rates in RAS positive and negative subjects were compared for predicting association between RAS and CRFs .

**Results:** RAS prevalence rates progressively increased with advancing age(25 to 44 years 16.67%, 45 to 64 years 23.19% and above 65 years 45.23% p=0.00005).Neither cardio metabolic risk factors nor the number of affected coronary vessels were predictive of RAS.

**Conclusion:** Renal artery stenosis is common in subjects under going coronary interventions and prevalence rates significantly increase with advancing age None of the risk factors were predictive of RAS except age.

**Keywords:** RAS, Renal Angiography, coronary Interventions, Prevalence

## INTRODUCTION

Atherosclerosis has a common systemic pathogenesis and simultaneously affects multiple circulations. As new advances in the treatment of coronary artery disease continue to reduce mortality and morbidity, caregivers will increasingly be confronted with the problem of concomitant "noncoronary" arterial disease.<sup>1</sup> Renal artery stenosis (RAS) is a common cause of secondary hypertension and emerging as a common and frequently unsuspected cause of chronic renal failure and end-stage renal disease (ESRD). Abdominal aortography at the time of coronary angiography has revealed incidental ARAS in 15 to 20% of patients. Progression

in the severity of luminal narrowing occurs in 9 to 16% of cases, being more likely in subjects with more than 75% stenosis.<sup>2</sup> The proportion of patients with ESRD attributable to atherosclerotic RAS has been reported as between 5 and 15%, a number that has risen substantially in recent years.<sup>3</sup> Renal artery stenosis can contribute to hypertension and /or can interfere with its treatment. Renal artery stenosis has a negative effect on both primary and secondary prevention of cardiovascular events. The mortality of patients with concomitant coronary artery disease and RAS is doubled when compared with those without RAS. Improving renal perfusion may influence the course of the cardiac disease because renal dysfunction has a

major impact on cardiac mortality.<sup>4</sup> There are two main groups of patients in whom renal artery stenting should be considered, young patients with new onset hypertension and older patients with multiple risk factors with worsening of established hypertension and/or deterioration of renal function. Recurrent flash pulmonary edema despite good left ventricular function and patients of CHF who develop acute renal failure with ACE inhibitors are also candidates for renal revascularization. Similarly patients with single kidney and renal artery stenosis and patients with bilateral renal artery stenosis may also get benefitted from revascularization.<sup>5,6</sup> The benefits of revascularization versus medical management is not yet known and this is an area of active clinical investigation. Until the CORAL (Cardiovascular Outcomes in Renal Atherosclerotic Lesions) trial results are in, physicians will continue to be faced with difficult choices when determining the optimal management for RAS patients and deciding which, if any, patients should be offered revascularization<sup>7</sup>.

#### **The objective of the study was**

1. To study the prevalence of significant renal artery stenosis in patients undergoing coronary interventions.
2. To study which age group of patients undergoing coronary interventions need to be subjected to routine renal angiography at the time of coronary angiography.
3. To compare ARAS positive and negative subjects for their association with cardio metabolic risk factors, number of coronary vessels affected and Left ventricular dysfunction.

#### **MATERIALS AND METHOD**

This study includes 407 subjects aged between 25 to 80 years who underwent coronary interventions (percutaneous coronary angioplasty and CABG) for significant coronary artery disease, between 1st January 2008 and 31st December 2009 at GSL general hospital. Institutional ethical approval was taken prior to the study. Written informed consent of the subjects was obtained prior to the procedure. All these subjects

underwent renal angiography at the time of coronary angiography and those subjects with significant renal artery stenosis (70%) or more stenosis on visual estimation were included in the study. All these patients had access to governmental health insurance (Rajeev Arogyasri). Out of 407 subjects 267(65.6%) were men 140(34.4%) were women. Subjects were divided into three age groups. Group one constituted 60 subjects in the age group of 25 to 44 years, group two 263 subjects in the age group of 45 to 64 years and group three 84 subjects in the age group of 65 years and above. Case records of all the subjects were reviewed and CRFs like hypertension, Diabetes mellitus, smoking and dyslipidemia were recorded. Serum creatinine levels, left ventricular ejection fraction and the number of coronary arteries affected were also recorded.

#### **Inclusion criteria**

- Age between 25 to 80 years.
- A hemoglobin concentration of 10 gm%/dl or more.
- Left ventricular ejection fraction more than 30%.
- Serum creatinine less than 2.5mg/dl.

#### **Exclusion criteria**

- History of allergy to contrast media.
- Subjects with Peripheral vascular disease (except RAS).
- Subjects with connective tissue disorders and Aortoarteritis
- Subjects with fibro muscular dysplasia .

Ejection fraction < 50 % was considered as LV dysfunction. Serum creatinine > 1.5 mg was considered as renal impairment. RAS positive and negative subjects were compared for their association with CRFs, number of coronary vessels affected, and Left ventricular dysfunction.

**Statistical Analyses:** Fisher's exact test was used to examine differences with categorical variables. Values are presented as mean ( $\pm$ SD). Logistic regression

was applied for the measured parameters for prediction of RAS. For all statistical analysis  $P < 0.05$  was considered Significant

### RESULTS

Significant (>70%) renal artery stenosis was found in 109(26.8%) subjects out of which 17(15.6%) were bilateral RAS. Out of the 109 subjects with significant renal artery stenosis 10 subjects were in group one, 61 subjects were in group two and 38 subjects were in group three. Out of ten group one RAS subjects six (60%) were men and four (40%) were women. In group two out of 61 RAS subjects, 36(59%) were men and 25 (41%) were women and in group three out of 38 RAS patients, 22 (57.9%) were men and 16 (42.1%) were women. The RAS prevalence rates among men were 23.97% and women were 32.14%. RAS prevalence rates

were 16.67%, 23.19% and 45.23% in groups one, two and three respectively. Statistically significant difference was seen in the prevalence of RAS in the three studied age groups ( $p = 0.00005$ ). There was progressive increase in the prevalence of RAS with age. (Table-1) Only age was found to be independent predictor of RAS. When RAS positive and negative subjects were compared for the prevalence of hypertension (73.56% and 63.64%,  $p = 0.136$ ), diabetes mellitus (30.28% and 34.34%,  $p = 0.441$ ), smoking (37.61% and 44.11%,  $p = 0.280$ ) Left ventricular ejection fraction (33.94% and 39.06%,  $p = 0.346$ ), Renal dysfunction (11.93% and 7.05%,  $p = 0.117$ ), One vessel disease (44.04% and 42.42%,  $p = 0.771$ ), Two vessel disease (47.71% and 52.53%,  $p = 0.389$ ) and three vessel disease (10.09% and 5.72%,  $p = 0.389$ ) statistically significant differences were not found (table-2).

**Table 1: RAS Prevalence in different age groups**

Age group	RAS positive n=109	RAS negative n=298	p value
>=65	38(45.23%)	46(54.77%)	0.00005
45-64	61(23.19%)	202(76.81%)	
25-44	10(16.67%)	50(83.33%)	

\* $P < 0.05$  is significant,  $P > 0.05$  is not significant. AS: Renal artery stenosis

**Table 2: Association of Study parameters with RAS positive and negative subjects.**

Variables	Total (n=407)	RAS positive n=109(26.85%)	RAS negative n=298(73.15%)	p value
Age (yrs)	54.50 ± 10.02	57.33 ± 9.99	53.22 ± 9.79	*0.0001
<b>Sex</b>				
Male	267(65.76)	64(58.72)	203(68.35)	0.07
Female	140(34.24)	45(41.28)	94(31.65)	
Hypertension	267(65.76)	78(71.56)	189(63.64)	0.136
Diabetes Mellitus	135(33.25)	33(30.28)	102(34.34)	0.441
Smoking	172(42.36)	41(37.61)	131(44.11)	0.28
<b>LV Dysfunction</b>				
<50%	153(50)	37 (33.94)	116(39.06)	0.346
>50%	153(50)	72 (66.06)	181(60.94)	
Renal impairment	34(35.38)	13(11.93)	21(7.05)	0.117
1 Vessel	174(42.86)	48(44.04)	126(42.42)	0.771
2 Vessel	208(51.23)	52(47.71)	156(52.53)	0.389
3 Vessel	28(6.90)	11(10.09)	17(5.72)	0.389

\* $P < 0.05$  is significant,  $P > 0.05$  is not significant. figures in parenthesis indicates percentage (%)



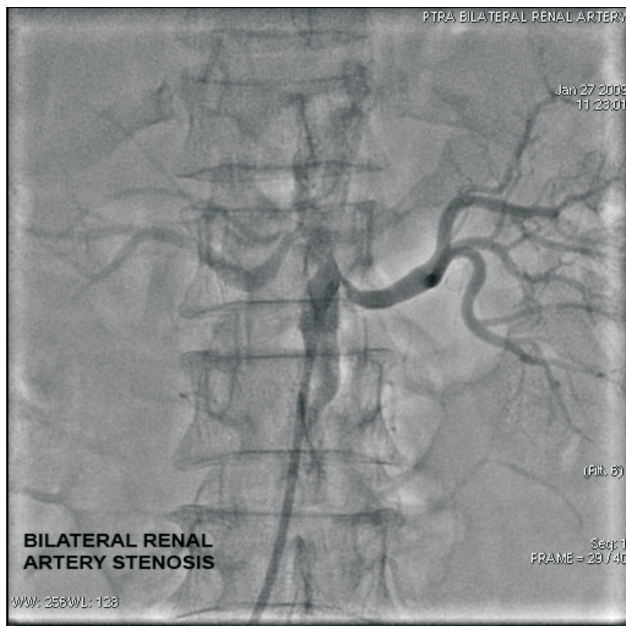


Fig. 1. Bilateral Renal Artery Stenosis

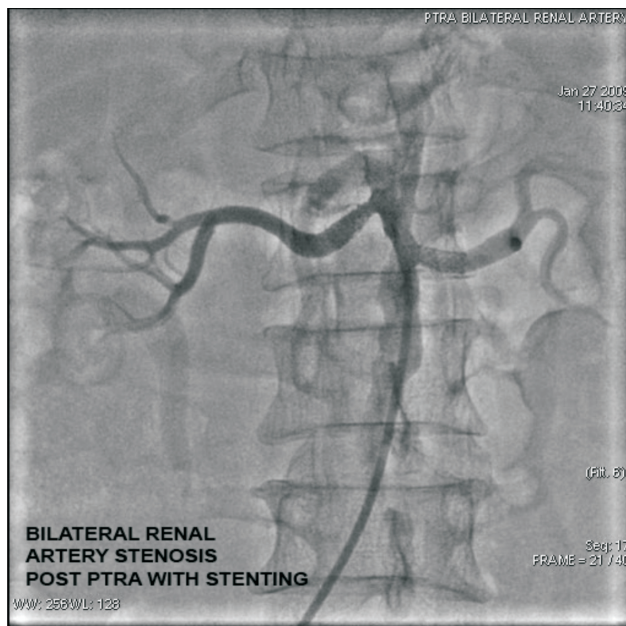


Fig. 2. Bilateral Renal Artery Stenosis After Percutaneous Renal Intervention

## DISCUSSION

This study shows that RAS is common among patients under going coronary interventions and there was female preponderance. Various studies from around the world report RAS prevalence rates varying between 10 to 39% with concomitant coronary artery disease. RAS prevalence rate of 26.8% in this study is in accordance with those studies.<sup>8,9,10</sup> When RAS prevalence rates were compared between different age groups there was progressive increase with age in

accordance with published data.<sup>8,11,12</sup> In this study significant RAS was seen in 1/6th of subjects in the age group of 25 to 44 years, 1/4th of the subjects in the age group of 45 to 64 years and about half of subjects in the age group of 65 years and above. This observation emphasizes the need for early recognition of RAS, as it contributes to cardiovascular morbidity and mortality besides being a cause for secondary hypertension and end stage renal disease. More over early recognition and intervention may prevent or stabilize progression of hypertension and renal impairment.<sup>13</sup> When RAS positive and negative subjects were compared for CRFs there was no significant difference between them, though the prevalence rates were little higher in RAS positive subjects compared to RAS negative subjects and none of them were found to be predictors of RAS. The prevalence rates for CRFs in this study are comparable with the findings of other studies conducted in India.<sup>14,15</sup> The CRF prevalence rates for CAD in general population are comparatively much lower than those found in patients with CAD and RAS confirming their association with cardiovascular disease burden in India.<sup>16,17,18</sup> A study conducted by Andhra Pradesh rural health initiative in this region in 2004, revealed that 32% of all deaths were due to CVD.<sup>18, 19, 20</sup> These observations show that there is urgent need for modifying community risk factor profile to reduce cardiovascular disease burden in India. statistically significant differences were not found between RAS positive and negative subjects with regard to left ventricular ejection fraction, serum creatinine and the number of coronary vessels affected. These findings are not consistent with the observations made in other studies which show associations between RAS, decreased LV function, Renal impairment and number of affected coronary arteries.<sup>8, 9,11,12,21</sup> This may be due to the ethnic differences in the populations studied or due to different cut off points adapted for each parameter in those studies.

## CONCLUSION AND RECOMMENDATIONS

Significant renal artery stenosis is common in patients undergoing coronary interventions and there is female preponderance. Renal artery stenosis is a progressive disease. Age is a significant contributing factor for RAS. Cardio metabolic risk factor prevalence rates are high in CAD and RAS patients and early life style modifications may prevent progression of disease. Severity of coronary artery disease rather than



the number of coronary vessels affected and longer duration of risk factor prevalence predict RAS. Drive by renal angiography may be in benefit of elderly patients undergoing coronary interventions.

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# A Study of Unstable Distal Radius Fractures Treated by Percutaneous Techniques

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## ABSTRACT

Fractures of distal radius constitute one of the common skeletal injuries treated by orthopaedic surgeon. These injuries account for one sixth of all fractures evaluated in emergency room. The optimal method of obtaining and maintaining an accurate restoration of distal radius anatomy remains a topic of considerable controversy.

In this study 45 cases of unstable distal radius fractures were classified according to Frykman's classification after obtaining anteroposterior and lateral radiographs of the wrist.

These were randomly grouped into three groups based on treatment modality;

1. Percutaneous K wires and cast
2. External fixation
3. External fixation augmented by K wires

These three groups were followed for a period of average 3 years. Functional assessment was done according to Gartland and Werley (1951) and results are

1. Patients treated with K wires had 10 excellent, 2 fair, 8 good and 0 poor results.
2. Patients treated with external fixator had 1 excellent, 2 fair, 9 good and 1 poor results.
3. Patients treated with external fixator with K wires had 0 excellent, 3 fair, 8 good and 1 poor results.

Functional outcome and Anatomical outcome were better in patients treated with K wires than with external fixator and external fixator augmented with K wires.

**Keywords:** *Distal Radius Fracture, Functional Outcome, Anatomical Outcome*

## INTRODUCTION

Fractures of the distal radius constitute one of the most common skeletal injuries treated by Orthopaedic surgeons. These injuries account for one sixth of all fractures evaluated in emergency room. Vast majority

of fractures of distal radius are articular injuries that result in disruption of both radio carpal and radioulnar joint. Better understanding of the spectrum of distal radius fractures has led to changing concept of treatment.

The optimal method of obtaining and maintaining an accurate restoration of distal radial anatomy remains a topic of considerable controversy. Wide arrays of techniques, including closed, percutaneous, and open methods of reduction and stabilization, have been increasingly advocated as successful treatment.

Fracture of the distal radius was first described by Pouteau (1783) and Colles (1814). Prominent among

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the concept is that optimal management of distal radius fracture requires differentiation of the relatively low energy metaphyseal injuries from the more violent injuries that disturb the articular surface. The articular injuries are more frequently comminuted and unstable, and therefore less suitable for traditional method of closed reduction and cast application. Without supplemental skeletal fixation, redisplacement of the fracture commonly to its pre-reduction position is inevitable, resulting in malunion, limited range of motion, weakness, pain and post traumatic arthritis<sup>1</sup>.

### MATERIALS AND METHOD

The present study consists of those cases selected from the department of Orthopaedics Government Wenlock Hospital, KMC Hospitals and other hospitals of Mangalore between May 2007 to March 2010.

45 patients of unstable distal radius fractures were included in the study and were followed for an average of 3 yrs. Fractures were classified according to Frykman’s classification after anteroposterior and lateral radiographs. Patients were grouped into three groups based on treatment modality given as follows:

1. Percutaneous K wire fixation and cast
2. External fixation
3. External fixation augmented with K wires

For closed reduction and K wire fixation, general anaesthesia was given, fracture reduced under image intensifier guidance and were fixed with 1.5-2mm k wires and followed by cast. K wires were removed as an outpatient by 6-8 weeks and mobilisation started<sup>1</sup>

For external fixation, under GA AO external fixator was used, 2.5mm schanz pins for 2<sup>nd</sup> metacarpal, 3.5mm schanz pins for radius. Fixator was removed as an outpatient at 6-8weeks and mobilisation of wrist begun. Pin tracts antiseptic dressings were taught to patients and were encouraged to do daily.

For group c under GA external fixator was applied and then augmented with k wires. Fixator and k wires removed at 6-8 weeks and mobilisation of wrist begun.

Check radiographs were taken at immediate post operative, at 3 weeks 6 weeks 3 months and 6 months. At every follow up patients were analysed for functional outcome as per Gartland and Werley et al scoring system and anatomical outcome as per Stewart et al scoring system. Grip strength was measured and range of movements measured with goniometer. The data obtained was tabulated, analysed and subjected to standard statistical tests, chi square test and p value calculated. (Table 1)

Mode of treatment Female Male Total cases  
Kwire 11920  
External fixation 01313  
External fixator with kwire 21012  
Total 133245

**Table 1. Distribution of males and females in three groups.**

Mode of treatment	Female	Male	Total cases
Kwire	11	9	20
External fixation	0	13	13
External fixator with kwire	2	10	12
Total	13	32	45

### Frykman’s classification

Frykman’s type VI, VII and VIII formed 58% of cases. Dominant side was involved in 51% of total cases.

Anatomical results based on Stewart et al as follows

### Dorsal tilt

Mean post reduction volar angulation was 8.5 degrees, 10.3 degrees and 11.5 degrees in group A, group B and group C respectively. K wire fixation was found to be better for maintaining dorsal tilt.

### Radial length

Mean post reduction radial length was 8.7mm, 9.23mm and 9.25mm in group A, group B and group C respectively. External fixation was better for maintaining radial length.

### Radial inclination/angulation

Mean post reduction radial angulation was 19.65 degrees, 16.3 degrees and 12 degrees in group A, group B, and group C respectively.

**Table 2. Anatomical Results in three groups.**

Group	Excellent	Good	Fair	Poor	Total
A k wire	10	7	2	1	20
Bexternal fixation	1	6	5	1	13
Cexternal ixation with k wires	0	7	4	1	12



## ANALYSIS AND RESULTS

### Functional results

It includes residual deformity, subjective evaluation, objective evaluation and complication. (Table 3)

**Table 3 Functional Results in three groups.**

Group	Excellent	Good	Fair	Poor	Total
A k wire	10	2	8	0	20
External fixation	1	2	9	1	13
C external fixation with k wire	0	3	8	1	12

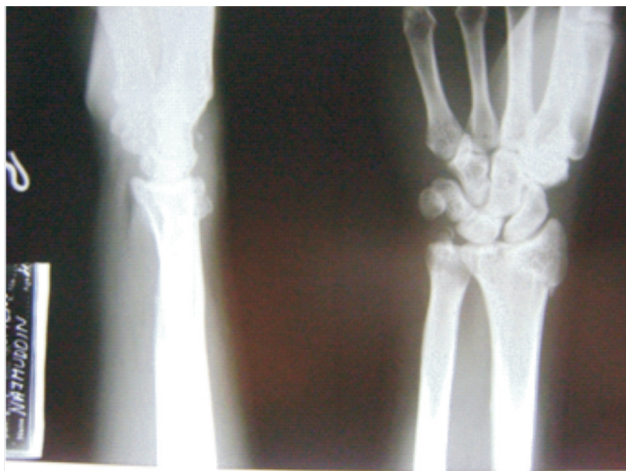


Fig. 1. Pre op Radiographs



Fig. 2. Post op radiographs



Fig. 3. Full range of dorsiflexion and palmarflexion



Fig. 4. Full range of pronation and supination

### COMPLICATIONS

Group A treated with percutaneous k wires, 2 had superficial pin tract infection which were treated with antiseptic dressing and oral antibiotics.

Group B treated with external fixation, 4 had residual cosmetic deformity and 2 had reflex sympathetic dystrophy which resolved with physiotherapy.

Group C treated with external fixation with k wires, 3 had residual cosmetic deformity and 3 had reflex sympathetic dystrophy which resolved with physiotherapy.

### 4. Discussion

The average age in the study was 40yrs. Average age in other studies was 53yrs<sup>2</sup>, 45yrs<sup>4</sup> and 39yrs<sup>9</sup>.

Mode of injury in the study was fall on the outstretched

Hand accounting for 71%. This was similar to other studies of John T Anderson and Brian J Harley <sup>2</sup>

In our study dominant side was involved in 51% similar to other study of L A Benoist<sup>3</sup>

Mean loss of arc range of movement in patients treated with k wire was 19 degrees in comparison to 38 degrees, 46 degrees in patients treated with external fixator and external fixator with k wire respectively.

Mean loss of pronation was 7 degrees in patients treated with k wire compared to 20 degrees and 23 degrees in patients treated with external fixator and external fixator with k wire.

Mean loss of supination was 7 degrees with k wire fixation in comparison to external fixation was 17 degrees and external fixator with k wire was 23 degrees.

According to Cooney et al<sup>1</sup> average loss of pronation and supination was 10 degrees and 17 degrees loss of arc range of movements, 14 degrees loss of radial and ulnar deviation. In Brian J Harley <sup>2</sup> series of augmented external fixation versus percutaneous k wires, no significant difference in mean disability of arm, shoulder and hand scoring.

### Grip strength

Average grip strength between patients treated with k wire and external fixator was significant as p value was <0.005 in chi square test. Average grip strength between patients treated with external fixator and external fixator with k wires was not significant as p value was >0.005 in chi square test. Average grip strength in group A was 75%, in group B 68% and in group C 65%.

For restoration of radial length, best modality of treatment was external fixation as it maintained radial length by ligamentotaxis (10). For restoration of dorsal tilt, best treatment would be k wire fixation <sup>10</sup>as they prevent dorsal angulations of distal fragment.

Complications like residual cosmetic deformity and reflex sympathetic dystrophy were seen in patients treated with external fixation <sup>7,8</sup>.

## CONCLUSION

Functional outcome and anatomical results were better in patients treated with k wires compared to external fixator. There was significant difference in movements and radiological parameters between k wires and external fixator. Grip strength was better in patients treated with k wires. Radial length is an important factor for better functional outcome and can be better maintained by external fixator by ligamentotaxis (10). Best results are obtained in comminuted fractures by external fixation, but complications like residual cosmetic deformity and reflex sympathetic dystrophy were common with external fixation.

**Acknowledgement:** Nil

**Conflicts of Interest:** No conflicts of interest.

**Source of Support:** Nil

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# Isolated Tuberculosis of Appendix- A Rare Case Report

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## ABSTRACT

Tuberculosis of the appendix remains a rarity despite the frequency of intestinal tuberculosis. We report a case of chronic appendicitis that underwent appendectomy, and the histopathology of the specimen revealed tuberculosis.

**Keywords:** Tuberculosis, Appendicitis, Granuloma

## INTRODUCTION

Tuberculosis is a chronic bacterial infection caused by *Mycobacterium tuberculosis*.

Tuberculosis can affect any organ. Lung is the usual site involved. The extra pulmonary sites involved are lymph nodes, pleura, genitourinary tract, bones, joints, meninges, peritoneum.<sup>1</sup>

Although ileocaecal tuberculosis is the commonest presentation of abdominal tuberculosis, isolated appendicular involvement is seldom found. The pathogenesis of this isolated lesion is not clear and unless histopathological diagnosis of resected specimen is asked for, the true diagnosis is likely to be missed.<sup>2</sup> Tuberculosis being endemic in our country, it is a must to send all appendectomy specimens for histopathology examination, so as to prevent misdiagnosis and prevent further complications.<sup>3</sup>

## CASE REPORT

A twenty two year old female came with history of pain abdomen since one month. Pain was present in the right iliac region. She didn't have any urinary complaints. Her hematological investigations were within normal limits, X-ray chest didn't show any abnormality. Patient was advised to undergo elective appendectomy. Routine appendectomy was done and specimen sent for histopathological examination.

Intra operatively there was no evidence of tubercles on the intestine or ascites.

Grossly the appendix was 6cm in length, thin and cord like. On cut section the lumen was patent. Microscopic examination revealed a tubercular granuloma comprising of caseous necrosis, epithelioid cells, Langhan's type of giant cells, lymphocytes and fibrosis suggesting the diagnosis of tubercular appendicitis.(Fig). However Zeihl- Nelson stain for acid fast bacilli was negative.

Patient was put on anti-tuberculous treatment and followed with satisfactory outcome.

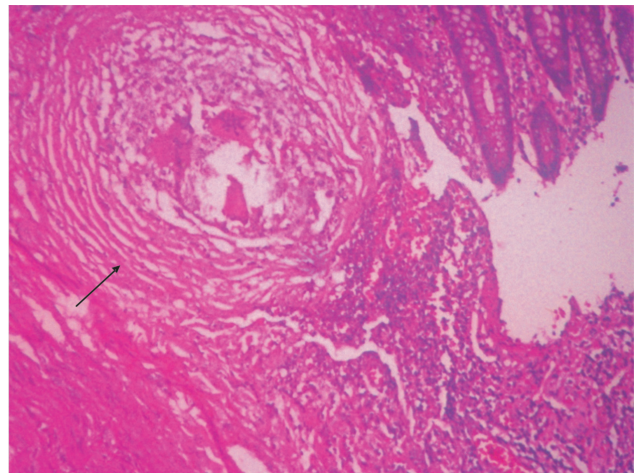


Fig. 1. Showing microscopy of appendix with a Tubercular granuloma in the wall of appendix.(H&E:400X)

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## DISCUSSION

The older series reported incidence of appendicular tuberculosis in all appendectomies performed varying from 0.1 to 3.0%, with an incidence of 1.5 to 30% among patients who are known cases of

tuberculosis.<sup>4</sup> In our case also there was no history suggestive of tuberculosis in the past.

A study conducted in India revealed only 3 cases of tuberculous appendix among 102 cases of gastrointestinal tuberculosis.<sup>5</sup> Another large study of 78 cases of abdominal tuberculosis in children did not mention even a single case of tuberculous appendicitis.<sup>6</sup> A recent study also showed that tuberculous appendix is uncommon, accounting for 0.08% of all appendectomies and 0.2% of all tuberculosis cases.<sup>7</sup>

The route for tuberculous infection of appendix may be haematogenous or from contaminated gut contents.<sup>8</sup> The tuberculosis of appendix has been described as ulcerative or hyperplastic type, former being more common. The gross appearance may vary from normal to thick walled appendix, very large appendix or a mass, in which absence of tuberculosis elsewhere in the body or other pathological foci at laparotomy may conclude the diagnosis of primary tuberculous appendicitis.<sup>2</sup> It can only be confirmed on histopathological examination. Some pathologists suggest study of more than 2 sections of each appendix for histopathological examination, so that more cases can be detected in endemic areas.<sup>2</sup>

Sarin et al have also suggested that the possibility of tuberculosis, Crohn's disease or malignancy, must be ruled out and representative biopsies must be taken from the bowel and adjoining mesenteric lymph nodes at the time of appendectomy<sup>9</sup>. However this was not done in our case as bowel and lymph nodes appeared normal.

### CONCLUSION

Isolated tuberculosis of appendix is rare. High index of suspicion is required for preoperative diagnosis which should be confirmed by

histopathological examination. All the appendectomy specimens should be sent for histopathological examination to prevent misdiagnosis.

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# Prolapsed Giant Cervical Leiomyoma-A Case Report

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## ABSTRACT

Cervical leiomyoma are grossly and histologically identical to those found in the corpus. Although they are frequently incidental findings on physical examination, with excessive growth, they may cause bowel/bladder symptoms.

**Keywords:** Cervical Fibroid, Uterine Inversion, Myoma

## INTRODUCTION

Cervical leiomyoma constitute only 0.4% of all leiomyomas. They are histologically similar to uterine leiomyoma. Here, we present a case report of an unusually large leiomyoma arising from the cervix, which had prolapsed outside the introitus.

**Case Report:** A 45 year old multiparous lady presented to the emergency block of R L Jalappa Hospital with a sudden increase in mass per vagina associated with vaginal bleeding, while straining at stools. Patient gave a history of mass per vagina since 6 months which was painless and progressively increasing in size and was associated with intermenstrual vaginal bleeding and foul smelling vaginal discharge. Patient also gave a history of menorrhagia. Patient had 3 uneventful vaginal deliveries with a normal puerperium. On examination, patient appeared pale. No mass was palpable per abdomen. On local examination, there was a large mass of size 20x20cms extending about 15cms outside the vulval outlet with areas of necrosis and hemorrhage on the surface. Mass was firm, non-tender, irreducible with restricted mobility. On vaginal examination, posterior lip of the cervix was seen and anterior lip of the cervix was not felt separately from the mass. Offensive purulent vaginal discharge was present. Rectal examination showed a normal shaped uterus at its usual position. Her hemoglobin was 5 gm%. Ultrasound examination revealed a normal sized uterus but the visualization of the cervix was limited only up to the pubic symphysis. We went ahead with an MRI of the pelvis since USG was inconclusive. Patient's hemoglobin status was corrected by adequate

packed cell transfusion. With adequate antibiotic coverage, patient was posted for vaginal myomectomy with TAH. Intra-operatively, vaginal approach was used first to excise the myoma from the cervix. The myoma pedicle was found to be arising from the cervical canal anteriorly. The pedicle was clamped, cut and ligated. A large myoma of the size 25x20cms was obtained. On laparotomy, an 8weeks sized uterus was found and endometriotic adhesions were present which were released by blunt dissection. Right fallopian tube and ovary were found to be buried in the Pouch of Douglas. TAH with salpingo-oophorectomy was performed. Postoperative period was uneventful. Histopathology showed a leiomyoma arising from the cervix with myohyperplasia of the uterus.

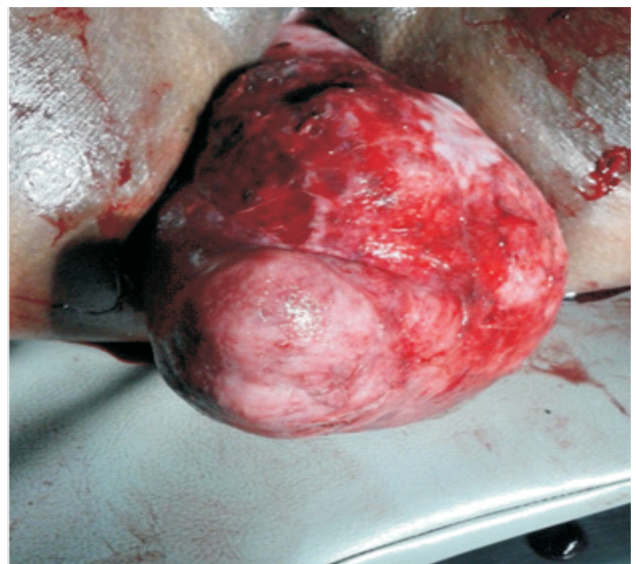


Fig. 1. Prolapsed cervical fibroid





Fig. 2. Fibroid appears to be arising from the Anterior lip of cervix. The artery is in the cervical canal.

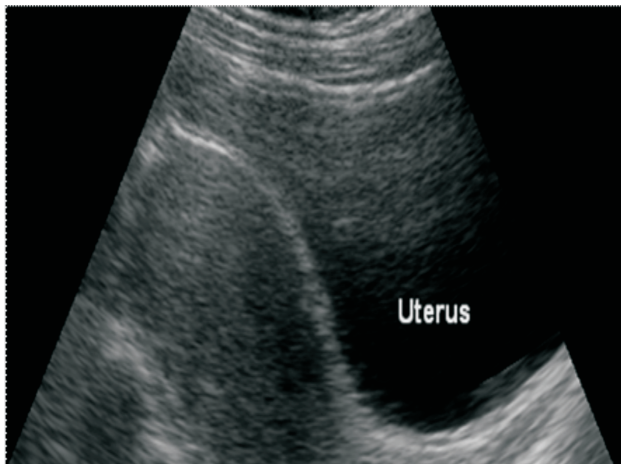


Fig. 3. Ultrasound showed Normal contour of the uterus with the cervix not being visualized

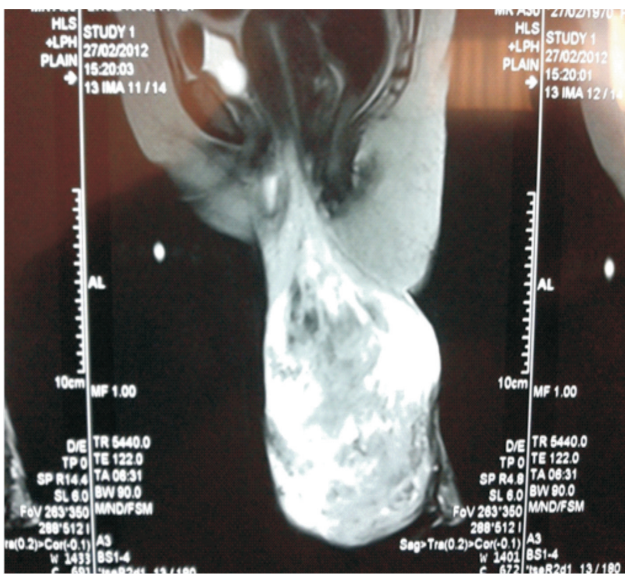


Fig. 4. MRI showed a large cervical fibroid measuring 22 x 12 x 14cms arising from anterior lip of the cervix traversing through the introitus & herniating to the exterior. The fundus & the body of the uterus appeared normal

## DISCUSSION

Only 0.4% of the leiomyoma develop in the cervix (1). A cervical leiomyoma is commonly single and is either interstitial or subserous. Rarely, does it become submucous. The subserous tumour grows into one/other broad ligament (2).

A leiomyoma arising from the supravaginal portion of the cervix tends to displace the bladder and the ureters, and its removal is hazardous for the same reason. This patient had a myoma arising from the vaginal portion of the cervix. Chronic uterine inversion was one of the differential diagnosis (3) in this patient but it was excluded based on our clinical findings, which were confirmed by MRI. Preoperative imaging with USG and MRI help to delineate the location and nature ( eg: pedunculated) of the cervical leiomyoma when clinical examination is inconclusive(4). This patient had developed anemia as a manifestation of menorrhagia, which could be explained by the generalized increase in vascularity of the uterus and endometrial hyperplasia, that are commonly associated with uterine fibroids.

Although supracervical hysterectomy is an increasingly popular modality for surgical management of benign uterine conditions, data exploring all of its consequences are still forthcoming. After supracervical hysterectomy, the remnant cervix has the potential for leiomyoma formation (5). Hence, TAH was performed in this patient.

## CONCLUSION

Large cervical fibroids are rare since they are usually symptomatic and patient seeks early treatment. TAH should be performed in the same sitting especially if the patient has completed her family.

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# Anterior Loop Connector Fixed Partial Denture - A Case Report

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## ABSTRACT

Replacement of anterior teeth with ridge defect and diastema is a complex challenging scenario with regards to prosthesis as well as esthetics. Different aesthetic treatment options such as implant supported restoration, conventional fixed partial denture and removable partial denture need be explored in treating such a patient. Problems posed may include drifting of teeth into edentulous areas which may reduce available pontic space, whereas diastema existing before an extraction may result in excessive mesiodistal dimension of pontic space. In such cases, loop connectors may be used to maintain the diastema in a planned fixed prosthesis. This article aims to describe the procedure for the fabrication of a loop connector fixed partial denture to restore an excessively wide anterior edentulous space in a patient with existing spacing between the maxillary anterior teeth.

**Keywords:** Anterior Edentulous Space, Diastema, Loop Connector

## INTRODUCTION

Fixed prosthodontics aims at restoration of esthetics, functions, form and comfort<sup>1</sup>. The success of fixed prosthodontics depends on the accurate replication of the previously existing natural conditions in the oral cavity. In order to replicate such pre-existing conditions, the form of the tooth should be same as earlier to its loss and replication of the surrounding conditions. For example, if diastema existed before the loss of tooth, it should be maintained while replacement. This is possible with loop connector fixed partial denture. Loop connector is a nonrigid component of a fixed partial denture provided when

an existing diastema is to be maintained in a planned fixed prosthesis.<sup>2,3</sup>

## CASE REPORT 1

A 20 year old female patient with a history of trauma reported to the out patient department with a chief complaint of requirement of replacement of missing teeth in the anterior tooth region. Her primary concern was esthetic replacement as well as maintenance of midline diastema. On oral examination, available edentulous region was greater than the approximate size of the adjacent abutments falling in the Siebert class III defect. Before starting treatment, ethical clearance was obtained from the ethical committee, Modern Dental College and research centre and is self funded Diagnostic radiograph, maxillary and mandibular impressions were made. Diagnostic cast mockup was done for final restorations. After patient's approval, tooth preparation

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was done in relation to 13, so as to give a cantilever bridge and replace 12. Retraction procedures were carried out, polyvinyl siloxanes (Aquasil soft putty and Aquasil LV, Dentsply Int ) impression was made using the putty relined technique.

Wax pattern was made so as to maintain the diastema between 11, 12 and 13. The loop connector was given between 12 and 13. Casting was done and metal coping was made (Fig. 1). Metal coping trial was carried out (Fig. 2, 3). After shade evaluation and selection, the ceramic build up was done in relation to 12 and 13 while maintaining the diastema. The bridge was cemented using glass ionomer luting cement (GC,GOLD LABEL, GC Corp, Tokyo, Japan) (Fig. 4,5).



Fig. 3. Metal coping trial palatal view.



Fig. 1. Metal coping



Fig. 4. Metal coping trial.



Fig. 2. Metal coping trial.

## DISCUSSION

Various treatment options, i.e., dental implants, resin bonded bridges and conventional fixed partial dentures are available for the replacement of a single missing anterior tooth.<sup>9</sup> Loop connectors have several advantages with regard to esthetics and maintenance of diastema. Connectors are those components of a fixed partial denture that joins the retainers to the pontics. Connectors are of two types, the rigid and nonrigid. Loop connector is a nonrigid component of a fixed partial denture and is required when an existing diastema is to be maintained in a planned fixed prosthesis. The size, shape and position of the connector determines the success of the prosthesis as it prevents the distortion, and fracture of the prosthesis.<sup>8</sup>

In loop connector fixed partial denture, the connector consists of a loop on the lingual aspect of the prosthesis that connects the adjacent retainer and/or pontic. The loop may be cast from sprue wax that is circular in cross section. Maximum esthetic results may be efficiently obtained if the natural anatomic forms of the teeth are protected and the diastema are maintained with minimal over contouring of the adjacent teeth.<sup>6</sup>

Spring cantilever could be considered as an alternative. The loop connector in spring cantilever fixed partial denture is a type of palatal connector. The connector is long, thin and partly supported by soft tissues.<sup>4</sup> It connects the pontic to the posterior tooth or teeth requiring full coverage crown. The long palatal connector may deform if thin and produce coronal displacement of the pontic. It may interfere with speech and is often poorly tolerated.<sup>7</sup>

### CONCLUSION

Presence of excess space in the midline makes esthetic replacement a great challenge to the dentist. Use of innovative techniques to achieve esthetic results in fixed partial denture treatment procedures makes loop connectors a suitable and viable treatment option. Loop connectors have several advantages when it comes to the esthetic appearance but the patient might object to the projecting minor connector in the palatal region and it may serve as a potential food trap. If the patient can adapt to the palatally projecting connector, incorporation of loop connector is an excellent treatment option in cases where excessive space is present in the esthetic zone.

**Conflict of Interests:** Nil

**Source of support:** Self Funded

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# Oral Biopsies: A Gold Standard Chair Side Investigation

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## ABSTRACT

Biopsies are an important diagnostic tool for the diagnosis of lesions ranging from simple periapical lesions to malignancies. Planning prior to performing a biopsy is essential. It will be beneficial to the receiving pathologist in reaching a helpful and meaningful diagnosis, and therefore ultimately and more importantly, to the patient. This paper presents an updated view of biopsies and discusses some of the potential problems with biopsy technique and specimens and how to overcome them.

**Keywords:** *Biopsy, Exfoliative cytology, Fine Needle Aspiration Cytology*

## INTRODUCTION

A biopsy is often the only way to diagnose oral lesions and diseases and as with most procedures there is often more than one method of undertaking the surgery successfully. Whatever the method used, however, the aim is to provide a suitably representative sample for the pathologist to interpret, while minimizing perioperative discomfort for the patient. An unsuitable, unrepresentative sample is of no use to the pathologist, clinician or most importantly the patient who would be ill served by an unnecessary repeat procedure. Although most biopsies are performed in hospitals, a recent study has shown that many general dental practitioners felt able to perform biopsies but lacked some of the necessary skills.<sup>1</sup> The purpose of this article is to review those skills, to discuss new developments in this area, and to highlight some of the potential pitfalls that may occur in taking a biopsy and methods available to avoid them.

## SPECIFIC TISSUES

### Apical lesions and those associated with the dental hard tissues

Many apical lesions are submitted routinely from general dental practice as well as hospitals following periradicular surgery. The majority of the lesions are inflammatory in origin, most commonly periapical granulomas or radicular cysts. Less commonly, other odontogenic cysts present at the apex, namely nasopalatine duct cyst, odontogenic keratocyst. Bone lesions such as Langerhans cell histiocytosis, giant cell granuloma and myeloma may also present in this way. Rarely, malignant metastatic deposits or even intraosseous squamous cell carcinoma can occur at this site.<sup>2</sup> For diagnosis, the excised material needs to be fixed to stop tissue autolysis prior to the sample reaching the pathology laboratory. The solution of choice to do this is 10% neutral buffered formalin fixative (a 4% solution of formaldehyde). This can easily be obtained on request from most pathology laboratories together with a supply of request forms and specimen pots. In a recent survey, many practitioners appeared unaware of these facilities and as such pathology laboratories may need to consider advertising their services more widely.<sup>3</sup> It should be noted that some laboratories might levy a nominal

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charge for such services. Some clinicians submit apical lesions on gauze which has been placed in formalin solution. However, if the volume of formalin in the container is not great enough, the gauze tends to absorb most of the formalin leaving the specimen dry and unfixed. Although not essential, it is desirable to inform the pathologist if bone is included in the specimen. Occasionally, it is necessary to examine the dental hard tissues, most often to rule out an abnormality of dentine or enamel.

- Biopsies of different tissue types and sites require specific techniques.
- Correct handling of biopsy specimens is crucial.
- The chosen site for a mucosal biopsy is dependent upon the disease/lesion.
- Written consent is advised for all biopsies.

As with most other tissues submitted for routine examination, teeth should also be submitted in 10% neutral buffered formalin fixative. A mineralised sample, such as bone or tooth may require decalcification before it can be processed.<sup>4</sup> The time for the decalcification will vary according to the size and consistency of the specimen as well as the methods employed by a particular laboratory, but it should be borne in mind that it can be a matter of weeks before a histopathology report is available.

### **Mucosal biopsies**

Biopsy technique for the sampling of mucosal biopsies can be critical. If a tumour or premalignant disease is suspected, or when widespread mucosal disease is suspected, we would strongly advocate the biopsy being undertaken in a hospital setting following appropriate referral; such lesions should not be biopsied in general dental practice. Such biopsies should be performed by the clinician who is going to initiate the treatment. Some of the following section is, therefore, for information for general dental practitioners and of more relevance to junior hospital staff. Simple excisional biopsies of polyps or epulides are suitable for general dental practice, and can be both diagnostic and curative at the same time. Before embarking on a biopsy the question of what the biopsy is being taken for must be answered.<sup>5</sup> The provisional clinical diagnosis is especially important in guiding the technique and tissue handling to be used.

### **Suspected malignancy**

If the reason for the biopsy was to exclude malignancy in a long-standing ulcer, a biopsy of the ulcer to include some adjacent clinically normal epithelium would be desirable. If the lesion is a carcinoma this allows confirmation that it is arising from the overlying epithelium rather than from a deeper structure or from a metastasis from a different site. It also allows the invasive front to be examined which can yield useful prognostic information.<sup>6</sup> The centre of larger tumours should be avoided as this is often necrotic and will not yield diagnostic material.

### **Mucocutaneous lesions**

Biopsies are commonly taken to confirm the clinical diagnosis of lichen planus, lichenoid reactions or other similar mucocutaneous conditions. To aid in the histological diagnosis of such lesions, an area of non-erosive lesional tissue should be chosen. Sampling of an erosive area will often show non-specific inflammatory changes associated with ulceration and will not aid in the diagnosis. Adjacent normal tissue is not generally required for such lesions. Similarly for suspected vesiculobullous disorders, the site of the biopsy should be adjacent to bulla where the epithelium is still intact. For these lesions it is desirable also for the laboratory to receive a fresh specimen of tissue in addition to a formalin fixed one to allow direct immunofluorescence. When desquamative gingivitis is present, the biopsy should be taken from the most intact area of mucosa which is often the attached gingiva; an elliptical area of mucosa is incised and carefully dissected from the underlying periosteum with a Mitchell's trimmer.

### **Precancerous lesions**

For the precancerous lesions of leukoplakia and erythroplakia, the adequate and correct sampling of lesions may prove more difficult. It is now well recognized that lesions showing a non-homogenous or speckled appearance and lesions of erythroplakia are potentially more serious with a generally higher incidence of dysplasia and malignant transformation.<sup>7</sup> These areas, if present, should be the site of choice for biopsy. If the lesion is extensive or there are numerous erythematous regions it may be prudent to biopsy more than one area.



## Handling of mucosal biopsies

Sometimes specimens can be rendered of little diagnostic value due to poor handling which produce a crush artefact in histological section. There are various methods available to reduce traumatic damage to the specimens. The 'traditional' technique using toothed tissue forceps to grasp the specimen is acceptable providing care is taken and the area grasped is away from the main site of interest. The punch biopsy technique is an alternative to the traditional incisional biopsy.<sup>8</sup> Essentially the punch comprises a circular blade attached to a plastic handle. Diameters of two to ten millimetres are available. This removes a core of tissue the base of which can be simply and atraumatically released using curved scissors. Alternatively, the specimen can be lifted from the mucosal surface and the base undermined with a scalpel. Care should be taken if aspiration is being used to prevent the specimen being sucked away. The resultant wound may not require suturing if using the smaller diameter punches. This technique is described and reviewed in detail by Lynch and Morris.<sup>9</sup> Punch biopsies have been shown to have fewer artefacts than conventional incisional biopsies.

Also, it is generally safer to use the larger diameter punches to avoid handling problems both clinically and in the laboratory. Generally when performing a mucosal biopsy an adequate depth of tissue should be obtained. Traditional incisional biopsies are in the shape of an ellipse, the length of which should be approximately three times the width.

## Orientation of biopsies

The incisional biopsies (Fig. 1) constitute majority of mucosal biopsies, however, occasionally small lesions may be excised encompassing diagnosis and treatment in one operation this is known as excisional biopsy (Fig. 2). If malignancy is suspected, the biopsy should be of sufficient depth and have a surrounding margin to ensure adequate clearance. Sometimes prior exfoliative cytology (Fig. 3) is done to study the type of cells present on the surface of the lesion. In case the lesion was not completely excised it should be orientated. This can be achieved by placing a suture at one known margin, for example the anterior or superior margin. This would enable the pathologist to confidently indicate the precise location of any residual tumour. The same applies for surgical resection

specimens. A technique new to the oral cavity but established for other bodily sites is that of the brush biopsy. Essentially a hybrid of fine needle aspiration cytology (Fig. 4). and exfoliative cytology, this technique uses a small brush to sample cells from all the layers of the epithelium.<sup>10</sup>

## SOFT TISSUE BIOPSIES

Indications include the diagnosis of granulomatous conditions such as Crohn's disease and the diagnosis of salivary lesions. In the case of the former, an incisional biopsy of adequate depth is required. When performing labial gland biopsies in the diagnosis of Sjögren's syndrome, a minimum of five minor salivary gland lobules should be obtained. The lower lip is the site of choice and care should be taken to minimize trauma to adjacent glandular tissue which is not being removed<sup>5</sup>.

Mucocoeles arise from the blockage and subsequent rupture of minor salivary gland ducts. It is important when excising such lesions to remove the associated minor salivary glands to help prevent recurrence. For palatal swellings which are suspected salivary tumours, incisional biopsies should be as deep as possible and down to bone if appropriate after due attention to

the position of the palatal vessels and nerves. This is due to the anatomy of the region as lesions can be a considerable depth beneath the mucosa and so a superficial biopsy may give a false negative result. Punch biopsies (Fig. 5) can be carried out for lesion on the palate. Incisional biopsies should never be performed. Smaller lesions obviously within the soft tissues can safely be excised. Larger lesions, particularly those affecting the lip are best ablated with either laser or cryosurgery.<sup>7</sup>

## FIXATION AND TRANSPORT

Ensure the specimen is placed in an adequate volume of fixative, this should be at least ten times the volume of the specimen. Avoid the use of gauze to place the specimen onto as it merely absorbs the fixative and can make separation of the specimen from the gauze difficult. The fixative should be 10% neutral buffered formalin which has a pungent and distinct odor.

Most other immunohistochemical methods used in diagnosis can now be performed on fixed tissue with the use of antigen retrieval. Specific cardboard boxes with full-depth lids or grooved polystyrene containers are available for this purpose. A further outer padded bag is recommended which should be labelled 'PATHOLOGICAL SPECIMEN — FRAGILE WITH CARE' and the name and address of the sender should be clearly displayed. Occasionally, specimens are required for electron microscopy, these should ideally be fixed in glutaraldehyde, but formalin is an acceptable alternative. Specimens for cytogenetics may be required to confirm genetic changes in rare tumours which should be submitted in universal transport medium which has been stored at 4°C.

### GENERAL POINTS

Local anaesthesia should be administered deep to or in a field around the proposed biopsy site. A regional block can also be used although the haemostatic effect of the adrenaline within the anaesthetic solution will be lost. Sampling of tissues at the site of the local anaesthetic will produce artefactual tissue oedema or distortion. The biopsy should be planned before local anaesthetic is administered. Major vessels and nerves should be avoided and to minimize the risk of damage to smaller structures, incisions should be made parallel to their expected position.<sup>3</sup>

Attention to the surgical technique will minimise the introduction of artefacts into the tissues which can hinder pathological diagnosis or even render the specimen non-diagnostic.

Consideration should also be given to healing of the biopsy site. It has been suggested that punch biopsies can be left unsutured.

### Information to accompany mucosal biopsies

1. Patient demographic data
2. Description of the clinical appearance of the lesion and suspected diagnosis
3. The site of the biopsy
4. The relationship of the lesion to restorations, particularly amalgam
5. A detailed drug history
6. Medical history including blood dyscrasias
7. Smoking and alcohol consumption



Fig. 1. Incisional Biopsy



Fig. 2. Excisional Biopsy

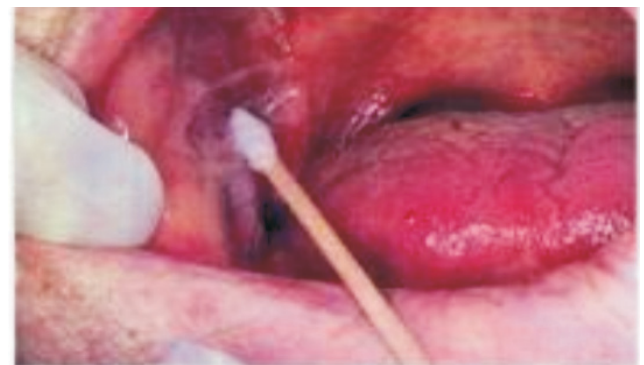


Fig. 3. Exfoliative Cytology



Fig. 4. Fine Needle Aspiration Cytology

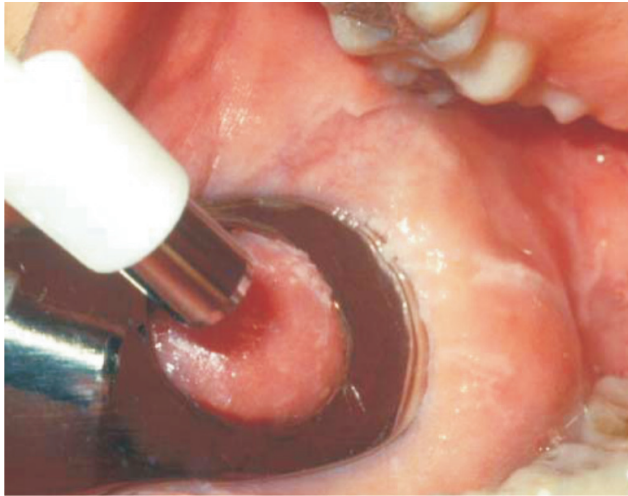


Fig. 5. Punch Biopsy

### CONCLUSIONS

When considering biopsy a little forward planning and thought can greatly improve the diagnostic value obtained. Careful handling of the tissue and prompt appropriate fixation will enable a confident histological diagnosis to be reached. Inadequate care at any stage could result in a non-diagnostic biopsy and may necessitate the patient having a repeat procedure with its ensuing physical and psychological morbidity.

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# Extensive Cutaneous Larva Migrans -A Case Report

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## ABSTRACT

Cutaneous larva migrans (CLM) or creeping eruption (also called ground itch) refers to the production of serpiginous inflamed trails in the skin, resulting in intense pruritus. It is an uncommon parasitic skin infection caused by larvae of various nonhuman species of *Ancylostoma* and other nematodes. Human can pick up the infection by walking barefoot on soil or sandy beaches contaminated with animal faeces. Here, we report a case of cutaneous larva migrans affecting the whole trunk in a 65 year old man who is a farmer by occupation. The diagnosis was made on the basis of clinical features and biopsy of the skin. Erythematous, serpiginous, pruritic, cutaneous eruptions were found. A nematode larva could be detected in the vesicular fluid and histopathological examination of skin showed superficial and mid perivascular and interstitial infiltrate of numerous eosinophils constituent with larva migrans. Though CLM is a self limited dermatosis, the discomfort caused due to intense pruritus, eczematization and the risk for secondary bacterial infection necessitate treatment of the cases.

**Keywords:** *Cutaneous Larva Migrans, Creeping Eruption, Nematode*

## INTRODUCTION

Cutaneous parasitic infections are a major source of morbidity affecting millions of people worldwide. It is a common tropically acquired cutaneous eruption. Tropical climate, overcrowding, poor hygiene and sanitation problems play a very important role in the causation of the disease. It presents as an erythematous, serpiginous, pruritic, cutaneous eruption associated with percutaneous penetration and subsequent migration of larvae of various nematode parasite.<sup>1</sup>

Creeping eruptions are more common with *Ancylostoma braziliense* and *Ancylostoma caninum*, which are not adapted to human and hence cannot proceed to normal development in small bowel.<sup>2</sup> Infection occurs by contact of skin with contaminated soil or beach sand. Eggs shed in the faeces of infected hosts hatch in the soil in the warm, shady, moist or sandy soil and moult twice and develop into third-

stage larvae, which penetrate the skin and migrate through the epidermis. Human walking barefoot on the soil then becomes accidentally infected with the larvae, which use their proteases to penetrate through follicles, fissures or the intact skin of their hosts. In humans, larvae are generally confined to the dermis and only rarely penetrate deeper. Deeper penetration is thought to be species specific (such as *A. caninum*).<sup>3</sup> CLM is most often a disease of children, utility workers, gardeners, travelers, sunbathers and others who are exposed to soil and sand contaminated with cat and dog feces.<sup>4</sup>

## CASE REPORT:

A 65 year old male presented with intensely itchy serpiginous lesion on the anterior abdominal wall of two months duration. Two months back, erythematous persistent wheal like lesions appeared first over the left side of the chest and back. It was associated with



itching. 10-15 days later, the lesion over the left side of the chest and back disappeared and erupted over the right side of chest and back just above the costal margin and there was formation of a vesicle at the anterior end of the tract which is an unusual presentation. The lesions were gradually progressing in a linear fashion anteriorly and posteriorly. (Figure-1 & 2) The patient is a farmer by occupation and gave history of frequent handling of cat at his home. The patient also gave history of pain in the lower abdomen and low grade fever.

A clinical diagnosis of cutaneous larva migrans was made. Laboratory investigations showed serum IgE-860IU/ml, Absolute eosinophil count-10,700/mm<sup>3</sup>. Under aseptic precaution, a superficial incision was made on the skin around 2cm ahead of the most recent advancing clinical tract. Then milking of the tract was done starting from the tract left behind by the larvae and vesicular fluid was collected. Differential leucocyte count of the vesicular fluid showed N<sub>55</sub>L<sub>20</sub>E<sub>25</sub>. It also showed presence of a larva of a nematode, but the species could not be identified. (Figure-3) The biopsy of the skin showed mild epidermal hyperplasia with some spongiosis. The dermis has a fairly dense superficial and mid perivascular and interstitial infiltrate of numerous eosinophils and scattered lymphoid cells, constituent with larva migrans. No larva was seen on deeper sections. (Figure-4) Repeated stool samples were collected for microscopy, but did not reveal any helminthic ova. The patient responded to the treatment with Albendazole 400mg orally daily for 3 days and Ivermectin 12mg (0.2mg/kg body weight) single oral dose.

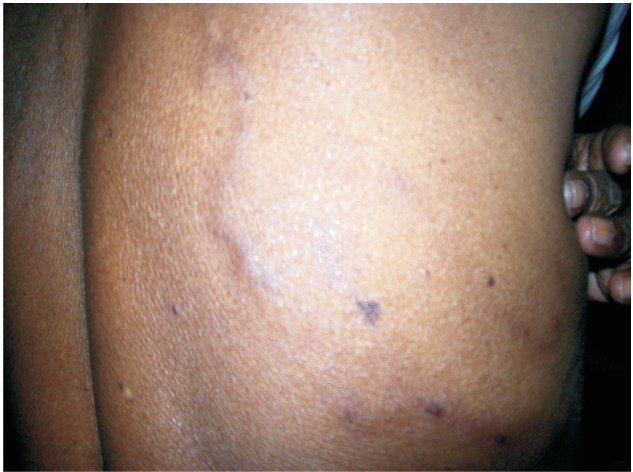


Fig. 2. Showing the advancing tract from chest wall to the back.



Fig. 3. Showing the larva of the nematode from vesicular fluid (X100)



Fig. 1. Showing the tract of the larva produced in the anterior abdominal wall.

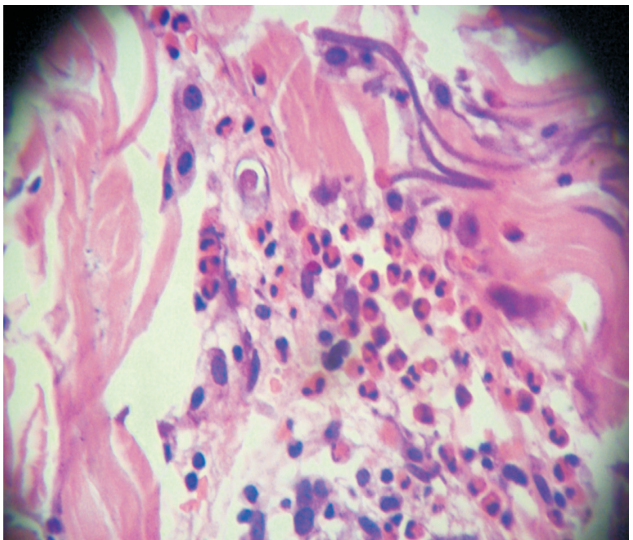


Fig. 4. Showing eosinophilic infiltration in H & E stained skin biopsy (X1000)



## DISCUSSION

Cutaneous larva migrans is the most common tropically acquired dermatosis whose earliest description dates back more than 100 years.<sup>4</sup> It is also known as sand worms, creeping verminous dermatitis, creeping eruption, plunter's itch and duck hunter's itch etc. Numerous etiological agents can cause creeping eruption like *Ancylostoma caninum*, *Ancylostoma braziliense*, *Uncinercerca stenocephala*, *Gnathostoma* species, *Dirofilaria conjunctivae*, *Capillaria* species etc.<sup>5</sup>

The most common location is the sole, although other sites like buttocks, backs and thighs, which may have rested on contaminated soil or sand, are susceptible.<sup>6</sup> Vano-Galvan *et al.*, reported a case of CLM with lesion in the lower extremities. Padmavathy *et al.*<sup>7</sup> and Malhotra *et al.* reported CLM cases with lesions confined to the anterior abdominal wall.<sup>6,8</sup> On the contrary, the present case presented with the lesion in the anterior abdominal wall and the whole of the back. Lacking the enzymes necessary to penetrate and survive in the deeper dermis, the larvae wander a serpiginous route at a speed of 3cm per day. Clinically, the primary lesion is pruritic, erythematous serpiginous burrow; while the larvae die usually in 2-8 weeks, survival up to two years has been reported.<sup>7</sup> Systemic signs include peripheral eosinophilia, migratory pulmonary infiltrate and increased Immunoglobulin E levels, but are rarely seen.<sup>5</sup> *A. caninum* can migrate to small intestine and can cause eosinophilic enteritis and transient eosinophilia.<sup>9</sup> The present case showed level with high absolute eosinophil count.

For diagnosis of CLM, biopsy is of no value as the larvae advances ahead of the clinical tract. Epiluminiscence microscopy is an effective non-invasive method to detect larva and confirm diagnosis.<sup>10</sup> In the present case, a parasitic larva could be demonstrated in the fluid collected from the tract by superficial skin incision 2cm ahead of the clinically progressing tract and thereafter milking the tract. This is not the usual way of diagnosing cutaneous larva migrans.

Even though the condition is self-limited, the intense pruritus, eczematization and risk for infection mandate treatment. Different therapeutic approaches are effective. Freezing the leading point of the burrow is an effective older method of treatment. But this sometimes produces tissue destruction. Moreover, the larva is up to 2cm ahead of the visible burrow hence often leads to treatment failure. A single dose of Ivermectin 12mg (0.2mg/kg body weight) kills the migrating larvae effectively and relieves itching quickly. Oral Albendazole (400mg daily), given for 5-7 days, shows excellent cure rates and the drug is well tolerated by the patient.<sup>11</sup> Thiabendazole given orally is poorly tolerated, and frequently causes dizziness, nausea, vomiting and intestinal cramps.<sup>12</sup> Tropical Thiabendazole 10% cream, although less effective, is a good alternative for young children to avoid potential side effects of systemic medication. The present case also responded well to oral Albendazole and single dose of Ivermectin.

CLM can be easily prevented by avoiding skin contact with moist soil contaminated with animal feces, by using adequate footwear, using a barrier while sitting or lying on the ground. Practicing good hygiene is the best way to avoid acquisition of this benign but bothersome parasitic infection.

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# Oral Ulceration With Low Dose Methotrexate Therapy in a Psoriasis Patient: A Case Report

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## ABSTRACT

Methotrexate (MTX) is a well established drug used in the treatment of various neoplastic diseases. The efficacy of MTX against rheumatic diseases was first demonstrated in the early 1950s when aminopterin, a precursor of MTX, was used for rheumatoid arthritis (RA). Recently it has been increasingly used as a once-weekly, low-dose treatment of disorders such as psoriasis and rheumatoid arthritis. As a consequence it is likely that dentists will encounter patients taking this drug in general dental practice. While certain adverse effects of low-dose methotrexate therapy have been described in detail, oral complications have received little attention. Ulceration in oral mucosa can occur as a side effect at any time during the course of methotrexate therapy. This may be due to lack of folic acid supplementation or overdosage due to confusion regarding its once-weekly regime. Even though adverse effects occur in oral cavity, potential still exists for specifically preventing and reversing its toxicity. Here, we are presenting a case report of low dose methotrexate therapy (LDMTX) induced oral ulceration in a patient suffering from Psoriasis. This article also summarises the uses and pharmacology of low-dose methotrexate and the mechanisms that lead to general and oral toxicity.

**Keywords:** Methotrexate, Oral Ulceration, Psoriasis

## INTRODUCTION

Ulcers commonly occur in the oral cavity, their main symptom being pain. The most widely used classification system divides them into *acute ulcers* (sudden onset and short lasting) and *chronic ulcers* (insidious onset and long lasting). Commonest causes for acute ulcerations in the oral cavity include traumatic ulcer, recurrent aphthous stomatitis, viral and bacterial infections and necrotizing sialometaplasia. Oral lichen planus, oral cancer, benign mucous membrane pemphigoid, pemphigus and drug-induced ulcers belong to the group of chronic oral ulcers.<sup>1</sup>

Methotrexate (MTX) is an antimetabolite and immune modulating drug. At high doses, its use is well established as a chemotherapeutic agent in the treatment of malignant diseases including leukaemia, non-Hodgkin's lymphoma and a number of other tumours.<sup>2</sup> However, when taken at lower doses, methotrexate is used in the treatment of chronic inflammatory disorders such as rheumatoid arthritis and psoriasis.<sup>3,4</sup> For these non-malignant conditions it is usually given in a once weekly dose of up to 25 mg.<sup>4</sup> MTX acts by inhibiting dihydrofolate-reductase (DHFR), a key enzyme for the production of tetrahydrofolates (THF), which are required for the synthesis of purines and pyrimidines.<sup>5</sup> Some of the frequent adverse drug interactions encountered with low dose methotrexate therapy (LDMTX) are GIT toxicity, hepatotoxicity and myelosuppression. Oral adverse effects like stomatitis and oral ulcerations are common in patients receiving LDMTX and may appear at any time in the course of treatment.<sup>4</sup>

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The success of long-term low dose methotrexate treatments suggests that a greater number of patients in our society are using this drug regimen for a variety of non-neoplastic conditions. As a consequence, the dental surgeons should be well aware of its adverse effects, especially those seen in the oral cavity.

Here, we present a case report of LDMTX induced oral ulceration in a patient suffering from Psoriasis.

### CASE REPORT

A 30 year old male reported to the OPD of the Department of Periodontics, Babu Banarasi Das College of dental sciences, Lucknow, with the chief complaint of painful oral ulcerations and burning sensation on both sides of posterior mandibular region and difficulty in opening the mouth since 10 days. He had no previous history of such ulcerations in the oral cavity. He did not smoke and was a teetotaler.

His medical history revealed that the patient had been diagnosed by his dermatologist with cutaneous psoriasis. He had been prescribed methotrexate (10mg once a week) along with an antioxidant capsule since 1 month. Cutaneous lesions presented on the patient's arms (figure 1) and legs. Upon intra-oral examination, reddish white patches and ulcerated area was seen bilaterally extending from the attached gingiva to the vestibule in the molar region (figure 2 & figure 3). The ulceration and sloughing observed was adherent, did not rub off and was extremely painful. The patient also had difficulty in opening the mouth.



Fig. 1. Cutaneous lesions of Psoriasis in the patient



Fig. 2. Oral ulcerations in right mandibular posterior region



Fig. 3. Oral ulcerations in left mandibular posterior region

From the above findings, the clinical diagnosis of oral mucositis secondary to LDMTX was made. Before starting treatment, ethical clearance was obtained from the ethical committee, Babu Banarasi Das University, Lucknow. Symptomatic treatment was started, which consisted of gently irrigating the ulcerated area with povidone iodine. As the site was very painful, only superficial scaling was done to remove the plaque and debris. The patient was prescribed benzydamine hydrochloride mouthwash twice daily and an anesthetic-antiseptic gel (for topical application) thrice daily. He was advised to maintain proper oral hygiene. The patient was then recalled after 7 days but the ulcerated area showed no signs of significant resolution. Therefore, the patient was referred to his dermatologist to substitute the medication. A week later, the lesions started showing signs of improvement and phase I therapy was completed. After a period of



4 weeks the lesions healed completely without any scarring (figure 4 & figure 5).



Fig. 4. Healing at 4 weeks in left mandibular posterior region



Fig. 5. Healing at 4 weeks in right mandibular posterior region

## DISCUSSION

A wide variety of drugs can give rise to numerous adverse orofacial manifestations, particularly xerostomia, oral mucosal ulceration, taste disturbances and/or gingival enlargement,<sup>6</sup> of which stomatitis accounts for 33.9% (Smith and Burtner, 1994)<sup>7</sup>. According to a study by Femiano *et al.* 2003<sup>8</sup>, cytotoxic drugs are very commonly associated with mucositis and ulceration, particularly those involving methotrexate, 5-fluorouracil, doxorubicine, melphelan, mercaptopurine, or bleomycin. Widespread sloughing and ulceration arise within days of commencement of therapy, the associated pain often requiring alteration or cessation of chemotherapy. The ulceration may be a portal of entry for infection and hence a potential cause of septicemia.<sup>6</sup>

The efficacy of MTX against rheumatic diseases was first demonstrated in the early 1950s when aminopterin, a precursor of MTX, was used for rheumatoid arthritis (RA). During the 1970s there was renewed interest in the use of this drug for the treatment of psoriasis.<sup>5</sup> The action of methotrexate in psoriasis and RA remains uncertain, although inhibitory effects on cytokines may be important. Methotrexate is an inhibitor of dihydrofolate reductase, an enzyme that reduces folate to an active form where it acts as a co-factor for the production of nucleic acids essential for DNA synthesis. This effect on reducing DNA formation and cell turnover is responsible for both the therapeutic effect and the more common side effects.<sup>2</sup>

Adverse effects are experienced by 30% to 80% of patients on LDMTX<sup>9</sup> (Mckendry *et al.*, 1993) and may develop at any stage of treatment, even after 30 years.<sup>5</sup> Myelosuppression, in the forms of leucopenia or thrombocytopenia has been found in approximately 8% of rheumatoid patients on an average of 10.7 mg of methotrexate per week.<sup>10</sup> Pancytopenia has also been recorded on low dose methotrexate, as also hepatotoxicity in 3% to 25% of psoriasis patients on long-term methotrexate therapy.<sup>2</sup> The side effect of methotrexate of most significance to dentists is that of mucositis and oral ulceration.<sup>2</sup> Stomatitis is a dose-dependent effect and the mechanism of toxicity of LDMTX may be similar to that at higher cytotoxic doses.<sup>5</sup> According to Kremer *et al.*, ulceration frequently appears within 2 weeks of administration but may also develop very late.<sup>11</sup> They heal within about 3 weeks after MTX discontinuation,<sup>12</sup> and this slow healing can be attributed to the slower cellular clearance of MTX polyglutamates. MTX is secreted in saliva and it has been suggested that a topical effect may play a role in the development of stomatitis at least in intermediate doses.<sup>13</sup>

Various strategies have been devised to prevent some of the adverse effects of LDMTX while still preserving the therapeutic benefit. Folate supplementation is the easiest and most effective way to reduce mucosal toxicity and may sometimes even avoid the need to discontinue MTX.<sup>14,15</sup> A Cochrane systematic review has concluded that both folic acid and its reduced form, folinic acid significantly reduce LDMTX associated mucosal toxicity, without affecting disease activity.<sup>16</sup> There is some evidence that indicates that the folic acid dose can be increased up to a 3:1 folic acid: methotrexate ratio (eg. 30 mg folic acid: 10 mg methotrexate/weekly) as treatment for adverse



effects, with no evidence of any diminished therapeutic effect of methotrexate.<sup>17</sup> The symptoms of MTX ulceration may also respond to traditional agents such as topical analgesics or steroids, benzydamine mouthwash, covering agents, and antiseptics such as chlorhexidine gluconate mouthwash.<sup>5</sup>

### CONCLUSION

Low dose methotrexate therapy is increasingly being used for the treatment of chronic disabling diseases like Psoriasis. As a consequence, the dental surgeons are likely to encounter more number of patients on LDMTX in their practice. Although known for its ability to cause severe oral ulceration, the potential exists for specifically preventing and reversing its toxicity. Therefore it is of paramount importance that dentists should be aware of its adverse effects and the available treatment options to manage them.

**Conflict of Interests:** Nil

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# A Study of Bacterial Contamination of Indian Currency Notes in Circulation

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## ABSTRACT

**Introduction:** To determine the degree of contamination of currency notes that were in circulation in a local market in a town of Kanyakumari district in Tamil nadu, India.

**Materials & Method:** One hundred currency notes of different denominations were randomly collected from sellers on the streets and market into sterile paper bags, shaken in universal bottles with 10ml sterile buffered peptone water, removed and the resulting peptone water incubated overnight and later sub-cultured onto Blood agar, MacConkey agar and incubated at 37°C for 24 hours. Colonial Morphology, Gram Reactions and Biochemical tests were used for identification of isolates.

**Results:** All 100 samples collected were contaminated with one or more bacteria representing 100% contamination. A total of 118 bacterial isolates were obtained from the 100 samples made up of 12 different bacterial species. Bacteria isolated from the notes were *Bacillus* species (33.07%), coagulase-negative staphylococci (26.04%), *S. aureus* (10.14%), *E. coli* (8.2%), *Proteus* species (5.4%), *Enterococci* species (4.3%), *Citrobacter* species (3.39%), ?-hemolytic *Streptococci* (2.7%), ?-hemolytic *Streptococci* (2.3%), *Klebsiella pneumoniae* (2.16%), *Enterobacter* species (1.4%) and *Shigella* species (0.9%). Ten non-circulated notes used as controls had no growth.

**Conclusion:** The study suggests that the Indian currency notes in circulation were found to be contaminated with pathogenic microorganisms which can spread human diseases. There should be public awareness of the fact that currency notes could be a source of infection and could be dangerous to health.

**Keywords:** *Bacterial species, Currency contamination, Denomination*

## INTRODUCTION

Paper currency is widely exchanged for goods and services in countries worldwide. <sup>(1)</sup> The possibility that currency notes might act as environmental vehicles or fomites for the transmission of potential microorganism was suggested in the 1970s. <sup>(2)</sup> The currency notes are used for buying ready to eat food, uncooked meat from the market, charcoal, milk at a local store, drugs and are used in all sorts of trade. So, the butcher with the bloody fingers, the artisan with dirty dusty and oily fingers, the teacher with the chalky

and inky fingers, the street-food vendor with the wetly-oily fingers, etc., will just receive or pick the currency notes with the dirty fingers, leading to the contamination of the notes with microorganisms. <sup>(3)</sup> The contaminated currency notes go in circulation and contaminate the hands of others transmitting pathogenic organisms in the process. Numerous research on currency in several countries indicated bacterial contamination. A study by Hosen *et al.*, <sup>(4)</sup> in Bangladesh revealed coliform contamination of 80% of thirty old two-taka notes, Pope *et al.*, <sup>(5)</sup> isolated pathogenic or potentially pathogenic organisms from 94% of one-dollar bills, Basavarajappa *et al.*, <sup>(6)</sup> found 96 out of 100 currencies contaminated with bacteria, fungi and protozoa and Umeh *et al.*, <sup>(7)</sup> revealed that 89.8% of Nigerian currency notes in circulation within the University of Agriculture, Makurdi Campus had microbial contamination. The Indian currency like any other being used in the world is exposed to the potential of bacterial contamination. Thus this present

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study seeks to introduce the nature, type and level of contamination of the Indian currency in circulation.

## MATERIALS AND METHOD

This study was an observational cross sectional study conducted from Jan 2010 to May 2011. One hundred currency notes of different denominations were randomly collected from sellers on the streets and market in a town of Kanyakumari district and immediately transported to the Department of Microbiology, Sree Mookambika medical college for bacteriological analysis on the same day. The currency notes studied were 30 each of the Ten rupee Note (Rs. 10) and Hundred rupee note (Rs.100) 20 of the Fifty rupee note and 10 each of five(Rs.5) and five hundred notes(Rs.500). Two currency notes of each denomination and not in circulation obtained from the Central Bank were used as control samples.

### Determination of bacterial load

With the aid of a pair of sterile forceps, each currency note was transferred aseptically into a sterile universal bottle containing 10 ml of sterile buffered peptone water. The bottle was capped and shaken vigorously by hand for about 2 min to dislodge the microorganisms into the fluid. The resulting fluid (buffered peptone water) served as the test sample, whilst the currency note was removed aseptically from the universal bottle with a sterile forceps, rinsed with water and dried to recover the note.

The resulting peptone water solution served as a test sample and incubated for 24 hours at of 37°C. The incubated test sample was then cultured onto Blood agar, MacConkey and Cysteine Lactose Electrolyte Deficient (CLED). The plates were incubated aerobically overnight in an incubator at 37°C. Pure cultures were obtained by sub-culturing distinct

colonies. Control samples underwent the same processes.

### Bacteria isolation and identification

Pure isolated colonies were identified using their Morphology. The first test was the gram staining and the results were followed by various standard biochemical tests (catalase, coagulase, oxidase, sugar fermentation, indole, citrate utilization, urease production, Triple sugar iron test, Hydrogen sulphide test ) and motility test.

After inoculating the agar plates, the remaining test sample was transferred into sterile centrifuge tubes and centrifuged at 3000 rpm for 5 min. The supernatant was decanted. Two smears were made on microscope slides from the deposit. To one smear, a drop of Lugol's iodine was added, covered with a cover slip and examined under the microscope for parasites. The other film was air-dried, heat fixed and stained with Ziehl-Neelsen method and then examined under the microscope for acid-fast bacilli.

## RESULTS

All 100 samples analysed were contaminated with various species of bacteria representing 100% contamination (Table: 1). A total of 118 bacterial isolates were obtained from the 100 samples analysed whilst all 10 samples not in circulation were negative for any bacterial isolate. Bacteria isolated from the notes were *Bacillus* species (33.07%), coagulase-negative *staphylococci* (26.04%), *S. aureus* (10.14%), *E.coli* (8.2%), *Proteus species* (5.4%), *Enterococci species* (4.3%) *Citrobacter species* (3.39%),  $\hat{\alpha}$ -hemolytic *Streptococci* (2.7%),  $\acute{\alpha}$ -hemolytic *Streptococci* (2.3%), *Klebsiella pneumoniae* (2.16%), *Enterobacterspecies* (1.4%) and *Shigella species* (0.9%). *Bacillus species* and *Coagulase Negative Staphylococci* were the highest isolates and *Shigella species* was the least isolated.

Table 1. Bacterial Isolates and their distribution amongst currency notes

Isolates	Rs.5	Rs.10	Rs.50	Rs.100	Rs.500	Total
Bacillus	01	23	05	08	02	39
CONS	01	15	04	08	02	30
S.aureus	01	05	02	03	01	12
E.coli	01	04	02	03	00	10
Proteus	00	02	01	02	01	06
Enterococci	00	02	01	01	01	05
Citrobacter	00	02	00	02	00	04
bhemolytic	01	01	01	02	00	04
ahemolytic	00	01	01	01	00	03
Klebsiella	00	01	01	00	01	03
Enterobacter	00	00	00	01	00	01
Shigella	01	00	00	00	00	01
TOTAL	06	48	16	36	12	118

The wet film analysis of two currency note yielded the ova of *Ascaris lumbricoides* (2.36%) and no AFB were seen from the smears made from peptone water.

## DISCUSSION

This study determined the level of contamination of the Indian currency notes. It demonstrated that, Indian Currency notes in circulation are contaminated with both gram positive and gram negative bacteria, and also the ova of a parasite. Currency contaminated by microbes plays an important role in the Transmission of microorganisms and also in the spread of drug-resistant strains in the community, as it is the most widely handled article by people from all walks of life.<sup>(5,8)</sup> Immunocompromised persons stand greater risk of acquiring opportunistic infections through handling of contaminated currency.<sup>(9)</sup>

In this present study the 100% contamination of the currency confirms other research findings about bacterial contamination of currencies in circulation as well as introduces a new level of contamination although other researchers have detected contamination levels of 80% Hosen *et al.*,<sup>(4)</sup>, 94% Pope *et al.*,<sup>(5)</sup> 96% Igumbor *et al.*,<sup>(9)</sup> and 90% Bosh and Steyn.<sup>(10)</sup>

Bacterial, Viral, Fungal and Parasitic contamination of various currencies all over the world has been confirmed by several researchers like Zarei *et al.*<sup>(11)</sup> Khin *et al.*,<sup>(12)</sup> and Veevers,<sup>(13)</sup>

The high levels of *Coagulase Negative Staphylococci* (23.4%) and *Bacillus species* (23.4%) confirmed earlier works by Goktas and Oktay,<sup>(14)</sup> isolating 63.3% *Staphylococcus epidermidis* and 91% *Bacillus species* from 120 currency notes. Singh *et al.*, (2002)<sup>(8)</sup> predominantly isolated *Bacillus species* as the major contaminant on currencies studied. Bacteria isolated from the currency notes include *Coagulase Negative staphylococci*, *Staphylococci aureus*,  $\alpha$ -hemolytic *Streptococci*,  $\beta$ -hemolytic *Streptococci*, *Escherichia coli*, *Yersinia species*, *Bacillus species*, *Klebsiella species*, *Shigella species*, *Enterobacterspecies*, *Enterococci species*, *Listeria monocytogenes* and *Proteus species*. These corresponds to more than 90% of isolates from other researchers like Asikong *et al.*,<sup>(15)</sup> Oyero and Emikpe,<sup>(16)</sup> Umeh *et al.*,<sup>(7)</sup> and Zarei *et al.*,<sup>(11)</sup> The several unhygienic conditions (butchers with bloody fingers, the artisan with dirty-dusty and oily fingers, the teacher with chalky and inky fingers, the street-food vendor with wetly-oily fingers, etc) indicate that, currency which

is handled by large numbers of people, under a variety of personal and environmental conditions, can be a source of infection.<sup>(17)</sup>

The widely accepted Indian attitude of applying saliva to fingers while counting the currency notes and squeezing serves as potential routes of exposure to these bacteria.

Folding or crumpling of banknotes creates pouches or crevices which could harbour dust particles and microorganisms some of which may grow or remain in a quiescent stage for long periods until they find suitable environments to grow and multiply (Bank of Ghana, 2007). Studies however have shown that there is no statistically significant association between physical condition and the bacterial contamination of currency notes which places all currencies in circulation as potential public health hazards.<sup>(11)</sup>

Currency notes are therefore possible vehicles through which infectious agents can be transmitted to humans.<sup>(18,7)</sup> This study revealed higher prevalence of bacterial contamination of the currency notes than of parasites (98.57 vs. 2.36% respectively) similar to a report from Nigeria.<sup>(1)</sup> The ova of *Ascaris lumbricoides* were found on two currency notes and it is a reflection of poor local environmental sanitation and personal hygiene.<sup>(19)</sup>

This situation is not limited to the underdeveloped countries alone, for a study in the United States of America indicated that, handling money and ready-to-eat food with the same gloved hands or without hygienic intervention between these activities can introduce the risk of cross-contamination to foods provided in food service establishments.<sup>(20)</sup> That study also determined the survival of pathogens on coins and currency notes and found that various microorganisms may survive and multiply on currency notes.<sup>(18,20)</sup> This is of concern, because the currency notes could serve as a vehicle for transmission of diseases and represents an often overlooked enteric disease.<sup>(9, 20)</sup>

This study has determined the presence, type and nature of bacterial contamination of Indian currency notes in circulation and will serve as a yard-stick to subsequent research work on other contamination parameters. Culture of the currency washings led to the isolation of various bacteria. The predominant bacteria isolated were *Bacillus species* (33.07%), which is comparable to a study done by Singh *et al.*<sup>(8)</sup>



The isolation of coagulase-negative *Staphylococci* on the currency notes could have been contamination from the normal skin flora. <sup>(21, 1)</sup> and from the soil. <sup>(9)</sup> The coagulase-negative *staphylococci* are normal human flora and sometimes cause infections such as food poisoning <sup>(22)</sup> and other diseases often associated with implanted appliances and devices, especially in very young, old, and immunocompromised patients. <sup>(9)</sup>

*S. aureus* is the next common bacteria isolated and is a major pathogen for humans. *S. aureus* causes

Diseases ranging from food poisoning or minor skin infections to severe life-threatening infections <sup>(22)</sup>

*E. coli*, *Klebsiella* species and *Citrobacter* species are enteric microorganisms that are potential pathogens especially when they change their habitat <sup>(8,16)</sup> and may cause significant infections in those with depressed immune systems. <sup>(18)</sup>

The isolation of *E. coli*, *Klebsiella*, *Proteus*, *Citrobacter* and *Shigella* goes to confirm other reports that currency notes can be commonly contaminated with enteropathogens <sup>(10,15)</sup> and the notion that, currency notes represent a reservoir of enteric disease. <sup>(22)</sup>

*Shigella* species are common causes of food-borne and water-borne illnesses worldwide. <sup>(23)</sup> The isolation of *S. dysenteriae*, the most virulent strain gives cause for concern, as it is often linked to large outbreaks of food/water associated dysentery and other forms of gastroenteritis. <sup>(24)</sup> The isolation of *Shigella* species and *S. aureus* from the currency notes and the fact that some food vendors serve food with their hands and also handle currency notes as they sell to their patrons, currency notes contaminated with pathogenic microorganisms such as *Shigella* species and *S. aureus* may cross contaminate the food and may cause food-borne illness. <sup>(18)</sup>

It is therefore suggested that individuals should improve upon their personal health consciousness by washing hands after handling of currency notes. <sup>(24,25)</sup> Hands should not be taken into mouth without washing and should be washed before and after handling currency notes <sup>(16)</sup> just as we are advised to do after visiting the toilet, before and after handling food and finally before and after visiting hospitals.

Babies must be prevented from handling currency notes and adults should avoid using saliva during counting of paper currency notes. <sup>(4)</sup> Ready-to-eat food

sellers should be educated to avoid possible cross contamination between currency notes and food by avoiding handling currency notes as they sell. <sup>(25, 26)</sup>

There should be public awareness of the fact that currency notes could be a source of infection and could be dangerous to health. <sup>(4, 16)</sup>

## CONCLUSION

The Indian currency notes in circulation were found to be contaminated with various types of microorganisms. Although the number of currency notes studied was small compared to notes in circulation in India, this study may draw a representative indication of the danger in handling of currency notes. All efforts should be made to reduce contamination of currency notes by investing on hygienic/sanitary education and proper handling of the currency notes. Individuals should improve upon their personal health consciousness by washing hands after handling of currency notes. The Govt. of India should take measures to educate the public and enforce rules on proper way to handle money.

**Conflict of Interest:** Non

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