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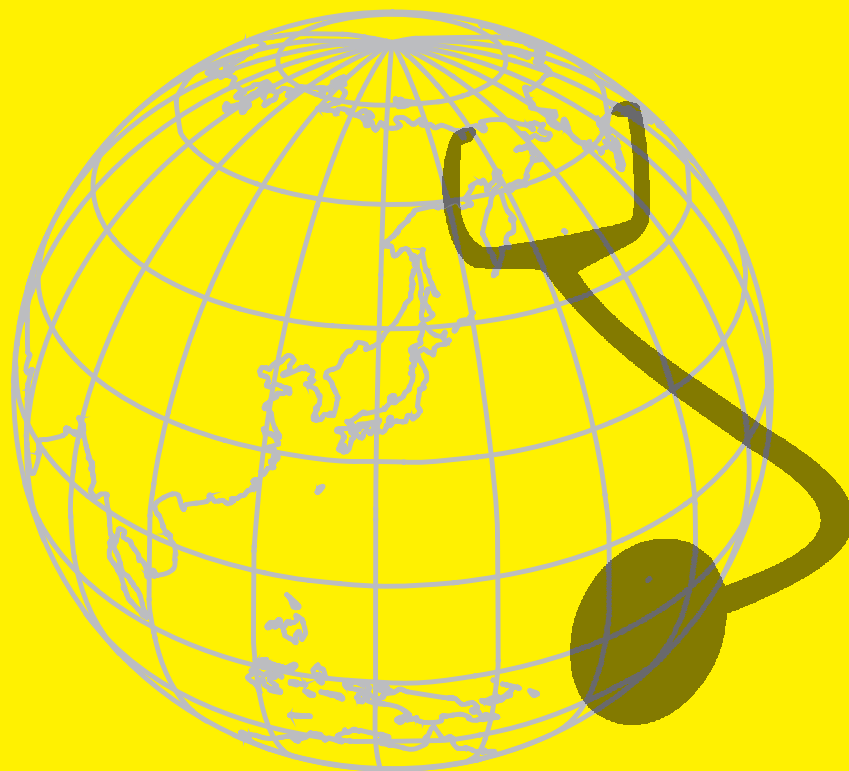
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# A Study of Cytomorphological Spectrum in Tuberculous Lymphadenitis from Northern India

Goel Seema<sup>1</sup>, Mitra Subir<sup>2</sup>, Madan Jyotsna<sup>3</sup>, Goel Narendra<sup>4</sup>, Gupta Namrta<sup>5</sup>

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## ABSTRACT

**Context:** Tuberculous lymphadenitis is one of the most common causes of lymphadenopathy. It shows a vast array of morphological pattern on fine needle aspiration cytology. One should be aware of these cytomorphological patterns to arrive at a correct diagnosis.

**Aim:** To analyze pathological spectrum of involved lymph nodes by tuberculosis on cytological smears.

**Study design:** The study was conducted in Department of pathology, Santosh Medical College and Hospitals, Ghaziabad, Uttar Pradesh. 120 consecutive cases suspected as tubercular lymphadenopathy, who presented during June 2010 to July 2011, were reviewed. Cytological smears, ancillary techniques and biopsy material were studied to arrive at the diagnosis.

**Results:** The results of our study showed that a wide spectrum of morphological changes were present on cytology. These included presence of caseation necrosis, epithelioid cell granuloma, multinucleated giant cells, lymphocytes, neutrophils, plasma cells, fibrosis and calcification. Presence of neutrophils along with necrotic material does not rule out tuberculosis. This may be the earliest phase of tuberculosis and a repeat fine needle aspiration cytology may increase the diagnostic yield as the disease progresses.

**Conclusion:** It was concluded that in tuberculous lymphadenopathy, morphological spectrum varies from early exudative to caseous to late fibrocalcific phase and fine needle aspiration cytology provides a reliable, safe, rapid and economical method of diagnosing these patients with accuracy.

**Keywords:** FNAC, Tuberculosis, Reactive, Superficial Lymphadenopathy, Non-Neoplastic

## INTRODUCTION

Lymphadenopathy is a common presenting symptom in various diseases or it may be an incidental finding during evaluation of patient for other illnesses. Tuberculosis should be strongly suspected in a young patient presenting with peripheral lymphadenopathy, with prolonged duration of illness and involvement of cervical glands with multiple and matted appearance.<sup>[1]</sup> Since early diagnosis is the cornerstone of the tuberculosis control strategies,<sup>[2]</sup> a study was, therefore, undertaken to assess the different cytomorphological patterns associated with tuberculosis and its correlation with histopathological findings and ancillary investigations

## MATERIAL AND METHOD

120 consecutive cases suspected as/of tuberculosis on cytological smears who presented during June 2010 to July 2011 were included in the study after approval from ethical review board.

A detailed history was taken and complete physical examination was done. FNAC of enlarged lymph nodes was performed with informed consent of the patient. Procedure was done using 22-23G needle and 20 ml syringe. Giemsa preparations were used to study the smears. In all cases where cytological diagnosis was of a granulomatous disease, Ziehl-Neelson staining [Z.N staining] was performed to see for acid

fast bacilli [AFB]. Smears showing caseous necrosis or epithelioid cell granuloma with AFB positivity on Z.N staining were taken as tubercular. In cases with other cytomorphological findings, one of the accessible lymph nodes was removed for histopathological examination. Then results of FNAC were further correlated with the histological diagnosis from paraffin embedded sections of tissue blocks, fixed in 10% formal saline.

A complete blood count and ancillary tests including X-Ray chest, Tuberculin test with 1 T.U PPD and serology for tuberculosis (detection of antibodies IgG and IgM) were done in all patients. Any two of the ancillary tests reported positive in correlation with clinical and cytological findings were taken indicative of the infected status of the patient.

### OBSERVATIONS

A total of 120 cases of lymphadenopathy were reviewed during the course of 1 year [June 2010 to July 2011]. These cases were divided into three groups depending on their age: Group I included children and adolescents [i.e. 0-20 years], Group II included middle aged patients [i.e. 20-50 years] and Group III with elderly patients [i.e. >50 years] [Table 2]. About 75% cases of the tubercular lymphadenitis cases were in the age group of 20-50 years.

In our study, cervical group of lymph nodes were commonly involved [73.3%] followed by axillary group of lymph nodes [19.2%] [Table 1] and slightly increased incidence in males was noted.

Out of the 120 cases, 101 cases [85%] were Montoux positive. [Montoux was considered positive when 72 hours after intradermal injection of 0.1 ml of PPD on the flexor surface of the forearm, erythema was noted along with induration of more than or equal to 10 mm.] However 10 confirmed tuberculosis cases, had negative Montoux test. We did not see strongly positive reaction [over 20mm] in any group.

Gross appearance of the aspirates was either cheesy, purulent or mixed with blood.

Caseating material [fig 1] was found in 8 cases, necrosis with granuloma seen in 52 cases, [Fig 2] only epithelioid granulomas without necrosis seen in 36 cases and scattered doubtful epithelioid cells seen in 6 cases. [Fig 3] Lymphocytes were seen mostly with well defined granuloma formation. With abundant caseous necrosis when the granulomas were absent, few

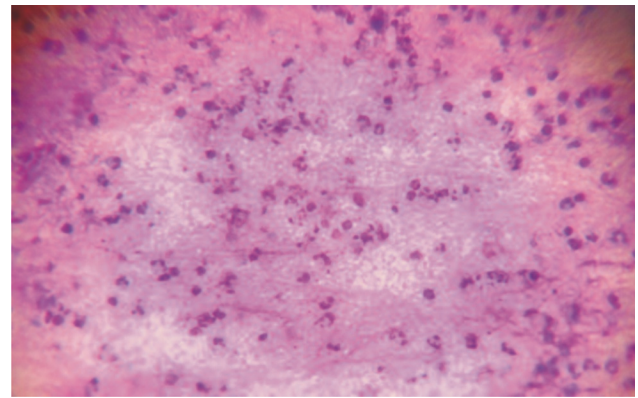


Fig. 1. Caseous Necrosis with inflammatory cells [Giemsa,40x]

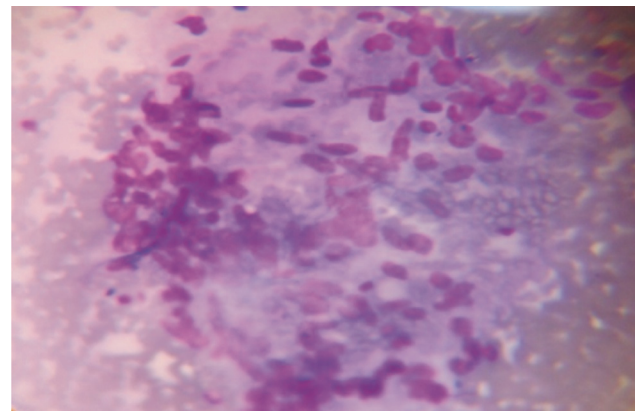


Fig. 2. Epithelioid Granuloma with necrosis (Giemsa, 40x)

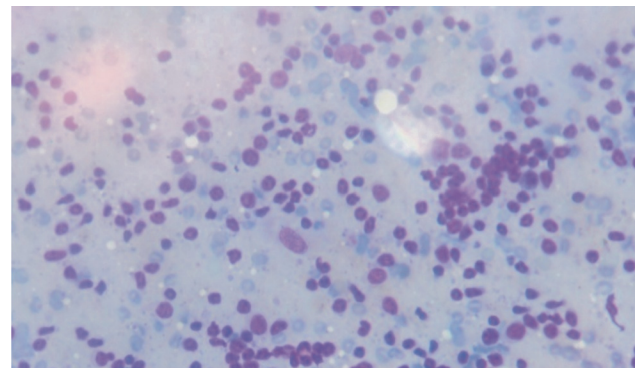


Fig. 3. Single epithelioid cell, without necrosis or granuloma [Giemsa,40x]

lymphocytes were seen. Low number of intact/fragmented neutrophils were noted in early lesions and they were absent when granuloma were well defined. Plasma cells were rarely seen, only during granuloma formation stage. Fibrosis was evident in late lesions.

In cases of acute suppurative lymphadenitis, repeat FNAC increased the diagnostic yield of tuberculosis

as caseous necrosis, epithelioid cells and ill defined granuloma begin to appear.

Stain for AFB was positive in 49 cases [44.1%]. [Table 3] Diagnosis of tuberculosis in remaining cases was furnished on the basis of caseating epithelioid cell granuloma [52 cases]. Thus a total of 74 cases showing either caseating epithelioid cell granuloma and /or Z.N positivity were diagnosed as tubercular on cytological smears. Histopathological examination of the biopsied gland was needed in remaining 46 cases.

Tubercular lymphadenitis was confirmed in 37 cases on biopsy which also showed at least two ancillary tests positive. Out of the 9 discordant diagnosis, 1 showed non specific reactive hyperplasia, 1 lymph node diagnosed as kikuchi's disease, 4 were suppurative and 2 showed only necrotic material. One case showed positive serology for brucellosis [ancillary investigations and Z.N staining were reported negative in this case while granulomatous reaction was seen in cytology.] [Table 4]

**Table 1: Site distribution of lymph nodes aspirated**

	Number of cases[n=120]	%age
Cervical	88	73.3
Axillary	23	19.2
Inguinal	6	5
Parotid	2	1.7
pectoral	1	0.1

**Table 2: Clinical characteristics of patients in different groups**

Group	Age	Males	Females	M:F ratio	Matted/Adherent	Montoux test
I	0-20	11	14	0.8:1	6	23
II	21-50	42	22	1.9:1	36	50
III	>50	20	11	1.8:1	13	28

**Table 3: Cytological findings of 120 cases of Tubercular lymphadenitis**

Group	Cytological findings	Number	%age	Ziehl Neelson positive	%age
I	Granuloma alone	36	30	9	25
II	Granuloma and Caseation necrosis	52	43.4	27	51.9
III	Necrosis alone	8	6.6	5	62.5
IV	Few scattered epithelioid cells	6	5	2	33.3
V	Necrosis and polymorphs	18	15	6	33.3
	Total	120	100	49	-

**Table 4: Cytological and histopathological correlation [n=46]**

Serial Number	Cytological Findings	Number	Ancillary Tests Positive	Biopsy Performed In Cases	Histologically Concordant	Histologically Discordant
1	Granuloma alone	36	34	27	25	2[1-brucella positive,1-Kikuchi's disease]
2	Granuloma and caseation necrosis	52	52	-	-	-
3	Necrosis alone	8	6	3	1	2[both necrotic]
4	Few doubtful epithelioid cells	6	6	4	4	-
5	Necrosis and polymorphs	18	13	12	7	5[4-suppurative, 1-reactive]
	Total	120	111	46	37	9

Two cases were diagnosed as necrotic lymph nodes where only necrosis and focal calcification was seen on histology. Both these cases were negative for AFB stain.

Kikuchi's disease was seen in 1 case [1.6%] in the present study. Large discreet areas of necrosis with partial architectural effacement was seen on histopathological examination. Abundant nuclear debris surrounded by histiocytes, lymphocytes and plasmacytoid monocytes were seen. Follicular hyperplasia and polymorphs were absent which differentiated it from bacterial infections and cat scratch disease.

In the present study 1 case showed non-neoplastic, non-specific reactive hyperplasia. Histologically they were characterized by numerous enlarged, coalescing lymphoid follicles with distortion of lymph node architecture.

In 4 lymph nodes histological features were suggestive of suppurative/ bacterial infection.

## DISCUSSION

In developing countries like India where tuberculosis is rampant, tuberculous lymphadenitis continues to be the most common lymphadenitis encountered in clinical practice.<sup>[3]</sup>

The predominance of cervical lymph nodes as noted in our study finds concordance with other studies.<sup>[4,5,6,7]</sup> Regarding the correlation of the clinical characteristics of lymph glands to cytological expression it was observed by us that caseation, matting and adherence to surrounding tissues were present in less than half of cases<sup>[8]</sup> Thus these two signs when present suggest tubercular aetiology but their absence does not rule out the disease as in the early stages of tuberculosis, lymph nodes may be discrete and firm.

Male preponderance seen in our study correlates well with other studies. No significant relationship seen with either TLC/ DLC results.<sup>[9]</sup> Maximum number of patients of tuberculosis in our study were in the age group of 20-50 years, followed by 0-20 years and >50 years. Tuberculosis showed a declining trend after 40 years which was in concordance with other workers.<sup>[5]</sup> It may be due to the development of immunity with age.

Out of 111 cases of tubercular lymphadenopathy, 49 cases [44.1%] showed Acid fast or Z.N staining

positivity. Our findings correlate with Dev Prason [46%].<sup>[10]</sup> However Pamra et al,<sup>[11]</sup> reported a lower AFB smear positivity rate [35.6%] in their studies.

Diagnostic utility of Montoux is very limited and has to be interpreted in relation with other findings. Tuberculin reaction of <10mm induration which is reported as negative was seen in 24 confirmed tuberculosis cases in our study. Probably it was due to depressed cellular immunity in these patients. It means that a negative Tuberculin test cannot be relied upon to exclude tuberculosis.<sup>[12]</sup> Others have also supported this view on Montoux test in Tuberculosis.<sup>[9]</sup>

Diagnostic cytologic criteria of tuberculous lymphadenitis is clearly described as presence of epithelioid cell granulomas with or without multinucleated giant cells and caseation necrosis.<sup>[13,14,15]</sup> Diagnostic accuracy can be increased by using Z.N staining for acid fast bacilli identification.<sup>[3,16]</sup>

Three main cytological patterns in tuberculosis of lymph nodes are described.<sup>[2,15,17]</sup> Type 1: Epithelioid granuloma without caseous necrosis. Type 2: Epithelioid granuloma with caseous necrosis. Type 3: Caseous necrosis without epithelioid granuloma but with lymphoid cell population. In addition to these groups, a fourth group comprising of poorly developed/ doubtful epithelioid cells or occasional epithelioid cells without characteristic necrosis/giant cells has been adopted by few pathologists.<sup>[7,13]</sup> In the present study we categorized the lesions in similar way and found an excellent cytohistologic correlation. Type II reaction, especially granuloma with necrosis, is the most common type followed by Type I and Type III reactions. At times there was neutrophilic infiltration in necrotic material [18 cases], which was so intense in few cases that it suggested an acute suppurative lesion. However on repeat FNAC, further investigations and biopsy, a histologically concordant diagnosis of tuberculosis was achieved in 13 cases.

Thus as observed by Das et al,<sup>[18]</sup> our study also concludes that when AFB is positive in a smear containing epithelioid granuloma and/or necrosis, it is diagnostic of tubercular lesion. When AFB is negative in the presence of epithelioid granuloma in a developing country like India, it is considered granulomatous lesion likely to be of tuberculous etiology and culture for mycobacterium is advised. When the smear contains only necrotic material with or without inflammatory cells and AFB is negative, it is advisable to rule out tuberculosis by

repeating aspiration at a later date and advising investigations like Montoux, IgG and IgM antibodies and biopsy.

Though cytodagnostic parameters of tuberculosis are well defined, procedures has its own limitations. In cases of early / small lesions or in cases of fibrosis of lymph node, aspirate may be inadequate or non-representative.<sup>[19]</sup> In cases presenting with cold abscess, well formed epithelioid granulomas may not be seen. Again granuloma may be poorly formed in HIV positive patients. Similarly differential diagnostic problems may arise because of presence of cytologic features like giant cells, necrosis and epithelioid cells in diseases other than tuberculosis. [sarcoidosis,<sup>[20]</sup> leprosy,<sup>[21]</sup> post vaccination lymphadenitis,<sup>[22]</sup> cat scratch disease.<sup>[23]</sup> There is a risk of degeneration in malignancy especially squamous cell carcinoma and abundant necrotic material can add to diagnostic dilemma. In case tuberculosis coexists with malignancy, one of the lesions can be missed if proper sampling is not done.

### CONCLUSION

Wide array of morphological patterns seen in different individuals is according to immunological status of body, person's age, antigenic potency and duration of proliferation. Our study stresses that one should be aware of different tubercular cytomorphological spectrum for a timely diagnostic and therapeutic intervention. However, biopsy is mandatory in doubtful cases

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# Perceptions of School Children about Harms of Tobacco and Tobacco Control Laws

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## ABSTRACT

**Background:** Globally, about 80,000 to 1,00,000 adolescents start smoking daily. As adolescents get addicted to tobacco much faster than adults, sensitizing them regarding harms of tobacco and various tobacco control laws is essential.

**Objectives:** To determine the knowledge about harms of tobacco among school children and understand their awareness about tobacco control laws in India.

**Materials and Method:** A cross sectional survey was conducted among tenth grade students aged 14-16 years in six schools in Mumbai using a self administered questionnaire. Awareness regarding harms of tobacco and tobacco control legislation was given next day.

**Results:** Among 505 participants, mean age of the students was 14.69 years. None of them were tobacco users. Many students knew about forms of tobacco and were aware that tobacco was harmful but could name only a few health hazards. About 76% knew that smoking is banned in public places, 87.7% knew about warning signs on tobacco products, 96.6% felt that tobacco should not be sold to minors and only 36% knew that sale of tobacco was banned within 100 yard of schools. Most important source of information was television (88.5%) followed by newspapers (78.4%). Majority students (89%) felt tobacco should be banned and 98.4% were sure that they won't use tobacco in future.

**Conclusions:** There is a need to increase awareness among adolescents regarding various tobacco control policies and harmful effects of tobacco.

**Keywords:** Tobacco, School Children, Tobacco Control Laws, Health Hazards, Mass Media

## INTRODUCTION

There has been an alarming rise in tobacco use among adolescents throughout the world. According to World Health Organization, 80,000 to 1,00,000 adolescents start smoking daily <sup>(1)</sup> globally. According to Global Youth Tobacco Survey India, 17.5% students of 8-10 grades are tobacco users in any form. About 14% were using smokeless tobacco and 8.3% were cigarette smokers.<sup>(2)</sup> Various factors play a role in adolescents taking up tobacco habit like peer pressure, tobacco user in the family, curiosity, impressing the

opposite sex, low self esteem, tobacco advertisements and stress.<sup>(3-6)</sup> Most youngsters, due to ignorance, think that smokeless tobacco has curative properties to treat health ailments which may predispose to addiction in their later life. <sup>(7)</sup> Studies have shown that adolescents get addicted to tobacco much faster than adults. <sup>(8)</sup> Various health hazards of tobacco use like Chronic obstructive pulmonary diseases (COPD), emphysema, acute and chronic myocardial infarction, cerebral and peripheral vascular diseases, cancer, poor pregnancy outcomes, depression and others is well

documented, <sup>(9-10)</sup> and depends upon the duration of exposure to tobacco products.

The Government of India has formulated tobacco control Act, Cigarette and Other Tobacco Products Act (COTPA) 2003. <sup>(11)</sup> There is a need to sensitize adolescents regarding harms of tobacco and tobacco control laws in India. Hence this awareness program was designed for tenth grade students of six schools in Mumbai, before these students enter the junior colleges, a period when they are most susceptible to initiate tobacco use. The interactive educational program was conducted with the main objectives of determining the knowledge of tobacco related health hazards among these students and understanding their awareness about tobacco control laws in India.

## METHODOLOGY

A cross sectional survey was conducted among tenth grade students, aged 14 to 16 years, belonging to six high schools in Mumbai. After obtaining permission to conduct the program from the school authorities, details regarding the number of schools, sections, students in each class and school timings was obtained from the school co-ordinator.

The students were explained about the program and a self administered questionnaire was distributed. To get prompt answers, they were assured that their identity would not be revealed. Considering the attention span and school schedule, fifteen minutes was given to fill up the questionnaire. Health workers were assigned to help the students in case of any query in understanding the questions. A well designed Health education program covering harms of tobacco use, how youngsters are lured into the tobacco habit, how to refuse tobacco when offered, different tactics of the tobacco industry, different anti-tobacco laws, various tobacco control measures and different methods of tobacco cessation were delivered to the students on the following day. The educational programme was designed to be interactive and participatory.

**Statistical analysis:** SPSS version 15.0 was used to determine the mean and percentages of various variables studied.

## RESULTS

### Socio-demographic characteristics

Total 505 students participated on the first day of

the session. The students were aged between 14-16 years. About 51% of participants were boys and 48.9% were girls. Mean age of the participants was 14.69 (SD 0.694) years. Majority of the participants were Hindus (83%) followed by Christian (7.7%) and Muslims (3.2%). Most of the students (53.86%) were not getting any pocket money. About 24% students received less than 100 rupees per month and 14.85% between 101 to 500 rupees per month as pocket money. Only few students (7.52%) received more than 500 rupees as pocket money. Only 7 (1.4%) students had experimented with tobacco and none of them were current users.

### Tobacco types and health hazards

Most of the students were aware about various forms of tobacco. Majority of them knew about cigarettes (91.3%), beedis (90.3%), pan with tobacco (84.6%), gutka (74.7%) and hookah (62%). Other forms like mawa (31.5%), masherri (32.5%) and khaini (22.4%) were lesser known forms of tobacco. Most of the students (97.4%) were aware that tobacco was injurious to health; however most of them were unaware of harms of tobacco other than cancer (98%) and respiratory diseases (84%). About 60% students were aware of tobacco as a risk factor for heart diseases, stroke (30%), premature aging (32%) and impotence (14.3%). Knowledge regarding passive smoking was moderate with 62.18% considering it as harmful to health.

### Public policies against tobacco

Many students were aware about the tobacco control laws. About 76% of students were aware about smoke free law and that smoking was prohibited in public places. Majority of them 443 (87.7%) had seen health warnings on tobacco products. Among them, 123 (27.77%) had seen only written warnings, 45(10.16%) had seen only pictorial warnings and 277 (62.53%) had seen both. Most of the students (96.6%) knew about ban on sale of tobacco products to minors. About 36% students knew regarding ban on sale of tobacco products within 100 yards of an educational institution, whereas 34.3% were not aware and 29.9% of them were not sure.. However, 219 (43.4%) students had seen vendors selling tobacco within 100 yards of their schools

### Source of Information

Figure 1. shows the source of information about tobacco related health effects and existing policies. For



majority of the students, the main sources of information was television (88.5%) followed by newspapers (78.4%), parents/family members (68.9%), their family physicians (63.6%), school teachers (63.2%), movies (41.6%), internet (40%) and radio (38.8%).

### Attitudes regarding tobacco use and ban

About 98% students said they would refuse tobacco

products if offered. However, 78.6% felt that, tobacco habit is difficult to quit. Similarly 86.7% students answered that they would not imitate any famous personality using tobacco and 85.9% were of the opinion that using tobacco would not make them more attractive. About 89% of the students felt there should be a ban on production and sale of tobacco.

**Table 1: Profile of participant students (n=505)**

Variable	Number	Percentage
<b>1. Age</b>		
a) < 14 years	3	0.59%
b) 14 years	204	40.40%
c) 15years	256	50.69%
d) 16 years	36	7.13%
e) > 16 years	6	1.19%
Total	505	100%
<b>2. Sex</b>		
a) Males	258	51.09%
b) Females	247	48.91%
Total	505	100%
<b>3. Religion</b>		
a) Hindu	419	82.97%
b) Christian	39	7.72%
c) Muslims	16	3.17%
d) Others	31	6.14%
Total	505	100%
<b>4. Monthly pocket money (Rs)</b>		
a) Nil	272	53.86%
b) ≤100	120	23.76%
c) 101-500	75	14.85%
d) 501-1000	24	4.75%
e) >1000	10	1.98%
f) Not answered	4	0.79%
Total	505	100%

**Table 2: Participant knowledge and attitudes related to tobacco products**

Knowledge	Number	Percentage
<b>1. Is Tobacco harmful to health</b>		
a) Yes	492	97.43%
b) No	8	1.58%
c) Don't know	5	0.99%
Total	505	100%
<b>2. Harmful effects of tobacco*</b>		
a) Cancer	496	98.22%
b) Respiratory diseases	424	83.96%
c) Heart diseases	305	60.40%
d) Premature aging	161	31.88%
e) Stroke	151	29.90%
f) Impotence	72	14.26%
g) Others	32	6.34%
Total	505	100%

**Table 2: Participant knowledge and attitudes related to tobacco products(Contd.)**

Knowledge		Number	Percentage
3.	Is passive smoking harmful to health		
	a) Yes	314	62.18%
	b) No	19	3.76%
	c) Don't know	172	34.06%
	Total	505	100%
4.	If someone offers tobacco will you use it		
	a) Yes	3	0.59%
	b) No	497	98.42%
	c) Don't know	5	0.99%
	Total	505	100%
5.	Does smoking make people more attractive		
	a) Yes	31	6.14%
	b) No	434	85.94%
	c) Don't know	40	7.92%
	Total	505	100%
6.	Do you imitate any famous celebrity using tobacco		
	a) Yes	45	8.91%
	b) No	438	86.73%
	c) Don't know	22	4.36%
	Total	505	100%
7.	Should tobacco be banned		
	a) Yes	449	88.91%
	b) No	20	3.96%
	c) Don't know	36	7.13%
	Total	505	100%
8.	Once started, is tobacco habit difficult to quit		
	a) Yes	397	78.61%
	b) No	62	12.28%
	c) Don't know	46	9.11%

\*Multiple responses were permitted

**Table 3: Participant perceptions regarding tobacco control laws**

Knowledge about Law		Number (%)
1.	Participants aware of smoke free law	383(75.84%)
2.	Participants unaware of smoke free law	62(12.28%)
3.	Participants not heard about smoke free law	14(2.77%)
	Total	505(100%)
1.	Participants who have seen health warnings on tobacco products	443(87.72%)
2.	Participants who have not seen health warnings on tobacco products	62(12.28%)
	Total	505(100%)
1.	Participants who have seen pictorial warnings	45(10.16%)
2.	Participants who have seen written warnings	121(27.77%)
3.	Participants who have seen both warnings	277(62.53%)
	Total	443(100%)
1.	Participants aware of ban on tobacco sales to minors	488(96.63%)
2.	Participants unaware of ban on tobacco sales to minors	12(2.38%)
3.	Participants not heard of ban on tobacco sales to minors	5(0.99%)
	Total	505(100%)

**Table 3: Participant perceptions regarding tobacco control laws (Contd.)**

Knowledge about Law	Number (%)
1. Participants aware of ban on tobacco sale in 100 m radius of educational institutions	182(36.04%)
2. Participants unaware of ban on tobacco sale in 100 m radius of educational institutes	173(34.26%)
3. Participants not heard of ban on tobacco sale in 100 m radius of educational institutes	150(29.70%)
Total	505(100%)
1. Participants who had seen sale of tobacco within 100 m radius of their school	219(43.37%)
2. Participants who had not seen sale of tobacco within 100 m radius of their school	286(56.63%)
Total	505(100%)

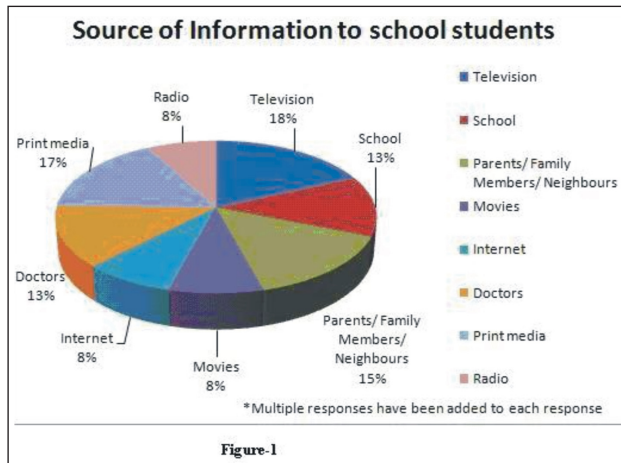


Figure 1: Source of Information to school students

## DISCUSSION

Although tobacco consumption is a big public health problem, many youngsters are getting hooked which will have long term effects on the individual as well as the society. As per GYTS, 17.5% students aged 13-15 years were current tobacco users in any form. However no tobacco users were found in our program. Fear of school authorities or punishment from parents could have been the reason for not revealing their tobacco use status. It is also observed that smokeless tobacco use is more among younger population than smoking forms<sup>(2)</sup> as it is easily available, considered safe and acceptable in the society. Some studies have shown that more money to spend may contribute to initiation of tobacco habit by young adolescents.<sup>(12, 13)</sup> However in our program more than 50% of students didn't get any pocket money. It has to be noted that, having money itself may not influence to start tobacco habit, as adolescents may share from friends or borrow from someone.<sup>(13)</sup>

Most of the students knew about common forms of tobacco but were unaware of other forms like mawa, khaini, masheri. It is very important to educate students about the harms of other forms of tobacco as well, since they may fall prey to them considering it harmless. It was encouraging to know that many students knew about few health hazards of tobacco, but it is equally important to inform them about all harms of tobacco. It is also important to educate girls regarding poor pregnancy outcomes due to tobacco use. Similar findings were noted in studies in other parts of India with about 80% of students knowing about harmful effects of tobacco in any form.<sup>(14, 15)</sup>

Participants in our program had a fair knowledge about policies like ban of smoking in public places, warning signs on tobacco products and ban on sale of tobacco products to minors. However their knowledge regarding ban on sale of tobacco products near educational institutes was very poor. Overall knowledge regarding tobacco law was poor as compared to their knowledge regarding harms of tobacco; which can be improved further. It has been observed that policies like increasing the taxes on tobacco products; ban on smoking in public places, restricting the sale of tobacco products to minors and educating school children will go a long way in decreasing tobacco consumption by younger generation.<sup>(16-19)</sup>

Television and newspapers were the most important mass medias for gaining knowledge about hazards and tobacco laws. This shows mass media can play a vital role in tobacco control and reach large population. Mass media can modify the level of knowledge and attitudes regarding tobacco as a result of reinforcement due to repetitive exposure amongst the audience.<sup>(20)</sup> Mass media has a significant role

among youngsters as they are more media savvy.<sup>(21)</sup> Efforts should be made to utilize this trend and help youngsters know more about dangers of tobacco.

It was encouraging that majority of the participants said they would never use tobacco if offered by someone. In a study among 4280 youths in south India, significantly higher proportion of current cigarette smokers (19%), gutka/pan masala users (27%) and beedi smokers (34%) compared to never tobacco users (5-6%) were offered these products free of cost by tobacco company representatives.<sup>(14)</sup> This shows that tobacco companies can go to any extent to lure youngsters into the habit. Similarly most of the students felt they would not look more attractive to the opposite sex if they used tobacco. However studies have shown that tobacco users are considered more attractive than non tobacco users.<sup>(14, 22)</sup>

### CONCLUSION

Awareness about harms of tobacco was good among the students. They need to be sensitized regarding tobacco control policies, harmful effects of tobacco and same should be included in their curriculum. Mass media should be used effectively in tobacco control activities. Strict implementation of COTPA, is necessary to curb the tobacco menace.

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# Effect of *Mucuna Pruriens* Seeds on Testes of Young Albino Rats

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## ABSTRACT

**Background:** Infertility is a major public health concern which cannot be treated like other illness and the hormonal preparation ends up with grave side effects. There is a remarkable increase in the use of herbs over the past few years and research interests have focused on various herbs. According to Indian system of medicine many herbs were used for treating male sexual disorders since ancient times. Several non-hormonal preparations have been used to correct such sexual disorders.

**Materials and method:** In this study *Mucuna pruriens* seeds powder (herb) were administered orally to the experimental albino rats of Wister lineage and compared to the placebo albino rats using various parameters such as hormonal analysis, semen analysis, histomorphometry of seminiferous tubules and the drug's efficacy was analyzed.

**Results:** The administration of the drug showed significant positive results in improving various parameters involved in maintaining maleness. The data's were analyzed using student t test and found to be statistically significant.

**Conclusion:** This study proves the effect of the *Mucuna pruriens* on the testis of albino rats, the results of which can be interpolated for the treatment in man. The outcome of this study will also constitute a source of baseline data.

**Keywords:** *Infertility, Mucuna Pruriens, Wister Albino Rats, Testes, Sperm Histomorphometry, Seminiferous Tubules*

## INTRODUCTION

Infertility is a major public health concern. Management of infertility therefore requires the keenest insight, the tactfulness and utmost compassion. <sup>[1]</sup> The treatment of certain sexual disorders with gonads and/or pituitary hormones have not yield favorable results. <sup>[3,4]</sup> Many herbs were used for treating male sexual disorders since ancient times. The present investigation was undertaken to study the aphrodisiac effect of an individual herbs *Mucuna pruriens* commonly called as velvet bean or cowhage Fig 1. The seeds contain mucunadine, mucuadinine, pruriendine, and 40mg/gm of L-dopa. L-dopa enhances libido and sexual performance. <sup>[4]</sup> The

presentation of our reports shows some interesting results on the effect of *Mucuna pruriens* on the fertility of male albino rats.

## MATERIALS & METHOD

### a) Animal selection and drug administration

A total of twenty male albino rats (*Rattus norvegicus albinus*) of wistar lineage with an average weight of 130 – 140 gm were housed in the experimental animal unit. The study protocol was approved by the University's Animal Ethical Committee and Scientific Review Board. The rats were fed with standard rat feeds and given fresh

water.<sup>[5]</sup> The rats were distributed with 2 rats in each cage which was selected randomly 10 for control and 10 for experimental group. All the rats were placed under the same environment and management conditions. <sup>[6]</sup> After a week of stabilization, drug was administered using the feeding tube. The *Mucuna pruriens* powder was diluted with 1.5ml of sterile water for 25mg and administered orally using infants feeding tube (oral gavage) to the experimental group. The control rats were fed with the same amount of sterile water for placebo. The drugs were administered orally once a day regularly in the morning at a fixed time for 30 days for all the experimental animals. Rest period of about 10 days were given to all the animals after feeding the drug.

#### b) Sample collection

The rats were anaesthetized using Xylazine & ketamine<sup>[7]</sup> and placed on a clean dissecting board and the skin was incised to about 2 cm in length. The jugular vein was traced out and using disposable syringe about 2ml of blood was withdrawn Fig 2. After perfusion a midline incision was made on scrotum and the testicles were milked out of the incision site. The spermatic cord was exposed. The testes were then separated from the epididymis with the scalped blade. <sup>[5, 8]</sup>

#### c) Measuring dimension of testes

The lengths, breadth, height of the testes were measured using vernier caliper Fig 3 and the volume of the testis were calculated using the Lambert's formula <sup>[9]</sup> (Volume = Length x Breadth x Height x 0.71 cu.cm) and the testes were weighed and dropped into gendre's fluid for 48 hrs of fixation. The relative weight of testes was also known as gonado-somatic index (GSI) were calculated with the help of following formula (GSI = Weight of testes I grams / Body Weight in grams x 100) where GSI (Gonado Somatic Index), weight of Testes (Absolute weight in gram) and body Weight (weight of rats on the 40<sup>th</sup> day in gm). After calculating GSI, the values were tabulated. <sup>[10, 11]</sup>

#### d) Semen analysis

The semen samples were there after collected from the cauda epididymis by milking out on a glass slide and mixed with one drop of 2.9% sodium citrate. <sup>[5]</sup> The semen was collected from any one

epididymis, either right or left randomly selected. The other side epididymis was utilized for smear preparation. The sperm suspension in the slide was drawn into a white blood cell pipette and diluted to 1:10 with normal saline. Improved double Neubauer ruling Chamber (Depth 1/10 mm) was used for counting the spermatozoa.

Smears were prepared from the spermatozoal samples. Three smears were prepared from each rat's spermatozoal samples. After milking out the sperm on a glass slide, one drop of 2.9% sodium citrate was mixed well with seminal fluid and a smear was prepared. The slides were stained by Papanicolaou stain Fig 4. <sup>[12]</sup> The morphological characteristic of the sperm cells in all the smears were observed under oil immersion (100 X). <sup>[5, 13]</sup> The percentage of normal and abnormal sperm cells were tabulated for both control and experimental group, by counting 200 sperm cells per smear and three smear per rat. The data's were analyzed by Chi-Square test.

#### e) Hormone analysis

Serum was separated, collected and added to each wells (25µl) followed by adding of conjugate (100µl) to each wells and mixed. The wells were incubated at 37° c for one hour and the contents were removed from the wells. Then the wells were washed with (300µl) distilled water (2 times) and TMB-Substrate (100µl) was added to all the wells. Followed by incubation of wells for 15 minutes in dark and stop solution (100µl) was added to all the wells. After completing all the above procedures readings were taken using ELISA analyzer and noted down.

#### f) Histomorphometry of testes

The testes of both sides were cut into two halves in the equatorial plane so that the testes were fixed perfectly and processed, embedded in paraffin wax. <sup>[14, 16]</sup> Embedding was done by placing one half of testes from above downwards and the other half from below upwards. Eight sections were taken at different levels in each half of testis using rotary microtome and stained by haematoxylin and eosin. <sup>[14]</sup>

The stained slides were carefully observed for histological changes and morphometric analysis was done. Micrometry was used to measure the diameter of the seminiferous tubules. Prior to the measurements

ocular micrometer was calibrated against stage micrometer. [15, 16, 17, 18] After deriving the calibration constant (L), the stage micrometer was removed and the stained slides were focused using 10x objective, about 50 tubules were counted in each section and the diameter was calculated using the formula (Diameter of seminiferous tubules = Maximum length + maximum breadth / 2 C.µm). The mean diameter was taken from the 50 seminiferous tubules per section of testes, so that thirty two sections per animal were taken. The final average diameter of the seminiferous tubules of each animal was tabulated. The mean, standard deviation, Standard error mean were

calculated and tabulated. Further the data's were analyzed by student t test using Graph pad software quick calcs online calculator for scientist.

## RESULTS

The mean weight of albino rats, volume and weight of testes, gonadosomatic index, sperm count, testosterone hormone level and diameter of seminiferous tubules were tabulated for control and experimental rats separately (Table 1 and Table 2) and analysed by student t test to prove that the data's are statistically significant.

**Table 1: Weight of animals, Volume and Weight of testes and Gonadosomatic index:**

Statistical analysis	Weight of animals gm		Volume of Testes cu.cm		Weight of Testes Gm		Gonado Somatic Index	
	C	E	C	E	C	E	C	E
Mean ± SE	181.17±1.90	219.33±1.71	0.83±0.05	1.31±0.07	0.95±0.01	1.05±0.01	0.52±0.01	0.49±0.01
SD	4.67	4.18	0.133	0.180	0.04	0.03	0.02	0.03
P - Value	< 0.0001		< 0.0001		< 0.0001		< 0.0169	

Number of rats 10

C - Control, E - Experimental, SE - Standard error, SD - Standard deviation

**Table 2: Sperm count, Testosterone hormone level and Diameter of seminiferous tubules:**

Statistical analysis	Sperm Count Millions/ml		Testosterone hormone level ng/ml		Diameter of seminiferous tubule µm	
	C	E	C	E	C	E
Mean± SE	30.9 ±0.40	40.7±0.48	2.26±0.05	3.47±0.24	258.62±3.22	271.82±7.37
SD	1.001	1.178	0.119	0.60	7.9	18.07
P - Value	< 0.0001		< 0.0001		< 0.0485	

Number of rats 10

C - Control, E - Experimental, SE - Standard error, SD - Standard deviation

## DISCUSSION

Vermes et al through their study reported that *Mucuna pruriens* (MP) through its influence on the interstitial cells of Leydig cells increases testosterone secretion. [19] This anabolic steroidal hormone induces an increase in the body weight of the animal. In this study on day-1 the statistical analysis revealed a mean value of 134±1.13 gm of body weight in control and a mean value of 134±1.06 gm of body weight in experimental

After a period of 40 days when the drug administration (30 days) and rest period (10 days) were over, the mean body weight of experimental 219.33±1.71 gm was found to be increased, when compared to control 181.17±1.9 gm. The P value was found to be highly significant on day 40 (0.0001) Table

1 and this was due to the anabolic effect of *Mucuna pruriens* (MP) administered.

Patki et al done a study with *Mucuna pruriens* which showed a significant hypertrophy of the seminiferous tubules, increase in weight of the gonads thus increasing the sperm count. [23] In our study we observed the changes in gonads of albino rats after administering *Mucuna pruriens* and found that there was an increase in size of seminiferous tubules, thus in turn an increase in the weight of the gonads. The mean volume and the weight of both groups were compared, and found to be increased in experimental 1.31±0.07 cu.cm and 1.05±0.01gm when correlated with the control 0.83±0.05 cu.cm and 0.95±0.01 gm Table 1. The reason for increase is due to an elevated testosterone level which in turn increases the diameter



of the seminiferous tubules, which induces spermatogenesis resulting in an increase in sperm count. [20] The statistical study has given a p value of 0.0001 and 0.0001 for volume and weight respectively which was proved to be statistically significant. Rabia Latif et al and Qamar Hamid et al studied the effect of Amlodipine and Cimetidine respectively using GSI as one of their parameters to correlate the increase in body weight and gonadal weight of the rats. [10,11] The same parameter was utilized in this study to find the effect of MP. The GSI of experimental ( $0.49 \pm 0.01$ ) when compared to control ( $0.52 \pm 0.01$ ) was less. The statistical P value of GSI (0.0169) Table 1 which was significant as the weight of the animal and weight of the gonads of control and experimental were increased. Mitra reported that the sperm count was  $55.33 \pm 2.47$  millions/ml in single cauda epididymis of albino rats using phosphate buffer as a diluting fluid and the experimental animal showed increased counts upto  $81.50 \pm 2.70$  millions/ml. [21] The present study came up with a mean sperm count of  $30.87 \pm 0.41$  millions/ml in control and  $40.67 \pm 0.48$  millions/ml in experimental Table 2 which has brought out a marked increase in count, due to the effect of testosterone on sperm count via., the influence on spermatogenesis. The data analysis showed a P value of 0.0001 which is proven to be extremely significant.

Sperm cell morphology includes primary and secondary abnormalities, according to the classification by Noarkes et al. Primary abnormalities include rudimentary head and rudimentary tail. Secondary abnormalities include headless tail, curved mid piece, curved tail, looped tail, bent mid piece, tail less head, bent tail. [5] In this study about 8% of abnormal spermatozoa were found in control, whereas a much less percentage 4.25% in experimental and the datas analysed by Chi-Square test proved to be extremely significant (0.0001) .

Mitra et al works showed an increase in serum testosterone ( $6.80 \pm 0.27$  ng/ml) among rats treated with speman. [21] The testosterone level in the MP treated animals showed ( $3.47 \pm 0.24$  ng/ml) which was less in control ( $2.26 \pm 0.05$  ng/ml) Table 2 and the effect was due to L- dopa on ley dig cells to secrete more testosterone. [19] The analysis was extremely significant (0.0001)

Experimental rats showed pronounced hypertrophy of seminiferous tubules when compared to control which also showed some noticeable changes in the tubules Fig 5 and Fig 6. The interstitial tissues

had been reduced to a small extent, while the tubular volume was much increased in experimental, but less in control. The drug increased the spermatogenesis without causing any damage to the seminiferous tubules. The spermatozoa completely filled the lumen of seminal tubules of experimental (75-80%) the remaining tubules are either empty or filled with few scattered spermatozoa when correlated with control (54-60%) Fig 7 and Fig 8 were filled with sperm cells and the remaining were found to be empty, whereas other tubules had unequally distributed few spermatozoa. As the percentage of changes in the tubules was not very much satisfactory, a histomorphometric analysis was also done, to add to the histological analysis. The mean diameter of the tubules was charted out and found to be  $258 \pm 3.22$  μm in control, with a difference of thirties to the experimental  $271.20 \pm 7.37$  μm Table 2. When further analyzed showed statistically significant P value of 0.0485.



Fig. 1. Mucuna pruriens seeds

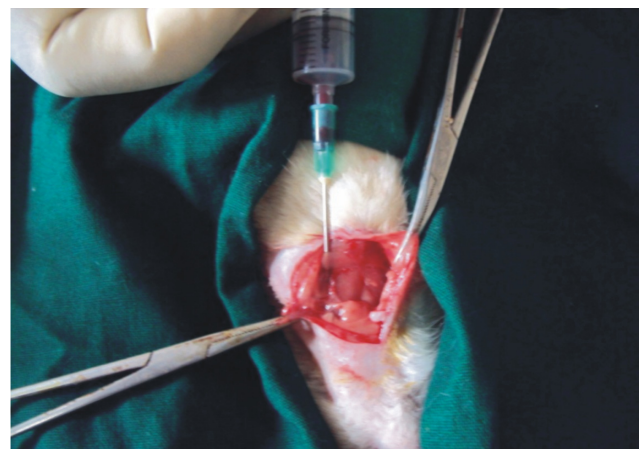


Fig. 2. Collection of blood

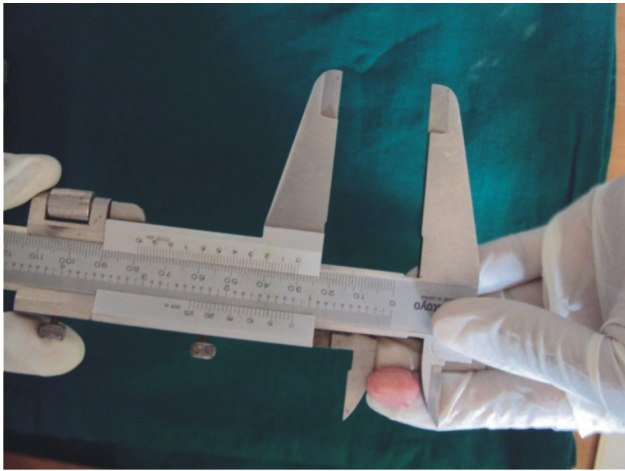


Fig. 3. Measuring Testis

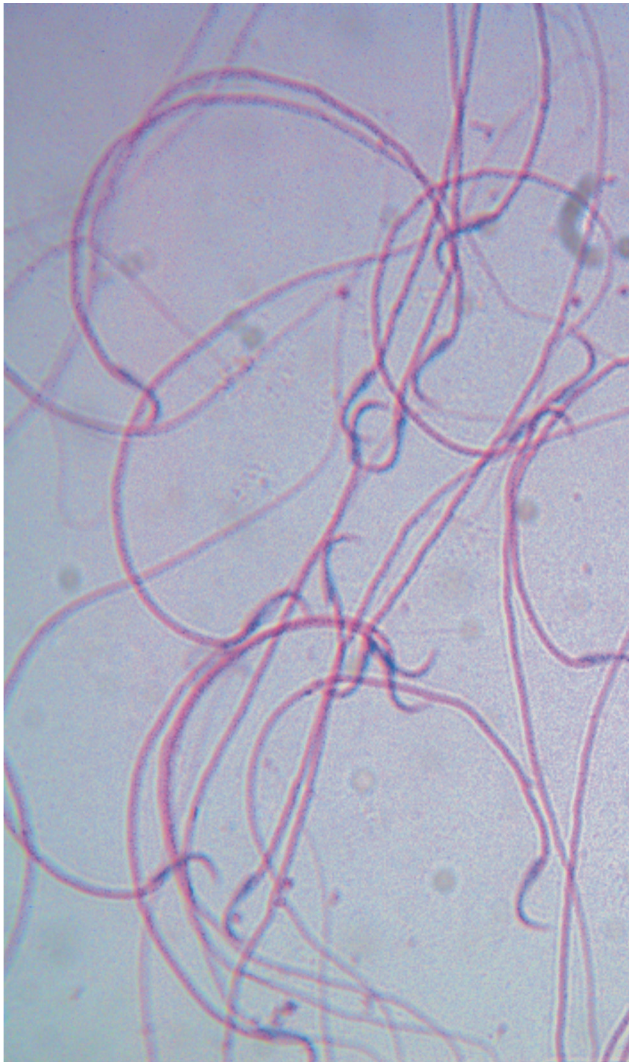


Fig. 4. Semen smear (Papanicolaou stain)

Histological analysis - young rat testis low magnification 10 X



Fig. 5. Control Rat testis

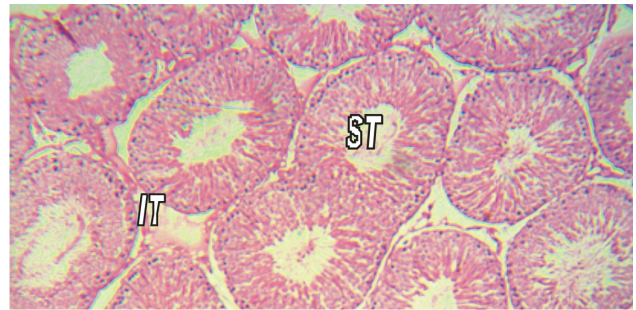


Fig. 6. Experimental Rat testis

Histological analysis - young rat testis high magnification 40 X

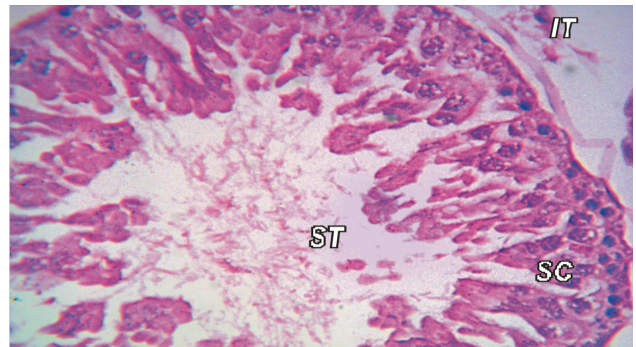


Fig. 7. Control Rat testis

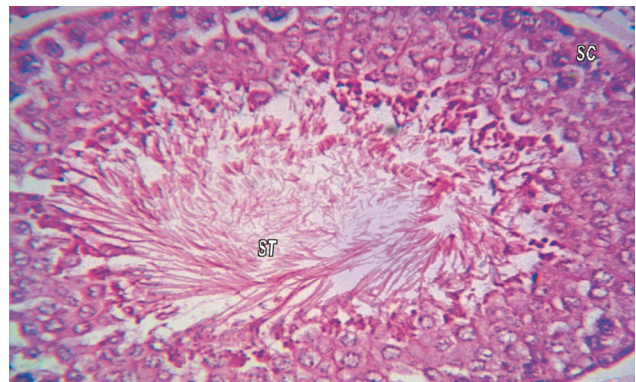


Fig. 8. Experimental Rat testis

ST-Seminiferous tubule , IT-Interstitial tissues, SC-Sertoli cells, LC- Leydig cells

## CONCLUSION

The study proved to be effective on improving the maleness of albino-wistar rats. The data was analyzed are found to be highly significant for weight of animals, volume and weight of testis, sperm count and testosterone hormone and proved to be significant gonado- somatic index and diameter of seminiferous tubules. This study can be reflected in the treatment of infertility in males after conducting similar clinical trials in males.

**Conflict of Interest:** Nil

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# Study on Knowledge, Attitude and Practice of Lymphatic Filariasis among Coastal Adult Population of Pondicherry

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## ABSTRACT

**Background:** The WHO has called for targeting filariasis elimination by 2020. India is the largest LF endemic country and has targeted the elimination of LF by 2015. *Wuchereria bancrofti* as a causative organism accounts for over 90% of the global burden. India contributes about 40% of the total global burden and accounts for about 50% of the people at the risk of infection. *W. bancrofti* is the predominant species accounting for about 98% of the national burden. Diethylcarbamazine (DEC) is an effective drug acting on the parasite and mass annual single dose community drug administration with selective vector control could result in effective elimination of infection by interruption of transmission. Thus knowledge about lymphatic filariasis and vectors were essential for elimination of this disease in the community. So this study was carried out to ascertain the knowledge, attitude and practices of Lymphatic Filariasis in the community.

**Material and Method:** Cross sectional study was carried out (March-June,2011) in our field practice area of Kalapet, Pondicherry UT. Among 400 consenting population above 20 years with the help of semi structured and pretested questionnaire. Systematic random sampling method was used for selection of respondent in this community. Data was analyzed using SPSS 16.0 version.

**Results:** Out of 400, 40.25% respondents were male and 59% respondents were female. Majority (68.5%) of the respondent age were more than 30 years. 79% of study population were educated. Majority of the study respondent were involving in fishing and labour. With respect knowledge more than half of the respondent.(53%) heard about lymphatic filariasis, only 35% of the study population knew about mode of transmission and 95% of the respondents were knew about any one method of prevention. More than half of the respondent knew that government had been taken some preventive measure to control curb the disease transmission.

**Conclusion:** The study population did not have adequate knowledge about mode of transmission but their attitude and practices for prevention of lymphatic filariasis were satisfactory.

**Keywords:** *Filariasis, Mass Drug Administration, Knowledge, attitude and Practice*

## INTRODUCTION

Lymphatic filariasis (LF) is a serious socioeconomic and public health problem in the world. It is a vector borne parasitic disease caused by three lymphatic

dwelling nematode parasites namely, *Wuchereria bancrofti*, *Brugia malayi*, and *Brugia timoris*<sup>1</sup>. Filariasis is a disease of the poor and is a cause and effect of poverty. Majority of the people at risk of filariasis live in rural areas. Diethylcarbamazine (DEC) is an effective drug acting on the parasite and mass annual single dose community drug administration with selective vector control could result in effective elimination of infection by interruption of transmission. This has led to the articulation of the World Health Assembly Resolution (1997) for global elimination of Lymphatic Filariasis<sup>2</sup>. In 1998, the WHO

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had targeted the elimination of this disease and formulated a Global Programme on Elimination of Lymphatic Filariasis (GPELF). The basic features of this programme are Mass Drug Administration (MDA) with appropriate anti filarial drug and morbidity management<sup>3,4</sup>. India is the largest Lymphatic Filariasis endemic country and has targeted elimination by 2015<sup>7</sup>. India contributes about 40% of the total global burden and accounts for about 50% of the people at the risk of infection. Inadequate coverage in drug distribution and consumption were found to be major limitation in mass drug administration (MDA) to eliminate filariasis<sup>1</sup>. The study done ICMR found that the major constraints for MDA were poor community awareness and poor acceptance of drug so this study was carried to ascertain the knowledge, attitude and practice towards filaria elimination.

### MATERIAL AND METHOD

The Cross sectional study was carried out in the field practice area of Urban Health Centre, Kalapet,

Pondicherry, run by Pondicherry Institute of Medical Sciences and UT Government, during March –June 2011. Among 400 consenting population above 20 years with the help of semi structured and pretested questionnaire. Systematic random sampling method was used for selection of respondent in this community. Study Period – This study was carried out for two months from 1<sup>st</sup> March 2011 to 30<sup>th</sup> June 2011. Data was analyzed using SPSS 16.0 version.

### RESULTS

Out of 400, 40.25% respondents were male and 59% respondents were female. Majority (68.5%) of the respondent age were more than 30 years and remaining was in the age group-18-30. Maximum (79%) were educated of which 34% were completed middle class remaining 21% were illiterate. Majority of the study respondent were involving in fishing and labour. 51% of the study respondent belongs to upper middle class (According to modified Prasad's classification 2011)

Table 1: Demographic Profile of Study Population

Characteristics	Gender		Total (%) N = 400
	Male (%) N = 161	Female (%) N = 239	
<b>1. Age</b>			
18 – 30	55 (34.16)	72 (30.13)	127 (31.75)
>30	106 (65.84)	167 (69.87)	273 (68.25)
<b>2. Family Structure</b>			
Nuclear	151 (93.79)	227 (94.98)	378 (94.50)
Joint	10 (6.21)	12 (5.02)	22 (5.50)
<b>3. Educational Status</b>			
Illiterate	21 (13.00)	63 (26.40)	84 (21.00)
Primary	24 (14.90)	40 (16.70)	64 (16.00)
Middle	62 (38.50)	66 (27.60)	128 (32.00)
High school	45 (28.00)	49 (20.50)	94 (23.50)
Higher second	6 (3.70)	17 (7.10)	23 (5.80)
Graduates	3 (1.90%)	4 (1.70)	7 (1.80)
<b>4. Occupation</b>			
home maker	9 (5.80)	162 (69.20)	171 (43.80)
Agriculture	22 (14.10)	11 (4.70)	33 (8.50)
Labour	48 (30.80)	30 (12.80)	78 (20.00)
Fisherman	53 (34.00)	10 (4.30)	63 (16.20)
Service	14 (9.00)	11 (4.70)	25 (6.40)
Business	7 (4.50)	6 (2.60)	13 (3.30)
Retired	8 (1.30)	6 (0.40)	14 (3.50)
Others	11 (6.83)	13 (5.43)	24 (6.00)
<b>5. Socio economic status</b>			
Upper	14 (8.80)	41 (17.20)	55 (13.80)
Upper Middle	85 (53.10)	119 (49.80)	204 (51.10)
Lower Middle	46 (28.80)	56 (23.40)	102 (25.60)
Upper lower	11 (6.90)	22 (9.20)	33 (8.30)
Lower	4 (2.50)	1 (0.40)	5 (1.30)

**Knowledge about Lymphatic Filariasis**

With respect knowledge more than half of the respondent.(53%) heard about lymphatic filariasis, only 35% of the study population knew about mode

of transmission and 34% of the respondent knew about preventive method. More than half of the respondent knew that government had been taken some preventive measure to control curb the disease transmission.

**Table 2. Knowledge about lymphatic filariasis**

Knowledge about lymphatic filariasis	Yes (%)	No (%)
Heard about lymphatic filariasis	212 (53.00)	188(47.00)
Knew about mode of transmission	140 (35.00)	260(65.00)
Knew about mode of prevention	380 (95.00)	20(5.00)
Aware about filariasis elimination programme	200 (50.00)	200(50)
Whether Government was had been taking mosquito control measure?	235 (58.75)	165 (41.25)

**Source of knowledge about mosquitoes**

The majority of the respondent received information from doctors (24%) remaining source were Television(18.75%), Radio(18.5%) and

Relatives(18.25%), news paper(12.75%). Male respondents had been received more knowledge from doctors than others source. Females respondent equally were received information from television, radio and relatives.

**Table 3 Source of Knowledge about mosquitoes**

Source	Male	Female	Total	Chi-Square & p value
Television	10(6.21)	65(27.19)	75(18.75)	80.883
Relatives	23(14.28)	50(20.92)	73(18.25)	
Newspaper	14(8.69)	37(15.48)	51(12.75)	
Radio	27(16.77)	48(20.08)	75(18.75)	
Doctor	72(44.71)	23(9.61)	95(23.75)	
Others	15(9.31)	16(6.69)	31(7.75)	

Among 400 respondents 45.75% of them were using screening mesh for their windows and doors and 71% of them were using mosquito nets for protection from mosquitoes. One third(34%) of the study populations were using mosquito repellents for avoiding mosquito bite. Majority(93%) of the respondents were accepted mass drug administration programme for effective tool for filariasis elimination. With respect to disease control about 96% of the respondents knew that any

one of the methods of prevention of which 30 % of the respondents said that use of spraying insecticide was essential and only 25% of the people said that all measures should be used. Just 2% of the people said that consuming tablets will be of use for prevention. The attitude of the people regarding taking DEC tablets was found to be satisfactory and More than 95% of them willing to take DEC tablets during the next MDA programme.

**Table 4 Attitude and Practices of Lymphatic Filariasis with Respect to Gender**

Practices	Males(%) (n = 161)	Females(%) (n = 239)	Total (n = 400)	Chi-Square (p - value)
<b>Use of screening mesh in windows and doors</b>				
Practices	Males(%) (n = 161)	Females(%) (n = 239)	Total (n = 400)	Chi-Square (p - value)
<b>Use of screening mesh in windows and doors</b>				
Yes	87(54.03)	96(40.16)	183(45.75)	7.456
No	74(45.96)	143(59.83)	217(54.25)	-0.006
<b>Use of Mosquito net</b>				
Yes	119(73.91)	165(69.03)	284(71.00)	1.111
No	42(26.08)	74(30.96)	116(29.00)	-0.291

**Table 4 Attitude and Practices of Lymphatic Filariasis with Respect to Gender (Contd.)**

Practices	Males(%) (n = 161)	Females(%) (n = 239)	Total (n = 400)	Chi-Square (p – value)
<b>Use of Mosquito repellents or coils</b>				
Yes	53(32.91)	83(34.72)	136(34.00)	0.14
No	108(67.08)	156(65.27)	264(66.00)	-0.708
<b>Acceptance of MDA</b>				
Yes	147(91.30)	224(93.72)	371(92.75)	0.837
No	14(8.69)	15(6.27)	29(7.25)	0.36
<b>Attitude towards elimination*</b>				
Personal Protection method	55(34.16)	81(33.89)	136(34.00)	5
Consuming tablets	5(3.10)	4(1.67)	9(2.25)	-0.287
Spraying insecticides	51(31.67)	67(28.03)	118(29.50)	
Environmental measures	10(6.21)	20(8.36)	35(8.75)	
All of the above	35 (21.73)	66(27.61)	101(25.25)	
Don't Know	8(4.96)	22(9.20)	30(7.50)	
<b>Willing to take DEC in next MDA Programme</b>				
Yes	153(95.03)	230(96.23)	383(95.75)	0.342
No	8(4.96)	9(3.76)	17(4.25)	0.558

•\*Multiple options

## DISCUSSION

In this study more than half the respondents heard about lymphatic filariasis and two third (65%) of the study population were not aware about the mode of spread of lymphatic filariasis which was similar to Dorle AS et al<sup>5</sup>. But it was less as compared to the study of Mukopadhaya et al<sup>6</sup> in AP, in which it was found that 65% of the people were aware about the transmission of Lymphatic Filariasis i.e., by the bite of mosquitoes. Patnaik et al also noted that 66% of the respondents knew that Lymphatic Filariasis was caused by mosquito bites, in the East Godavari district of Andhra Pradesh<sup>7</sup>. In the present study, 95% of the study population was aware about any one method of preventive treatment of Lymphatic Filariasis, while the Dore et al found that 70.83% of the study population knew about any one method of prevention<sup>5</sup>. This finding concludes that majority of the study population were not aware about all type prevention and mode of transmission of lymphatic filariasis. In this study, it was found that 50% of the population knew about the MDA programme which was similar to Mukopadhaya et al<sup>7</sup> in A.P. Amarillo ML et al<sup>8</sup> from his study in Philippines, found that the majority (89.1%) of the sampled population claimed to have heard of "mass treatment" or "MDA". Weerasooriya MV et al<sup>9</sup>, from his study in Sri-Lanka, found that 35.2% of the participants from the Colombo municipality were unaware of the MDA programme. Increased awareness in Sri-Lanka population might

be due to people literacy where it was good compared to Pondicherry. In our study 91% of the people accepted Mass drug administration which shows that 91% them knew about MDA and they had taken DEC. Most(95%) of the study respondents agreed that in future they would take DEC for lymphatic filariasis. One fourth (25%) of the study respondents had adequate knowledge regarding control of lymphatic filariasis while three fourth of them had partial knowledge. The most essential knowledge regarding control of breeding sites of mosquito was lacking in the study population.

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# Role of High Tibial Osteotomy in the Management of Osteoarthritis of knee

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## ABSTRACT

**Background:** High tibial osteotomy is an accepted treatment for unicompartmental Osteoarthritis of the knee. Encouraged by the results of this procedure by Various surgeons which is technically simple and considering the Prohibitive cost, sophisticated instrumentation, the technical expertise of Replacement arthroplasties, an attempt has been made to evaluate selection Criteria and the results of high tibial osteotomy in the management of osteoarthritis of knee as a temporary alternative procedure.

**Materials and Method:** Between May 2009 to September 2011, twenty knees in twenty patients Were treated by high tibial osteotomy at out institution.

**Results:** At a mean follow up of 15.9 months (range, 6-24 months) after the operation, the clinical results for 20 knees in 20 patients were analyzed. According to Coventry's criteria the subjective results was good in 17 patients (85%) fair in 2 patients (10%), and poor in 1 patient (5%). Two patients developed superficial wound infection.

**Conclusion:** High tibial osteotomy is a durable time - buying procedure for patients with unicompartmental osteoarthritis of knee and better postoperative care could be carried out by rigid internal fixation with buttress plate and screws. Satisfactory selection criteria are essential for the successful outcome of high tibial osteotomy.

**Keywords:** High Tibial Osteotomy, Osteoarthritis Knee

## INTRODUCTION

The term osteoarthritis and osteoarthrosis are currently used to define an Idiopathic, slowly progressive disease of diarthrodial joints, occurring late in life and characterized pathologically by focal degeneration of articular cartilage sub-chondral bone thickening, marginal osteochondral outgrowths, and joint deformity; clinically by recurring episodes of pain, Synovitis with effusion, stiffness, and progressive limitation of motion; and roentgen graphically by narrowing of the joint interval, increased density and thickening of the subchondral bone, subchondral cyst, and marginal bony excrescences.<sup>[1]</sup>

Knee is the most commonly affected joint. Women are affected more than males. In 90% of cases it is associated with varus deformity.<sup>[2]</sup>

Sir Graham Apley quoted that everyone will get it somewhere if they live long enough.<sup>[3]</sup>

From time immemorial various methods of treatment were adopted by mankind mainly to relieve the symptoms without any attempt at stopping the progress of the disease. Measures like analgesics, heat, walking aids, Intra-articular steroids etc. were used.

But it was Jackson and Waugh who in 1958 first did high tibial osteotomy in patients with varus deformity. It has as its objective, the shift of the gravitational line of weight bearing from an involved to a relatively uninvolved side of the knees.<sup>[4]</sup>

Encouraged by the results of this procedure by various surgeons which is technically simple and considering the prohibitive cost, sophisticated

instrumentation, the technical expertise of replacement arthroplasties, an attempt has been made to evaluate selection criteria and the results of high Tibial osteotomy in the management of osteoarthritis of knee as a temporary alternative procedure.<sup>[5]</sup>

### RESULTS

Twenty knees of 20 patients with primary uni-compartmental osteoarthritis were operated between May 2009 to September 2011.

The following observations were made from the available data.

**Table 1. AGE INCIDENCE**

Age in years	No. of patients	Percentage
31-40	2	10
41-50	4	20
51-60	8	40
61-70	6	30

In the present series, patients in the age group of 35-70 years were Operated. The youngest being 35 years, the oldest being 70 years, the average was 54.55 years.

**Table 2. SEX INCIDENCE**

Sex	No. of patients	Percentage
Male	6	30
Female	14	70

Out of the 20 cases operated, 6 were males and 14 were females. The Incidence being 30% in males and 70% in females, which shows female preponderance.

**Table 3. SIDE OPERATED**

Side	No. of patients	Percentage
Right	8	40
Left	12	60

Out of 20 cases, 8 were right knees and 12 left knees, were operated but Osteoarthritic changes were present in opposite knee in most of the cases.

**Table 4. PAIN**

Degree of pain	No. of patients	Percentage
Severe	14	70
Moderate	6	30
Mild	0	0

Pain is the prime complaint for which patient seek advice; of the 20 cases Operated, 14 patients had severe degree of pain and 6 had moderate pain.

### Synovial Thickening

Out of the 20 cases only 2 patients had mild synovial thickening i.e. In10% of cases, osteoarthritis was associated with mild synovial thickening.

### EFFUSION

Mild effusion was present in 2 patients, i.e., 10% of the cases, had mild effusion in the series.

**Table 5. Prevalence of Varus Deformity**

Varus deformity in degree	No. of patients
1	2
2	9
3	5
4	4

### Postoperative Valgus Achieved

The postoperative valgus alignment ranged from 6-11 degrees with a mean Age of 9.2 degrees.

**Table 6. Results as Per Coventry's Criteria**

Results	No. of patients	Percentage
Good	17	85
Fair	2	10
Poor	1	5

### DISCUSSION

In our series 20 patients were operated. In Coventry series there were 71 cases and 15 were operated bilaterally.<sup>[6]</sup> Majority of our cases were females (70%). Our study is consistent with studies of Coventry<sup>[6]</sup>, Insall,<sup>[7]</sup> Jackson and Waugh<sup>[8]</sup> wherein the majority of cases were females. The youngest patient in our series was 35 years old, age ranging to 70 years with a mean of 54.55 years. Mean age in Coventry's series was 60 years. The criteria for high tibial osteotomy put forward by Coventry, age less than 60 years, is the first criteria, but many authors stated that if the patients fulfill other criteria they can be taken up for surgery. In Insall's<sup>[7]</sup> series the oldest patients was 82 years old. In our series 30% of cases were above 6<sup>th</sup> decade. Rudan and Simruda<sup>[9]</sup> have shown that the results are equally good in patients older than 60 years.

The mean follow up of our series was 15.9 months ranging from 6 months to 24 months. In Coventry series the follow-up was 1 to 9 years.40% cases were operated on the right side and 60% on the left side and none of the patients were operated bilaterally in our series.

Case selection was very strict and none of the cases with lateral compartment involvement were operated. Varus deformity ranged from 1°-4° with a mean of 2.5° Almost 70% of the cases had a varus deformity.

In one case above knee POP cast was applied after fixation with buttress plate and screws where the wedge determination was inaccurate. The period of plaster immobilization was 12 weeks.

The postoperative valgus achieved ranged from 6 to 11 degrees with a mean of 9.2 degrees, 15 knee joints had a valgus more than 8 degrees. Coventry stated that long term results will be good if at least 8 degree of valgus is obtained. In our study 1 patients and valgus less than 8 degrees. Many authors [6],[10],[11],[12],[13],[14],[15],[16] have pointed that adequate postoperative valgus has to be obtained to get good results. Coventry stated that average loss of correction at the end of 10 years would be only 1 degree. There is no relationship between preoperative varus and postoperative valgus. It is the final valgus obtained that matters. This holds good till the cut off of 12 degrees varus.

In all the cases in our study, the pre operative assessment was good and the amount of wedge to be taken was determined preoperatively from weight bearing X-rays.

The results analyzed as per Coventry's criteria were good 17 (85%) Fair 2(10%) and Poor 1(5%) which was more or less similar to Coventry's study.

The mean age of the good cases was 56.82 years, fair 45 years and poor 35 years.

In our series countered buttress T or L plate were used to fix the Osteotomy site which was helpful for early mobilization. All our cases were immobilized in long knee brace except for one cases where above Knee POP cast was applied for 12 week who regained movement at later date. In 1991 Hofmann<sup>17</sup> reported a study comparing conventional high tibial osteotomy with rigid internal fixation and early motion and high tibial osteotomy and cast immobilization. He concluded that the former group had excellent result.

In 1996 Hee et al,<sup>[18]</sup> reported in a retrospective study comparing staple fixation to buttress plate fixation noted that the mean rehabilitation was shorter in the buttress plate group as compared to those fixed with staple.

Pain is the most disabling feature in persons with osteoarthritis of the Knee. The success of the treatment there fore depends on the degree of relief of pain and the considerable improvement in the function.

Out of 20 cases pain was assessed as per Ingemar Invarsson's criteria<sup>[14]</sup>

Where the relief of pain was good in 17 cases (85%) fair in 2 cases (10%) and poor in one case (5%).

In the series reported by Harris<sup>[19]</sup> the results of high tibial osteotomy were assessed on the basis of relief of pain, increase in walking tolerance and the range of movements, results were 26 good, 5 fair and 5 poor. Joseph and Msika<sup>[20]</sup> reviewed 95 knees and found good or excellent results in 63% of the knees in terms of relief of pain.

Kazunori<sup>[21]</sup> reported on 86 high tibial osteotomy in 78 patients and found that the results were satisfactory in 88% of the knees. In our series 17 out of 20 knees could walk more than the preoperative distance and in 3 knees it was unchanged.

Though many theories have been put forward regarding the cause of pain in osteoarthritis of the knee but the real cause is unknown. The appearance of the deformity is related to a sharp increase in pain and to certain x-ray changes of which diminution in the joint space of the corresponding compartment of the knee is most obvious. This suggest a localized atrophy of the articular cartilage to a greater degree than that has already taken place in the remainder of the joint. The relief of pain which follows the correction of the deformity could reasonably be attributed to the change in the line of weight bearing. Wardle,<sup>[22]</sup> Helal,<sup>[23]</sup>

Appley and Brookes<sup>[3]</sup> have confirmed increased venous pressure and State of venous congestion of the upper end of the tibia in an osteoarthritic knee and the tension around the knee joint and by dividing the bone this venous congestion is relieved more-over in the healing of an osteotomy a new bone forms across the medullary canal and so decompression.

There were 2 cases of superficial infection and there were no serious complication like neurological deficit, deep vein thrombosis, non union delayed union etc., as reported in other series of Togerrons WR<sup>[24]</sup> and Gunn.<sup>[25]</sup>

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# A Study on Indications of Thyroid Surgery among the Patients of Hyperthyroid Abnormality Attending General Surgery OPD of ASRAM Hospital, Andhra Pradesh

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## ABSTRACT

**Background:** The burden of thyroid disease in general population is enormous. It is the most common endocrinal disease in India. The history of thyroid surgery dates back thousands of years but the development leading to contemporary era began just over a century. The first thyroid surgery for treatment of goiter was done by Rogerfrugardi in 1170. Turning point for thyroid surgery came at the end of nineteenth century when Kocher developed innovative operative techniques. He was awarded Nobel Prize in the year 1909. Because of his operative techniques mortality declined to 1%.

**Objectives:** 1. To know the different indications for thyroid surgery. 2. To know the out come and complications of thyroid surgery. 3. To find the demographic variables in the hyperthyroid patients.

**Methodology:** The present Hospital based cohort study was conducted at Alluri Sita Rama Raju Academy of Medical Sciences, Eluru with the help of Community Medicine staff and General Surgery staff during the period from February 2010 to August 2010. A total of 33 hyperthyroid population was gathered and were interviewed with pre structured questionnaire and using stratified random sampling method. Data was analyzed with SPSS 17.0 version and necessary statistical tests like percentages were applied.

**Results:** In the study group, out of 33 hyperthyroid patients, about 39.4% were from adenoma thyroid condition, 21.2% were unilateral goitre, 15.2% were from bilateral multinodular, 15.2% were from cystic nodule, 6% were from cystic adenoma and lastly 3% were from follicular variety. About 87.8% were females and 12.2% were males. Nearly 18.2% were below 18 years age, 69.6% were in the age group of 19-49 years and lastly 12.2% were in the age group of more than 50 years of age. 90.9% were from below poverty line economic status and 9.1% were from above poverty line economic status. About 45.4% were underwent subtotal thyroidectomy, 39.4% were underwent hemi thyroidectomy and only 15.2% were underwent total thyroidectomy for various hyperthyroid indications. Post operatively nobody developed significant complications.

**Conclusions:** Based on the above results, even hyperthyroid condition was more common in females and peak incidence between 19-49 yrs of age group. Before thyroid surgery all the hyperthyroid patients were brought to euthyroid condition and within 10 days after surgery again thyroid profile was checked. Of which, majority were euthyroid condition with thyroxin hormone, less proportion were with hypothyroid condition and hyperthyroid condition. Nobody developed common complication of recurrent laryngeal nerve paralysis and thyroid storm complications etc. Again after 6 months following surgery, thyroid profile to be checked and to be followed.

**Keywords:** Age, Sex, Hyperthyroid condition, Type of Surgery, Thyroid status after surgery

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## INTRODUCTION

The thyroid gland is situated in the neck region and consists of two lateral lobes, one on each side of the trachea immediately below the larynx. Three hormones are produced and released into the blood, Tri-

iodothyronine (T3), Thyroxine (T4), Calcitonin (CT). The T3 and T4 increase metabolic rate in most cells by stimulating oxidative process. Hormones are essential for normal physical growth, sexual maturation and mental development. Production and release of thyroid hormones are controlled by thyroid stimulating hormone (TSH) secreted by anterior pituitary.

Hyperthyroidism may be asymptomatic, but when it is not, symptoms are due to an excess of thyroid hormone. Thyroid hormone is important at a cellular level, affecting nearly every type of tissue in the body. Thyroid hormone functions as a controller of the pace of all of the processes in the body. This pace is called the metabolic rate <sup>(1)</sup>.

If there is too much thyroid hormone, every function of the body tends to speed up. Therefore, some of the symptoms of hyperthyroidism are nervousness, irritability, increased perspiration, heart racing, hand tremors, anxiety, difficulty sleeping, thinning of the skin, fine brittle hair, and muscular weakness especially in the upper arms and thighs. More frequent bowel movements may occur, but diarrhea is uncommon. Weight loss, sometimes significant, may occur despite a good appetite, vomiting may occur, and, for women, menstrual flow may lighten and menstrual periods may occur less often. <sup>(1)</sup> Thyroid hormone is critical to normal function of cells. In excess, it both over stimulates metabolism and exacerbates the effect of the sympathetic nervous system, causing "speeding up" of various body systems and symptoms resembling an overdose of epinephrine (adrenaline).

## OBJECTIVES

- To know different indications for thyroid surgery among hyperthyroid patients.
- To know the out come and complications of thyroid surgery.
- To find the demographic variables in the hyperthyroid patients

## METHODOLOGY

**Methodology:** The present Hospital based cohort study was conducted at Alluri Sita Rama Raju Academy of Medical Sciences, Eluru with the help of Community Medicine staff and General Surgery staff during the period from February 2010 to August 2010. A total of 33 hyperthyroid population was identified and were interviewed with pre structured questionnaire and using stratified random sampling method. Data was collected from the patients. These patients were followed right from the outpatient department to the actual arrival of the treatment and towards confirmation of the diagnosis by the experts from our college Pathology Department. Fine needle aspiration biopsy has become the single most important test in the evaluation of patients with thyroid masses and can be performed with or without ultrasound guidance. A 23 gauge needle is inserted into the thyroid mass, and several passes are made while aspirating the syringe. A sample of aspirate is also placed in a 90% alcohol solution for cytospin or cell pellet. The slides are stained by papanicolaou (PAP) or wright's stain and examined under microscope. Final diagnosis was made only after discussion with Surgeon and pathologist reports. Data was analyzed with SPSS 17.0 version and necessary statistical tests like percentages were applied.

## RESULTS

**Table 1: Different Indications of Hyperthyroid Conditions in relation to Age Distribution:**

Indications	Age <18 Years	19 - 49 Years	50 & above	Total
Bilateral multinodular Goitre	0 (0%)	4(80%)	1(20%)	5(15.2%)
Adenoma thyroid	2(15.38%)	8(61.53%)	3(23.07%)	13(39.4%)
Unilateral goitre	0 (0%)	7(100%)	0 (0%)	7(21.2%)
Cystic adenoma	1(50%)	1(50%)	0 (0%)	2(6.0%)
Cystic nodule	3(60%)	2(40%)	0 (0%)	5(15.2%)
Follicular or meduallary hyper thyroid	0 (0%)	1(100%)	0 (0%)	1(3.0%)
Total	6(18.18%)	23(69.69%)	4(12.12%)	33(100%)

Table 1 reveals that nearly 18.2% were below 18 years age, 69.6% were in the age group of 19-49 years

and lastly 12.2% were in the age group of more than 50 years of age.

**Table 2: Different Indications of Hyperthyroid Conditions in relation to Sex-wise Distribution:**

Indications	SEX		Total
	Male	Female	
Bilateral multinodular goitre	1(20%)	4(80%)	5 (15.2%)
Adenoma thyroid	1(7.69%)	12(92.3%)	13 (39.4%)
Unilateral goitre	2(28.6%)	5(71.4%)	7 (21.2%)
Cystic adenoma	0 (0%)	2(100%)	2 (6.0%)
Cystic nodule	0 (0%)	5(100%)	5 (15.2%)
Follicular/medullary hyperthyroid	0 (0%)	1(100%)	1 (3.0%)
Total	4(12.13%)	29(87.87%)	33 (100%)

Table-2 reveals that 87.8% females were having hyperthyroid status and only 12.2% males were having hyperthyroid condition. Majority of females were

presenting Adenoma Thyroid condition, unilateral goiter followed by bilateral multinodular goiter.

**Table 3: Different Indications of Hyperthyroid Conditions versus Socio-economic Conditions**

INDICATIONS	SES -APL	SES -BPL	TOTAL
Bilateral multinodular goitre	2(40%)	3(60%)	5 (15.2%)
Adenoma thyroid	0 (0%)	13(100%)	13 (39.4%)
Unilateral goitre	0 (0%)	7(100%)	7 (21.2%)
Cystic adenoma	0 (0%)	2(100%)	2 (6.0%)
Cystic nodule	0 (0%)	5(100%)	5 (15.2%)
Follicular/medullary hyperthyroid	1(100%)	0 (0%)	1 (3.0%)
TOTAL	3(9.09%)	30(90.90%)	33 (100%)

Table 3 depicts that about 90.90% were from below poverty line Socio economic status. Of which, 39.4% were presented with Adenoma Thyroid, 15.2% were

presented with cystic nodule and only (1/33) 3% were presented with Medullary Hyperthyroid condition.

**Table 4: Different Indications of Hyperthyroid Conditions versus type of Surgery**

Indications	Total Thyroidectomy	Sub total Thyroidectomy	Hemi Thyroidectomy	Total
Bilateral multinodular goitre	3(60%)	2(40%)	0 (0%)	5 (15.2%)
Adenoma thyroid	1(7.69%)	12(92.3%)	0 (0%)	13 (39.4%)
Unilateral goitre	0 (0%)	0 (0%)	7(100%)	7 (21.2%)
Cystic adenoma	0 (0%)	1(50%)	1(50%)	2 (6.0%)
Cystic nodule	0 (0%)	0 (0%)	5(100%)	5 (15.2%)
Follicular/medullary hyperthyroid	1(100%)	0 (0%)	0 (0%)	1 (3.0%)
Total	5(15.15%)	15(45.45%)	13(39.4%)	33 (100%)

Table 4 reveals that 15% of cases total thyroidectomy done, 45% of cases underwent subtotal

thyroidectomy and 39.4% of cases underwent hemi thyroidectomy.

**Table 5: Post Operative thyroid status in relation to type of Surgery**

After Surgery Thyroid Status	Total Thyroidectomy	Subtotal Thyroidectomy	Hemi Thyroidectomy	Total
Hypothyroid	2 (100%)	0 (0%)	0 (0%)	2 (6%)
Hyperthyroid	0 (0%)	0 (0%)	1 (100%)	1 (3%)
Euthyroid	3 (10%)	15 (50%)	12 (40%)	30 (90.9%)
Total	5 (15.15%)	15 (45.45%)	13(39.39%)	33 (100%)

Table 5 reveals that about 90.9% were in the euthyroid status after surgery, 6% were in the

hypothyroid status and 3% were in the hyperthyroid condition.

## DISCUSSION

The present Hospital based cohort study was conducted at Alluri Sita Rama Raju Academy of Medical Sciences, Eluru at the out patient department of General Surgery during the period from February 2010 to August 2010. Initially taken all the demographic information of the patients, clinical symptoms and other parameters. Later patient is subjected to the necessary lab investigations like thyroid profile and fine needle aspiration cytology and biopsy. Finally confirmed the diagnosis and planned for required surgery. In the present study revealed that 18.2% were below 18 years age, 69.6% were in the age group of 19-49 years and lastly 12.2% were in the age group of more than 50 years of age. Same finding was observed with different thyroid related journals <sup>(2,3)</sup>.

The present study highlighted about that 87.8% females were having hyperthyroid status and only 12.2% males were having hyperthyroid condition. Majority of females were presenting Adenoma Thyroid condition which accounts 39.4%, unilateral goiter accounts 21.2%, bilateral multinodular goiter 15.2%, cystic nodule also 15.2% and lastly follicular/medullary hyperthyroid was 3% only. Our study was correlated with many studies done different parts of the world namely Andersen S, Pedersen KM, Bruun NH & Laurberg P study done in Journal Clinical Endocrinology of Metabolism 2002 <sup>(6)</sup>.

In the present study revealed that about 90.90% were from below poverty line Socio economic status. Of which, 39.4% were presented with Adenoma Thyroid, 15.2% were presented with cystic nodule and only (1/33) 3% were presented with Medullary Hyperthyroid condition. Low socioeconomic status people not interested to continue the medication for long time, cost factor and adherence of drug therapy, estimation thyroid profile frequently and people demanded for permanent surgical solution and to avoid frequent hospital visits and to prevent daily wages. Hence, finally surgeon decided to take-up surgery to curtail the burden. Hence, majority of low socioeconomic people underwent surgery <sup>(9)</sup>.

In the present study highlighted about that 15% of cases total thyroidectomy done, 45% of cases underwent subtotal thyroidectomy and 39.4% of cases underwent hemi thyroidectomy based on different indications of hyperthyroid conditions. After surgery majority of people 90.9% were in the euthyroid status

after surgery, 6% were in the Hypothyroid status and 3% were in the hyperthyroid condition. After discharge from the hospital, for 1 month follow-up is required regarding wound status. Once everything is settled, these candidates were advised them to visit the hospital once in 6 months to know their thyroid status post operatively.

## CONCLUSIONS

Based on the above results, even hyperthyroid condition was more common in females and peak incidence between 19-49 years of age. After thyroid surgery, majority of them about 90.9% were euthyroid with thyroxine hormone, 6.1% hypo thyroid, 3% were hyper thyroid condition. Nobody developed common complication of recurrent laryngeal nerve palsy. Hence, thyroid screening must be done from the Puberty age onwards especially in females.

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# Tuberculosis of Sternoclavicular Joint- A Report of 2 Cases

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## ABSTRACT

Sternoclavicular joint tuberculosis is very rare of all types of skeletal tuberculosis, hence it is likely to be missed most of the times and a high index of suspicion is required to diagnose it. If it is diagnosed in early stages then it can be managed conservatively with antitubercular drugs and surgery reserved only for advanced cases. Here we report two of such kind cases which were diagnosed with non invasive or semi invasive techniques and successfully treated with antitubercular drugs alone.

**Keywords:** Tuberculosis, Sternoclavicular Joint

## INTRODUCTION

Tuberculosis is a common entity in developing countries like India even today. Apart from pulmonary tuberculosis, the extra pulmonary skeletal tuberculosis is being seen more and more commonly these days. There is much less attention to tuberculosis affecting central joints like sternoclavicular joints compared to tuberculosis of spine, knees and hips, which are more commonly affected. So here we report two of such cases which were diagnosed with the help of modern imaging and were treated conservatively.

### Case 1

A 62 yr old lady came with history of pain in the right side of upper chest since 2 months, insidious in onset and gradually progressive; there was no history of fever, weight loss, and no loss of appetite. Minimal swelling was present on the right sternoclavicular joint; the joint was warm and tender. Her shoulder movements were full range but were painful. Blood counts showed ESR 30mm 1<sup>st</sup> hr, Total counts 9000, and lymphocytes 34%. Rest all tests were normal. Chest X ray showed normal lungs. As the patient was not willing for biopsy, we advised an MRI scan which showed the presence of effusion and signs of infective arthritis in right sternoclavicular joint. Montoux test was positive. She was however started with antitubercular drugs for 9 months and within the first two months of intensive phase she became symptom free except minimal pain persisting at sternoclavicular joint.



Fig. 1. MRI of right sternoclavicular joint



Fig. 2. Clinical picture of case 1 with diffuse swelling

Showing features of tuberculosis on right sternoclavicular joint

**Case 2:** A young lady aged about 16 yrs, came with complaints of swelling of right sternoclavicular joint since 7 months. She gave no history of loss of weight, fever or loss of appetite. She was thinly built and was pale. Local examination revealed a diffuse swelling over the right sternoclavicular joint and there was local warmth. Joint was very tender and movements were painful but full range. Investigations revealed, Hb 8 gm%, ESR 40 mm 1<sup>st</sup> hr, TC 8000, lymphocytes 40%. Chest X ray was normal and this patient was not affording an MRI. Montoux test was positive and aspirate from the sternoclavicular joint revealed presence of granulomas. After noting normal Liver function tests this patient was started with the antitubercular drugs. Except occasional pain and discomfort at the joint now she is completely free of symptoms after completion of antitubercular drug course.

As it is stated that biopsy is not necessary in presence of clinical and radiological findings suggestive of tuberculosis in areas where tuberculosis is highly prevalent, we did not do insist for an open biopsy in both of our cases.<sup>1</sup>

## DISCUSSION

Skeletal tuberculosis often presents as gradually deteriorating joint disease with or without cold abscess. Pulmonary symptoms are often not found and septic arthritis and other polyarthritis are to be considered as differential diagnosis. In our cases the joints did not show much swelling but affected part was warm and tender. The shoulder movements were painful terminally only. Because of prevalence of tuberculosis in our region and a low grade chronic course made us be suspicious of tuberculosis. In osteoarticular tuberculosis source of infection is usually hematogenous from lungs, or other viscera.<sup>2</sup> or even a contiguous spread from lungs to sternoclavicular joints.<sup>3, 4, 5</sup> But most often we don't find any evidence of pulmonary or any other visceral focus of disease. So in our cases also other investigations did not reveal any presence of primary foci. As described by Tadashi et al<sup>6</sup> our cases presented

only with the pain and no or minimal associated swelling in the sternoclavicular area. So a high index of suspicion is necessary to diagnose tuberculosis in this region.

Routine x rays are not of much help as many structures overlap in this part unless the disease advanced enough to produce an obvious cold abscess or massive destruction. Hence early detection lies with MRI, CT or a Bone Scan. In our cases the MRI showed definite collection at Sternoclavicular joint and also showed marginal erosions. The differential diagnosis can be Teitze's syndrome, RA, septic arthritis, osteoarthritis. But clinical and MRI findings together helped us diagnose this as tuberculosis.

Advanced tuberculosis at sternoclavicular joint needs to be treated with surgical debridement under antitubercular drugs coverage but in our cases as the disease was diagnosed early at the stage of synovitis patients were treated with only antitubercular drugs.<sup>7, 8</sup> within a period of 2 months patients improved dramatically and were symptom free. Patients are being followed up for any recurrence.

## CONCLUSION

Tuberculosis of sternoclavicular joint is very rare so is often not suspected but high index of suspicion and early treatment with drugs reduces the morbidity. Even though non invasive investigations might not help many a times as they are non specific, aspiration and finding of granulomas is the key for diagnosis and early institution of treatment.

**Conflicts of Interest:** There are no conflicts of interest

**Support:** This case study did not receive any kind of support

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# A Study of Short Term Yoga Training effect on Respiratory Endurance and Muscle Strength in Elderly Individuals

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## ABSTRACT

**Objectives:** Yoga has sound scientific basis and an ideal tool for improving health of our masses. There is evidence that the practice of yoga improves physical and mental performance. Although there are a number of reports on the effect of yoga, very few studies have been undertaken on the effect of yoga training on respiratory endurance and muscle strength in elderly individuals. Hence, the present study was undertaken to study the effect of yoga training on maximum expiratory pressure (MEP), 40 mmHg endurance test, breath holding time after expiration (BHTexp), breath holding time after inspiration (BHTinsp), and hand grip strength (HGS).

**Materials and Method:** An interventional study involving twenty four apparently healthy male elderly individuals, of average age of 62.5years, underwent two weeks of yoga training and the mean values of parameters were compared before and after yoga training.

**Results:** There was a significant ( $P < 0.05$ ) increase in MEP from 83.16  $\pm$  8.06 to 100.24  $\pm$  9.35 mmHg, 40 mmHg test and HGS increased significantly ( $P = 0.000$ ) from 22.37  $\pm$  6.21 to 28.91  $\pm$  5.40 s and 25.51  $\pm$  3.56 to 29.87  $\pm$  4.39 kg respectively. BHTexp increased from 29.54  $\pm$  4.36 to 37.41  $\pm$  3.45s ( $P = 0.000$ ) and BHTinsp increased from 35.53  $\pm$  4.27 to 44.73  $\pm$  3.78 s ( $P = 0.000$ ). Our results show that yoga practice for 2 weeks results in significant increase in respiratory pressures, BHT and HGS.

**Conclusions:** Our study shows that short term yoga training improves the respiratory pressures and muscle strength in elderly individuals.

**Keywords:** Yoga, Elderly individuals, Maximal Expiratory Pressure, Breath Holding Time, Hand Grip Test

## INTRODUCTION

The science and art of yoga has for millennia guided man in his search for truth.

Yogic lifestyle, yogic diet, yogic attitudes and various yogic practices help man to strengthen his body and mind and develop positive health.

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Many studies have shown that yoga has a sound scientific basis and is an ideal tool for improving the health of our masses.

Physical performance of an individual depends upon strength and endurance of both locomotive muscles (LM) and ventilatory muscles (VM). Respiratory pressures i.e. maximum expiratory pressure (MEP), maximum inspiratory pressure (MIP), Breath holding time and 40mmHg endurance test measure the strength and endurance of respiratory muscles<sup>5</sup>. These are non-invasive methods to assess respiratory muscle performance.

There are several studies showing the effect of yoga training on ventilatory functions like forced expiratory volume (FEV), forced expiratory volume in 1<sup>st</sup> second (FEV1) and peak expiratory flow rate (PEFR) <sup>1, 2, 3, 4</sup>. However, very few studies shown the effect of yoga training on respiratory endurance and muscle strength.<sup>6</sup>

Handgrip dynamometry is an indicator of muscle function and nutritional status. As an objective and accurate physiological test that is easy to perform, it can be used as a bedside test to predict preoperative nutritional status and postoperative complications. Few works showed significant increase in handgrip strength (HGS) after yoga training.<sup>7, 8, 9, 10</sup>

Since most of the studies on the effect of yoga training on pulmonary functions have been conducted on younger individuals, the present study was carried out on elder individuals of age (above 60 yrs) group.

However, to put yoga on a firm scientific pedestal and popularize it among the general public and elderly in particular, we planned to undertake a systematic study on the effect of yogic techniques on physiological functions. The aims and objectives of the present study were:

- i) To study the effect of 2 weeks yoga training on maximum expiratory pressure (MEP in mmHg), 40 mmHg endurance test (in seconds), breath holding time after expiration (BHTexp in seconds) and breath holding time after inspiration (BHTinsp in seconds) in elderly individuals of Bijapur.
- ii) To study the effect of 2 weeks yoga training on hand grip strength (HGS in Kg) in elderly individuals of Bijapur.
- iii) To popularize yoga (knowledge and practice) among elderly individuals of Bijapur.

## MATERIALS AND METHOD

The study was conducted on 24 elderly (>60 years) apparently healthy subjects who attended the two week yoga camp organized and conducted by an expert instructor. All the subjects had never undergone any kind of yoga trainings earlier.

Institutional ethical committee clearance was obtained. Informed consent was obtained from all the participants.

Subjects with cardiorespiratory diseases, hypertension, diabetes mellitus, h/o having suffered from tuberculosis, asthma, undergone major surgery in the recent past, athletes and those who are practicing yoga since long term were excluded from the study.

The yoga camp was conducted between 5.30 am to 7.30 am daily for two weeks.

### The yoga practice schedule consisted of

1. Prayer - 5 min.
2. Asanas – 25 min.
3. Pranayama - 25 min.
4. Meditation – 30 min.
5. Lecture on fundamentals in nutrition, stress management, meditation and yogic attitude in daily life - 30 min.
6. Prayer - 5 min.

All the parameters were recorded in the departmental laboratory between 8 to 10 am. Recordings were made before yoga training and after completion of 2 weeks yoga training.

Anthropometric parameters like height and weight of each subject was recorded. BSA was calculated by using Dubois nomogram. BMI was calculated by using Quetelet index. Maximum expiratory pressure (MEP in mmHg) was recorded by Modified Black's apparatus (Inco, Ambala, India), 40mmHg Endurance Test recorded using mercury sphygmomanometer (Diamond), Breath Holding Time and Hand grip strength by Handgrip dynamometry were recorded in each subject.

**Statistical Analysis:** Statistical analysis was done using SPSS version 9.0. All values are presented as Mean  $\pm$  Standard Deviation. Comparison of mean values of parameters before and after yoga training was done by using student's 't' test. p Value <0.05 is considered as significant.

## OBSERVATION &amp; RESULTS

Table 1. Baseline characteristics of subjects.

Parameters	participants (n=24)
Age(yrs)	62.5±1.5
Weight(kg)	67.91±10.56
Height(cm)	162.5±6.87
BSA(m <sup>2</sup> )	1.73±0.15
BMI(kg/m <sup>2</sup> )	25.5±3.21
Respiratory Rate (cpm)	19.0± 1.31
Pulse Rate (bpm)	78.5± 3.23
SBP(mmHg)	128± 17.86
DBP(mmHg)	88.8 ± 9.72

Values expressed as (mean ± SD). Cpm: cycles per minute,

Bpm: beats per minute, SBP: Systolic blood pressure,

DBP: Diastolic blood pressure.

Table 2. Comparison of parameters in elderly individuals before and after 2 weeks of yoga training. (mean±SD)

Parameters	Participants (n=24)		p value
	Before	After	
MEP (mmHg)	83.16 ±8.06	100.24 ±9.35	0.000***
40 mm Hg Endurance test (secs)	22.37±6.21	28.91 ±5.40	0.000***
BHTexp (secs)	29.54 ±4.36	37.41±3.45	0.000***
BHTinsp (secs)	35.53±4.27	44.73 ±3.78	0.000***
HGS(kg)	25.51 ±3.56	37.41 ±3.45	0.000***

Table 2 Values expressed are (mean ± SD), \*p<0.05 significant, \*\*p<0.01 highly significant,

\*\*\*p<0.001 very highly significant. MEP: maximum expiratory pressure, BHTexp: Breath

Holding Time after expiration, BHTinsp: Breath Holding Time after inspiration and HGS: hand Grip strength

Table 2 shows significant (p=0.000) increase in MEP (mmHg) 40 mm Hg Endurance test (secs) BHTexp (secs) BHTinsp (secs) and HGS (kg).

## DISCUSSION

The results of our study demonstrate the beneficial effects of short term yoga practice on maximum expiratory pressure (MEP), 40 mmHg endurance test, breath holding time after expiration (BHTexp), breath holding time after inspiration (BHTinsp), and hand grip strength (HGS).

Our study showed significant (p < 0.05) increase in MEP following two weeks of yoga training. Our results do agree with study done by Madanmohan et al <sup>11</sup>. The increase in MEP in our yoga group indicates that yoga training improves the strength of the respiratory

muscles. Respiratory muscles are vital and evaluation of their performance is important. Respiratory pressures are specific and sensitive indices of respiratory muscle strength and they are easy to measure and reproducible. Black and Hyatt <sup>6</sup> have demonstrated that their values are altered before there is alteration in other commonly used pulmonary function tests. Hence, evaluation of respiratory muscle strength is important from physiological as well as clinical point of view.

In our study there was a significant (p = 0.000) increase in the BHT after short term yoga practice. Improvement in BHT may be due to practice of yoga which makes stretch receptors to withstand more stretching. Also the sensitivity of the respiratory center to carbon dioxide is reduced. Hence respiratory center can withstand higher carbon dioxide concentrations in the alveoli and the blood. With training subject can exercise voluntary control on the respiratory muscles overriding the excitatory stimuli to respiratory centers. In addition there is gradual acclimatization of receptors to the increased concentrations of carbon dioxide <sup>12</sup>. Similar findings were observed in other studies<sup>13, 14</sup>.

There was significant (p = 0.000) increase in the 40 mmHg endurance indicating increase in respiratory muscle endurance <sup>15</sup>.

Thus by improving the strength and endurance of respiratory muscles through yoga, onset of respiratory muscles fatigue could be delayed, which could then led to improvement of physical performance <sup>5,14, 16 17</sup>.

Our study also showed significant (p = 0.000) increase in HGS after short term yoga training. This is consistent with our earlier finding that yoga training produces a significant increase in HGS <sup>9</sup>.

The results of our study demonstrate that short term yoga has beneficial on MEP, BHT, 40 mmHg Endurance test and HGS in elderly individuals, thus improving the strength and endurance of both locomotive and ventilatory muscles. With aging there is gradual reduction in pulmonary functions hence yoga can be used as an important tool in retarding the aging effects and to improve the pulmonary functions in elderly.

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# A Study of Morbidity Pattern of Under Fives and Health Seeking Behavior of their Parents in a Coastal Region of Pondicherry, South India

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## ABSTRACT

**Background:** Childhood morbidity and mortality rates are high in India as compared to other Asian countries. These health indicator rates vary between states and are dependent on prevailing socio-cultural factors and the health care delivery system; also both have a bearing on the health seeking behavior of community. We studied the morbidity pattern of under-fives, health seeking behavior of their parents.

**Material and Method:** A cross sectional study was carried out in Peri urban areas of Pondicherry. Systematic random sampling was used for selection of study population. 613 parents of under-five children were interviewed by using a pretested validated questionnaire. Data Entry and Analysis was done using SPSS 16.0.

**Result:** Most 606(98.9%) of the under-five children experienced at least one or more health problems three months prior to the study, among which 97.6% of the under-five children were taken to health facilities. Out of 97.6% under-five children who visited health facilities only 26% of them were taken within 24 hrs. Majority (80.4%) of the them had respiratory illness followed by fever (53%), Protein Energy Malnutrition (40.9%) and diarrhea (21.1%). About 60% of under- five children were taken to private health facilities and remaining 40% were taken to government health facilities.

**Keywords:** Health Seeking Behavior, Under- Five, Morbidity Pattern Of Under Five

## INTRODUCTION

Every year about 9.7 million children die globally before they reach their fifth birthday of which India contributes 2.1 million deaths. Majority of these deaths occur during infancy and neonatal period. Seven out of 10 deaths are due to acute infections i.e., pneumonia, diarrhoea, measles, malaria or malnutrition, and often a combination of these illnesses. The important causes of neonatal mortality in India are low birth weight (LBW), birth asphyxia, infections and hypothermia. In older children infections and nutritional diseases are more prevalent.<sup>1,2</sup>

There is wide variation in infant mortality (IMR) in different states of India. As per SRS -2011, Goa, Kerala, have low IMRs in the range of 10-13/1000 live births but in Madhya Pradesh and Orissa, IMR is high

and is above 62/1000 live births<sup>3</sup>. This variation could be because of varying socio economic status, illiteracy level and health seeking behavior of the community among different states. The capacity of the existing health systems to provide preventive, curative and referral services also differs across various states in India.

According to NFHS-III survey, 7 out of 10 children who had fever and 2 out of 3 children who had upper respiratory infection were taken to a health facility. Advice or treatment was sought from a health provider for 6 out of 10 children who had diarrhoea. The use of ORS to treat diarrhoea has not increased in urban or rural areas in the seven years between NFHS-2 and NFHS-3<sup>2</sup>. The present study is therefore to explore morbidity pattern and their treatment seeking practices

for children 0- 5 years of age. These will help in reducing the gaps between health system and community.

## MATERIALS AND METHOD

Community based cross sectional study was undertaken over a period of one month (February-2012) in a coastal area of Pondicherry. The northern coastal area of Pondicherry UT population was about 50500. The following regions were included in the study i.e., Pillaichavady, periamudalaiyarchavady, periamudalaiyarchavady Kalapet, Chennakalpet, Kottakuppam, Chinna Kottakuppam and Boomiyar palayam Sample size was calculated based on assumption that ARI prevalence in under five children was 50% in preceding last three months. Other parameters were:- precision of 10%,  $\alpha$  at 5%, and 95% confidence interval. Required sample size was 400 however we studied 613 families and their under five children. Study participants are parents of Under fives and their children. One children was randomly selected if the families having more than one children. The parents who were permanent residents for at least one year and willing to participate in current study were included in the study. Sampling frame was made with help of Anganwadi workers and auxiliary nurse midwife. Systematic random sampling method was used to select the study population. 613 under-five children and their parents were studied by using a pretested and pre designed questionnaire. If any of the parents and their children were not available during the first visit, revisit was done. An informed consent was taken verbally from all parents of under five children willing to participate in the current study. Data was collected by trained post graduate students, interns, final year MBBS students. Before data collection two days workshops were given to all interviewers. Data entry was made with Microsoft excel and Data analysis was done using SPSS 16.0.

Socio-economic classification was done by using Modified BG Prasad classification based on Consumer Price Index –Oct 2011.  $\chi^2$  test was used assess the association between two proportions.

**Definition: Appropriate time:** Any child taken to health facility within 12 hrs of development of illness.

**Primary delay:** if any child not taken to health facility when within 12-24 hrs of development of illness.

**Secondary delay:** if any child not taken to health facility more than 24 hrs of development of illness

## RESULT

### Socio Demographic Characteristics of Under-Five Children

Out of 613 under-five children majority (73.2%) belonged to 0-36months and their social status were 54.8% belonged to the upper middle class, 27.4 % belonged to lower middle class, lower class (9.9%) and 7.8% belonged to upper class. Most (81.7%) of the mothers were in the age group of 21-30 years and majority were Muslims (54.5%) and Hindus (44.4%). Most (93%) of the mothers were literate. About 94% of the mothers were home-makers. Majority (73%) of them lived in Pucca houses, most (96%) of them received safe drinking water and 84% of the household had sanitary latrine facilities.

### Seeking appropriate timely care

We found that there was statistical significant association between reaching health facilities at the appropriate time versus socio economic status, religion, maternal education and occupation, availability of vehicle at home, whereas remaining factors had no significant association. No gender disparity was found with respect to seeking health care. (table-1)

Table 1: Socio demographic characteristic versus seeking appropriate timely care

Demographic Factors	n=613 N(%)	Appropriate time N(%)	Delayed N(%)	P value
<b>Age distribution of children</b>				
0-12	133(21.7)	44(33.1)	89(66.9)	0.19
13-24	151(24.6)	36(23.8)	115(76.2)	
25-36	165(26.9)	47(28.5)	118(71.5)	
37-48	86(14)	26(30.2)	60(69.8)	
49-60	78(12.7)	21(26.9)	57(73.1)	

**Table 1: Socio demographic characteristic versus seeking appropriate timely care (Contd.)**

Demographic Factors	n=613 N(%)	Appropriate time N(%)	Delayed N(%)	P value
<b>Gender</b>				
Male	299(48.7)	82(27.4)	217(72.6)	0.33
Female	314(51.3)	92(29.3)	222(70.7)	
<b>Socio economic Status</b>				
Upper class	48(7.8)	24(50)	24(50)	0.04
Upper middle	336(54.8)	92(27.4)	244(72.6)	
Lower middle	168(27.4)	41(24.4)	127(75.6)	
Upper lower	34(5.5)	10(29.41)	24(70.59)	
Lower class	27(4.4)	8(24.6)	19(70.4)	
<b>Age group of mothers</b>				
15 – 20	33(5.40)	24(72.73)	9(27.27)	0.54
21 – 25	282 (46.00)	194(68.80)	88(31.20)	
26 – 30	219(35.72)	168(76.72)	51(23.28)	
>30	79 (12.88)	53(67.1)	26(32.9)	
<b>Religion</b>				
Hindu	272(44.4)	68(25)	204(75)	0.03
Muslim	334 (54.5)	103(30.8)	231(69.2)	
Christian	7(1.1)	3(42.9)	4(57.1)	
<b>Education of mother</b>				
Illiterate	43(7.1)	5(11.63)	38(88.37)	0.032
Less educated	472(76.9)	138(29.24)	334(70.76)	
Well educated	98(15.9)	32(32.6)	66(67.3)	
<b>Occupation of mother</b>				
House Maker	574(93.6)	169(29.4)	405(70.6)	0.02
Others	39(6.4)	5(12.8)	34(87.2)	
<b>Vehicle possession</b>				
No	104(16.9)	19(18.3)	85(81.7)	0.01
Yes	509(83)	155(30.5)	354(69.5)	

P value <0.05 considered as statistically significant

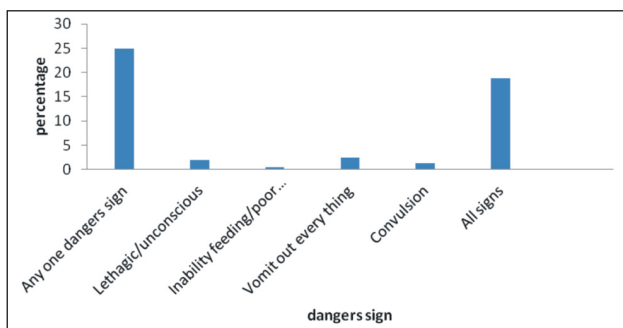
**Treatment Seeking practices and morbidity pattern of parents of under five-children in a Coastal Region of Puducherry.**

It was noted that majority 606(98.9%) of the under-five children had at least one health problem preceding last three months period. Out of 606 children 98.6% were taken to health facility and remaining 2.4% children were not taken to health facility. The reason for not taking to health facility was that the parents thought the condition was not serious (2.4%) 6 parents told that there was nobody to accompany them, 2 parents told that they were not satisfied with treatment, 2 said that there was nobody at home, and 2 followed homemade remedies and there was nobody at home to look after the other children at home. With respect to the morbidity pattern of under-five children, most (80.4%) of them had respiratory illness followed by fever(53.5%), Protein Energy Malnutrition (40.9%) and

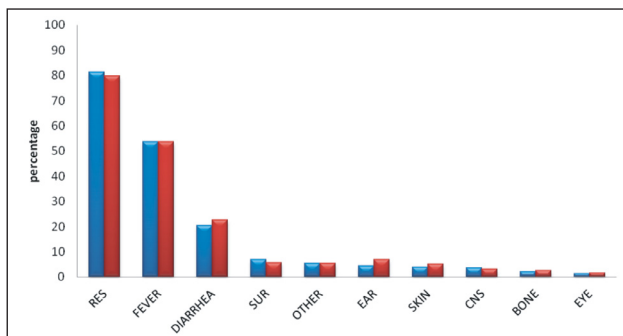
diarrhea (21%) while remaining 25.7% had other morbidities which included (surgical trauma, ear, nose, throat, ophthalmic, dermatologic conditions..) Out of those who had illness, majority 598(97.6%) of them were taken to any one type of health facilities. Among those under- five children who visited health facilities only 26% of the children reached health facilities in appropriate time, 23.6% of under-five children had primary delay and remaining 50% children had secondary delay. About 63% of children were taken to private health facilities and 37.2% of children were taken to District Hospitals. Only 9.6% of children were taken to PHC&CHC. Knowledge about general danger signs of under-five children were very poor among the parents of under- five children, only 25% of the caregivers knew about any one of the general danger signs like, lethargy or unconsciousness, vomiting out everything, convulsions, poor feeding.(table-2,3, figure-1,2)

**Table 2: Treatment Seeking Practices of Parents of Under-five children in study area**

Indicators	N=613 N(%)
Ill in last three months	606(98.9)
Visited to health facility	598(98.6)
Time taken to visit the Health facility (N=598)	
Appropriate time	156(26.1%)
Primary delay	301(50.3%)
Secondary delay	141(23.6%)
Type of health facility	N=598 N(%)
PHC	22(3.7%)
CHC	35(5.9%)
GH	166(27.8%)
Private Health Facilities	375(62.7%)



**Fig. 1. Knowledge about Danger Signs among parents of under-five children**



**Fig. 2. Morbidity Pattern of Under-Five Children With Respect to Gender**

**Table 3: Nutritional status of under -five children in study area.**

Malnutrition Grade	Male N=299 N(%)	Female N=314 N(%)	Total N =613 N(%)
Normal	189(63.2%)	173(55.09%)	362(59.0)
Grade I	62(20.7%)	70(22.29%)	132(21.5)
Grade II	28(9.36%)	41(13.05%)	69(11.2)
Grade III	20(6.68%)	30(9.55%)	50(8.1)

**DISCUSSION**

Existing interventions could prevent many deaths among children if they are presented for appropriate and timely care<sup>4</sup>. Improving families’ care seeking behavior could contribute significantly to reducing childhood mortality in developing countries. The World Health Organization (WHO) estimates that seeking prompt and appropriate care could reduce child deaths due to acute respiratory infections by 20%<sup>5</sup>. Various studies from developing countries have reported that delay in seeking appropriate care and not seeking any care contributes to the large number of child deaths<sup>6,7</sup>. In our study only 156(26.1%) of children visited health facility in appropriate time, remaining 142(23.6%) of children had primary delay and more than 368(50%) of the children had secondary delay. This study found that the following factors had significant association with delay, i.e., low socio economic status, Hindu-religion, low maternal education and occupation other than house wife, non availability of vehicle at home and also lack of knowledge about of general danger signs of childhood illness among parents of under-five children. Knowledge about general danger signs help mothers to recognize the situations as when to take the children to health facility at the time of illness. This would go a long way to prevent under-five mortality and morbidities. Our study shows 115(19.2%) of parents only knew about all general danger signs (according to IMNCI guidelines- difficulty in feeding, vomiting everything, convulsions, lethargy) and 153(25.5%) of parents knew about at least one of the danger signs. Study done in Panchkula showed that more than half of the mothers (55.4%) knew about 3-5 general dangers signs like lethargy or unconsciousness, inability to feed /drink, vomiting everything, convulsion<sup>8</sup>. A similar study in Wardha also showed that about 44% of the mothers knew about two dangers signs after implementation of IMNCI <sup>9</sup>. In IMNCI training, the health workers were trained to teach the mothers about danger signs and counsel them about the need to seek care promptly if these signs occur<sup>10</sup>. These differences in knowledge were due to the reason that above two studies was carried out after implementation of IMNCI but IMNCI was not implemented in our study area.

Well educated mother (more than high school) had higher (32.6%) appropriate health seeking behavior

than less educated (29.2%) and illiterate mothers (11.6%). House wife/house maker (29.4%) had better Health seeking behavior than other occupations (12.8%). Socioeconomic status also found to be significant for appropriate health seeking behavior for under five children. In this study we found that upper class were higher appropriate health seeking behavior than other classes ( $\chi^2$ ,  $p < 0.04$ ). Rahul et al also showed that Mothers in the highest wealth quintile were significantly more likely to use modern trained providers for antenatal care, birth attendance, post natal care and child health care than those in the poorest quintile ( $\chi^2$ ,  $p < 0.01$ )<sup>16</sup>. Some of the studies also showed similar result.<sup>11</sup>

This study shows that out of 613 under-five children 606(98.9%) children had illness during last three months prior to the study period, out of which 598(97.6%) of the children visited health facility. The burden of child hood morbidity in our study area was found to be less [respiratory tract infection 493(80.4%), fever 328(53.4), Protein Energy Malnutrition 251(49.9%), diarrhea 129(21%) and others 158(25.7%)] compared to NFHS-3 study finding. In NFHS-3 survey the recall period was only two weeks but our study recall period was 3 months. This study shows that the parents of under-five children preferred to seek health care from private health sectors 368 (62.7%) than government health sector (PHC-3.7%, CHC-5.9%,GH-27.8%). Majority of the people preferred secondary health care than primary health care. A similar type of study conducted in Pondicherry also showed that most of the children were taken to private health facilities for common childhood illness<sup>12</sup>. This preference was due to availability and accessibility of private practitioners in evening and night, quick relief and good individual attention given by private practitioners. In recent years, epidemiologists and social scientists have devoted increasing attention to studying health-seeking behavior associated with the two leading causes of child mortality, namely ARI and Acute Diarrheal Diseases (ADD). Health interview surveys appear to offer the best vehicle for analyzing health care seeking behavior on a representative sample of children<sup>13</sup>

Understanding the determinants of these (ARI, Diarrhea, fever and malnutrition) morbidities, as well as the health seeking-behavior, may help in planning interventions for controlling childhood morbidity and mortality. Though the magnitude of childhood

morbidities in India is well known, few studies have focused on their determinants and the health-seeking behavior of the mothers of the ill children<sup>14,15</sup>.

## CONCLUSION

Our study concluded that Maternal education, Maternal occupation, socioeconomic status, vehicle possession and knowledge about general danger signs determine appropriate health seeking behavior.

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# A Prospective Study of Outcome of Lumbar Disc Excision through Fenestration in Adults

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## ABSTRACT

**Background:** Low back pain due to lumbar disc herniation is one of the common causes of morbidity in the form of limitation of activity in young adults. Discectomy is considered as gold standard for operative intervention in patients with lumbar disc herniation where conservative management has failed to cure the symptoms. The results of discectomy depends upon various factors such as patient selection, neurological involvement at the time of presentation.

**Method:** This is a prospective study of 60 patients with lumbar disc herniation who underwent fenestration and discectomy between 2009 to 2012.

**Results:** The results were evaluated using Japanese Orthopaedic Association (JOA) low back pain score. The post operative results were good in 90% of patients, fair in 6.66 % and poor in 3.33 % of patients.

**Conclusion:** Lumbar discectomy by fenestration method without much removal of lamina (standard laminectomy) is an effective surgical procedure in properly selected patients with lumbar disc herniation. The results of our study are comparable with micro discectomy.

**Keywords:** *Limited Laminectomy, Fenestration, Discectomy, Lumbar Intervertebral Disc Herniation*

## INTRODUCTION

Impairments of the back and spine are ranked as the most frequent cause of limitation of activity in people younger than 45 years of age according by the National Centre for Health statistics<sup>1</sup>. Up to 70% of the population will experience low back ache sometime in their life. There are so many causes of low back ache including lumbar intervertebral disc herniation which an orthopaedic surgeon most encounters when dealing with patients presenting with low back ache. Hence the need for detailed history of the symptoms, clinical examination and radiological examination to differentiate disc herniation as the cause for low back ache from other causes which require different approach in their management.

The traditional laminectomy involves extensive disruption of posterior stabilizing structures of spine and its associated complications like instability. In this study limited laminectomy ie. fenestration and discectomy is carried out in properly selected patients.

### Objectives

The present study was undertaken to asses clinical and functional outcome of limited lumbar laminectomy by fenestration and discectomy in lumbar disc herniation with regards to relief of low back ache and radicular symptoms, improvement in SLRT and other clinical signs, complications of the surgery and their management.

## MATERIALS AND METHOD

The present study was carried out in the Department of Orthopaedics, Navodaya Medical College, Hospital & Research centre, Raichur over a period of 3yrs from July 2009 to June 2012. Total of 60 patients were selected for proposed surgery who met inclusion criteria.

### Inclusion criteria

- 1) Age between 18 to 55 yrs.
- 2) Presence of Positive root tension signs like Lasegue's test with or without neurological deficits.
- 3) Cauda equina syndrome( bowel and bladder involvement)
- 4) Failure to respond to conservative line of treatment.

### Exclusion criteria

- 1) Recurrent disc herniation
- 2) Failed back surgery syndrome
- 3) Patients less than 20 yrs and more than 55 yrs
- 4) Patients lost to follow up.

Pre-operatively these patients underwent thorough clinical evaluation by SLRT, Lasegue's sign, neurological examination, bowel & bladder involvement and radiological evaluation using MRI. All patients underwent limited lumbar laminectomy by fenestration and discectomy.

Post-operatively parenteral antibiotics were administered; pain controlled with injectable and oral analgesics, patient was allowed to turn on the bed. Patient was allowed out of bed after 5 to 7 days. Sutures removed after 8 to 10 days. Patient was put on Lumbosacral corset for 8 to 10 weeks postoperatively. At discharge patients were instructed to minimize sitting, riding two wheeler, to avoid straining their back by forward bending, lifting heavy objects. Long trips were avoided for first 3 months. Patients with desk job returned to their work after 6 to 8 weeks, and heavy laborers returned to their work after 12 weeks post-operatively. All the patients were followed up at end of 1 month, 3 months, 6 months and 1 year after operation. At every follow up the status of low back pain, radicular pain, SLR test, detailed neurological assessment was done and recorded.

Patients were assessed pre-operatively and post-operatively with Japanese Orthopaedics Association (JOA) Low Back pain Score for analysis of outcome. Total score was summed up from -6 to 29 points.

### Table I. JOA low back pain scoring system

1. Subjective symptoms (9 points)
  - a. Low back pain  
None (3), occasional mild pain (2), frequent mild or occasional severe pain (1), frequent or continuous severe pain (0)
  - b. Leg pain and? Tingling  
None (3), occasional slight symptom (2), frequent slight or occasional severe symptom (1), frequent or continuous severe symptom (0)
  - c. Walking capacity  
Normal (3),  
Able to walk further than 500 metres although it results in pain, tingling and/ muscle weakness (2)  
Unable to walk further than 500 metres owing to leg pain, tingling and/ muscle weakness (1)  
Unable to walk further than 100 metres owing to leg pain, tingling and/ muscle weakness (0)
2. Objective findings (6 points)
  - a. SLR tests  
Normal (2), 30° to 70° (1), <30° (0)
  - b. Sensory disturbance  
None (2), slight disturbance (1), marked disturbance (0)
  - c. Motor disturbance  
Normal (grade 5) (2), slight weakness (grade4) (1), marked weakness (grade3) (0)
3. Restriction of ADL (14 points)  
Turn over while lying, standing, washing the face, leaning forwards sitting (about one hour), lifting or holding heavy objects, walking:  
No restriction (2), moderate restriction (1), severe restriction (0) for each item



4. Bladder function (-6 points)

Normal (0), mild dysuria (-3,) severe dysuria (-6)

Post operatively the rate of improvement was calculated using the below formula.

Rate of improvement =  $\frac{\text{Post-op score} - \text{Pre-op score}}{15 - \text{pre-op score}} \times 100$ .

Results after surgery are assessed according to the rate of improvement as

Excellent: > 90% improvement

Good: 75 to 89 % improvement

Fair: 50 to 74 % improvement

Poor: < 49 % improvement.

**RESULTS**

A total of 60 patients underwent fenestration and discectomy. Out of these 42 were male and 18 were female. Age ranged from 23 to 53 yrs. Mean age being 40 yrs.

**Table II: Age distribution**

Age in years	No of patients	Percentage
20 - 40	26	43.33 %
40 - 60	34	53.66 %
Total	60	100 %

Patients occupation were classified as strenuous or light work. About 70 % of patients belonged to strenuous group.

Events which precipitated the onset of pain were analyzed. History of lifting heavy objects was present in 40% (24 patients). Insidious onset in 40 % ( 24 patients) and forward bending in 20 % (12 patients).

Average duration of symptoms before surgery was 8 months (ranging from 4 months to 38 months).

Sciatica was present in 45 patients. Unilateral in 40 patients (on right side in 22 and on left side in 18 patients), bilateral in 5 patients.

**Table III: Distribution of symptoms**

Symptoms	No. of patients	Percentage
Low back ache	60	100%
Radicular pain	54	90%
Sensory symptoms (paraesthesia)	50	83.33%
Motor symptoms(weakness)	28	46.66%
Bowel / bladder symptoms	2	3.33%

**Table IV: Clinical findings**

	No of patients	Percentage
Positive SLR test	57	96.33%
Crossed legged SLR	15	25%
Paraspinal muscle spasm	48	80%
Sciatic scoliosis	9	15%
Restricted spinal movements	39	65%
Motor deficits	26	43.33%
Sensory deficits	30	50%
Deep tendon reflex abnormalities	24	40 %
Sphincter involvement	2	3.33%

**Pre-op SLRT**

SLRT between 0 and 30 degrees was seen in 70 % of patients. 14 % of patients had SLRT between 31 and 60 degrees. 12.33% of patients had SLRT between 61 and 90 degrees.

All patients underwent MRI to know the level of the lesion.

**Table V: Distribution of the level of disc herniation**

Level of disc herniation	No of patients	Percentage
L3-L4	2	3.33 %
L4-L5	32	53.33%
L5-S1	22	36.66%
2 or more levels	4	6.66%
Total	60	100 %

**Table VI: Pre op JOA scores**

Pre-op JOA score	No of patients	Percentage
-6 to 0	0	0
1 to 10	22	36.66%
11 to 20	38	66.66%
21 to 29	0	0

**Table VII: Complications encountered**

Complications	No. of patients	Percentage
Dural tear	10	1.66%
CSF leak	0	0
Neural damage	0	0
Abdominal visceral injury	0	0
Wound infection	6	1%
Discitis	0	0

Average duration of hospital stay was 10.3 days ranging from 8 to 16 days.

**Surgical outcome:** Outcome after a mean follow up of 9 months is given below.

## Post-op SLRT

49 patients (81.6%) had a negative SLR test, 8 patients (13.33 %) had SLRT between 31 and 60 degrees. SLRT between 0 and 30 degrees was seen in 3 patients (5%).

**Table VIII: Post-op JOA score**

Pre-op JOA score	No of patients	Percentage
-6 to 0	0	0
1 to 10	2	3.33%
2 – 20	5	8.33%
21 – 29	53	88.33%

25 out of 28 patients with motor weakness pre-operatively improved after surgery. Out of 50 patients with sensory symptoms 42 recovered.

The outcome according to the JOA score was correlated and analyzed for the following variables

1. Sex
2. Age
3. Duration of symptoms
4. Neurological deficits

### 1. Correlation with sex

Outcome	Male	Female	Total patients
Poor	0	2	2
Fair	2	4	6
Good	40	12	52
Total	42	18	60

40 out of 42 males had good outcome. 12 out of 18 females had good outcome, while 2 had poor outcome. The difference between the groups was not statistically significant ( $\chi^2=4.85$ ,  $p=0.088$ )

### 2. Correlation with age

Outcome	< 40 years	>40 years	Total patients
Poor	0	2	2
Fair	4	2	6
Good	22	30	52
Total	26	34	60

2 patients aged more than 40 years had poor outcome, while 30 patients had good outcome. There was no statistically significant difference between the two groups ( $\chi^2=4.16$ ,  $p=0.125$ )

### 3. Correlation with duration of symptoms

Outcome	< 6months	> 6months	Total patients
Poor	2	0	2
Fair	0	6	6
Good	28	14	52
Total	30	30	60

28 patients of less than 6 months had good outcome, 14 patients of more than 6 months had good outcome. The difference between the groups was not statistically significant ( $\chi^2=1.44$ ,  $p=0.4865$ )

### 4. Correlation with neurological deficits

Outcome	Neurological deficits	No neurological deficits	Total patients
Poor	2	0	2
Fair	2	4	6
Good	36	16	52
Total	40	20	60

2 patients with poor outcome had neurological deficit. The difference between the groups was not statistically significant ( $\chi^2=2.08$ ,  $p=0.3539$ )

**Table IX: Distribution of outcome**

Outcome	No. of patients	Percentage
Good (>75%)	51	85 %
Fair (50– 75 %)	7	11.66%
Poor (< 50%)	2	3.33%

## DISCUSSION

Lumbar disc herniation is one of the most common conditions an orthopaedic surgeon most commonly encounters in his practice. Majority of the population experience back ache sometime in their life.

There are numerous causes of back ache but that due to intervertebral disc herniation contributes to larger quantity. The origin of disc related back ache was not recognized till 20<sup>th</sup> century. It was only when Mixter and Barr described disc herniation or protrusion and showed the effectiveness of surgery in the management of disc disease that there has been great amount of enthusiasm worldwide to solve disc herniation surgically by disc excision<sup>2</sup>. Though back ache lacks lethality (mortality) it contributes much to the morbidity functionally and economically in terms of low economic production.

The low back ache and radicular pain, though classical of lumbar disc disease, other conditions which mimic this are spinal canal stenosis, spondylosis and lateral spinal foramen syndrome. So one has to be meticulous in proper selection of patients.

However the results of good outcome after lumbar disc excision vary in literature from 51 to 89 %<sup>3,4,5,6</sup>. The recurrence rate varies from 6% to 11% in various studies<sup>4,5,7</sup>. And there lot number of failed back surgeries which require revision.

This implies that the outcome of lumbar disc surgery depends on many factors. Therefore emphasis must be laid on proper patient selection. For a majority of patients with back ache due to disc disease conservative treatment in the form of bed rest, analgesics and traction provides satisfactory relief of symptoms. In evaluating disc disease the natural history should be taken in to account which reveals that surgery plays only a palliative role in its management<sup>8</sup>. Lumbar disc herniation shows a favorable response to conservative management even in the presence of neurological deficits<sup>9</sup>.

So any surgical intervention without appropriate conservative line of management is sought with poor outcome after surgery<sup>10</sup>. It leads to unnecessary trauma – physical, mental and economical burden to the patient as well as their family members in addition to the one caused by disc herniation. However a prolonged conservative management in the presence of severe radicular symptoms must be avoided since it increases morbidity and reduces the chances of good outcome following surgery. A longer preoperative interval in patients with chronicity was associated with a less predictable outcome<sup>3</sup>.

The responsibility of properly selecting the patients for surgery relies wholly on the surgeon. His job is done easy by newer diagnostic tools like CT/MRI which help in accurate visualization of all the structures within spinal canal. Particularly MRI gives more information regarding the stages of disc degeneration, hypertrophy of ligamentum flavum, epidural fat, compression on spinal cord by disc protrusion, status of neural foramen and compression of nerve roots etc. MRI also helps in diagnosis of post-operative complications. The disadvantage of MRI is it over estimates the diagnosis of symptomatic disc prolapsed and in about 30 % of asymptomatic, normal

individuals above 30 – 40 years it detects incidental disc herniations. Results are good when there is correlation between clinical and radiological features.

In our study we used Japanese orthopaedics association low back pain score to evaluate our results. This score is simple and effective in assessing patient's outcome both subjectively and objectively. For this reason we chose this scoring system for our study. It also helps in correlating the results to various factors that may influence the outcome such as age, sex, duration of symptoms etc.

Males were more commonly affected as compared to female patients. This is in accordance with studies by Pappas et al<sup>5</sup> and Richard Davis<sup>6</sup>. Mean age was 40 years. Richard Davis<sup>6</sup> had mean age of 42 years ranging from 16 to 77 years. Pappas et al<sup>5</sup> had mean age of 42 years ranging from 15 to 83 years. L4-L5 was commonly affected level in our study which is in accordance with Pappas et al<sup>5</sup> and Richard Davis<sup>6</sup> studies.

In our study we achieved 85 % good outcomes and 11.66 % fair outcomes. We had 3.33% poor outcome as compared to Pappas et al<sup>5</sup> and Richard Davis<sup>6</sup> who had 6.66% and 3.33 % poor outcome respectively.

In our study there was low level of post-op complications with 1.66 % dural tear and 1 % superficial wound infection as compared to Pappas et al<sup>5</sup> and Richard Davis<sup>6</sup> studies who had a complication rate of 10.8% and 4.1% respectively.

The only limitation in our study is sample size and a follow up period of average 9 months only, which is favored in certain studies as mentioned by Hakkinen<sup>11</sup> that recovery following lumbar disc surgery occurred to a great extent during first 2 months and is a reliable indicator of post-operative outcome at one year follow up.

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# A Study on Prevalence of Metabolic Syndrome in Newly Diagnosed Hypertensive Patients

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## ABSTRACT

The study was done to determine the prevalence of metabolic syndrome in 100 newly diagnosed patients with essential hypertension in a tertiary care hospital, from South Tamilnadu, India. Hypertension, diabetes, insulin resistance and metabolic syndrome are all risk factors for coronary heart disease. Many patients with essential hypertension have associated metabolic abnormalities at the time of diagnosis. The results obtained show that 10% of hypertensives had diabetes and 32% had impaired glucose tolerance. 54% cases had any one form of dyslipidemia. Females (65%) were more dyslipidemic than males (46.67%). 48% patients fulfilled the criteria for metabolic syndrome. 46% of hypertensives had abnormal waist circumference; 30% had raised fasting glucose; 38% had low HDL and those with raised triglyceride were also 38%. Low HDL was predominant in males whereas abnormal waist circumference, raised TGL and glucose abnormalities were predominant in females. This indicates that metabolic syndrome is very common in essential hypertension and signals the need for proper laboratory investigations to initiate early treatment.

**Keywords:** IFG - impaired fasting glucose, IGT - impaired glucose tolerance, DM - Diabetes mellitus, FPG - Fasting plasma glucose, OGTT - Oral Glucose Tolerance Test, LDL-C - Low Density Lipoprotein Cholesterol, HDL - High Density Lipoprotein

## INTRODUCTION

The metabolic syndrome (syndrome X, insulin resistance syndrome) consists of a constellation of metabolic abnormalities that confer increased risk of cardiovascular disease and diabetes mellitus. The major features of the metabolic syndrome include central obesity, hypertriglyceridemia, low high-density lipoprotein (HDL) cholesterol, hyperglycemia, and hypertension<sup>1</sup>.

Hypertension is a cardinal risk factor for coronary artery disease (CAD) and the risk of CAD further increases in presence of dyslipidemia. Both hypertension and dyslipidemia coexist more often than by chance alone.<sup>2</sup> 80 – 95% of hypertensive patients are diagnosed as having essential hypertension also referred to as primary or idiopathic hypertension. In the remaining 5 – 20 % a specific underlying disorder

causing elevation of BP is identified. Clinically, hypertension is defined as systolic blood pressure  $\geq 140$  mm Hg and diastolic blood pressure  $\geq 90$  mm Hg based on average of two or more readings. A single reading is sufficient if systolic BP is  $\geq 160$  mm Hg or diastolic BP  $\geq 105$  mmHg.<sup>3</sup>

Hypertension is seen in 30 - 50% patients with type 2 DM and 20 – 40% of individuals with IGT; conversely, about 50% of hypertensives have impaired insulin sensitivity<sup>3</sup>. Hence OGTT was specifically done to bring out glycaemic abnormalities. With these considerations the present study was undertaken to determine the prevalence of undiagnosed glycaemic and lipid abnormalities in patients with essential hypertension. The prevalence and pattern of various components of metabolic syndrome was analyzed in the study group.

## MATERIALS AND METHOD

This study aimed to find the prevalence of impaired glucose metabolism and dyslipidemia among newly detected cases with essential hypertension. The study was conducted in the Hypertension clinic, Tirunelveli Medical College Hospital, Tirunelveli, Tamilnadu over a period of 8 months from July 2007 to February 2008. Patients newly diagnosed to have hypertension in the outpatient department and those registered as new cases in the hypertension clinic are included in the study. The hypertension was diagnosed based on JNC VII criteria, i.e. systolic blood pressure  $\geq 140$  mm Hg and or diastolic blood pressure  $\geq 90$  mm of Hg. 100 patients were randomly selected and were subjected to general physical examination to rule out any systemic illness.

### Inclusion Criteria

1. Patients having blood pressure  $\geq 140/90$  mmHg were selected.
2. Patients with essential hypertension only were selected
3. Patients of age group ranging from 30 – 70 years were included in the study.

### Exclusion Criteria

1. Patients with secondary hypertension were excluded.
2. Patients who are known diabetes were not included.
3. Individuals with renal failure, heart disease, stroke, liver disease and other systemic illness were excluded from the study.
4. Patients with paroxysms of hypertension were excluded.
5. Patients with target organ damage like retinopathy, nephropathy, and cardiac problem were excluded.
6. Patients taking drugs for other illnesses were excluded.

Documentation of blood pressure was done using the standard sphygmomanometer with cuff size 25 x10cm. Three readings were taken for a single patient to exclude labile hypertension or paroxysmal hypertension. Before taking measurement, the

individual was seated quietly for 15 min in a quiet room with a comfortable room temperature. Patients were advised to empty bladder, reduce anxiety; to avoid exercise, coffee, tea, smoking for half an hour preceding measurement.

Venous blood samples were taken for estimating fasting lipid profile and blood sugar. Fasting is defined as no caloric intake for at least 8 h. Oral glucose tolerance test was done in all the 100 patients selected for the study by using a glucose load of 75g anhydrous glucose dissolved in water. Two hours later plasma blood glucose was estimated. Blood glucose was estimated by glucose oxidase method; the value expressed in mg / dl. The total cholesterol (TC), Triglyceride (TG) and HDL-C were measured by enzymatic method. The LDL-Cholesterol was derived by the Friedwald's formula<sup>5</sup> i.e.  $LDL - C = TC - (HDL+TG/5)$ . Waist circumference<sup>5</sup> is measured at the level of the tip of the right iliac crest and measurement is made at the end of expiration.

Hypertension was diagnosed according to JNC VII classification<sup>3</sup> i.e. normal blood pressure is less than 120/80 mmHg, prehypertension is defined as systolic BP 120-139 mmHg and diastolic BP 80-89 mmHg, Stage 1 hypertension is systolic BP 140-159 mmHg or diastolic BP 90-99mmHg, Stage 2 hypertension is systolic BP  $\geq 160$ mmHg or diastolic BP  $\geq 100$ mmHg. Isolated systolic hypertension is defined as systolic BP  $\geq 140$  mmHg and diastolic BP  $\geq 90$  mmHg and staged appropriately.

Glucose tolerance is classified into three categories based on fasting plasma glucose FPG<sup>7</sup>. FPG < 100 mg/dl is considered normal. FPG 100 – 125 mg /dl is impaired IFG, FPG > 126 mg/dl is taken as diabetes. Based on OGTT, IGT is defined as plasma glucose levels between 140 – 199 mg / dl and diabetes is defined as glucose > 200 mg/dl 2h after 75g oral glucose load.<sup>7</sup>

The NCEP: ATP III (National Cholesterol Education Program: Adult Treatment Panel) has published guidelines for the diagnosis and evaluation of dyslipidemia in adults<sup>8</sup>. The desirable levels are: LDL-cholesterol <130mg%, total cholesterol <200mg/dl, Triglycerides <150mg/dl, Desirable HDL - C :> 40 mg/dl (Male) :> 50 mg/dl (Female).

According to the NCEP: ATP III 2001 criteria:<sup>8,9</sup> patients are considered to have the metabolic syndrome if they have three or more of the following:

1. Abdominal obesity: Waist circumference  $\geq$  102 cm in men;  $>$ 88cm in women
2. Triglyceride  $\geq$ 150 mg / dl.
3. HDL – C  $<$  40 mg / dl in men and  $<$  50 mg / dl in women
4. Blood pressure  $\geq$  130 / 85 mm Hg
5. Fasting plasma glucose  $\geq$  100 mg / dl or specific medication or previously diagnosed diabetes.

## RESULTS

**Table 1: Prevalence of impaired glucose metabolism (DM +1GT) in patients with newly detected essential hypertension in relation to sex.**

Sex	No of patients	DM		IGT		NGT	
		No	%	No	%	No	%
Males	60	6	10%	18	30%	36	60%
Females	40	4	10%	14	35%	22	55%

DM is equally prevalent in both sexes. IGT is more common in females

**Table 2: Pattern and Prevalence of dyslipidemia associated with impaired glucose metabolism in patients with essential hypertension**

	No. of patients With dyslipidemia	Percent (%)	Dyslipidemia associated with IGM/DM	
			No. of patients	%
! TC	24	24%	14	58.8%
! TGL	32	32%	18	56.22%
! HDL	38	38%	24	63.16%
! LDL	24	24%	14	58.3%

**Table 3: Prevalence of dyslipidemia in patients with essential hypertension in relation to sex**

	No of patients	Patients with dyslipidemia	Percent
Males	60	28	46.67%
Females	40	26	65%
Total	100	54	54%

Females are more dyslipidemic than males.

**Table 4: Prevalence of metabolic syndrome in newly detected hypertensives in relation to gender.**

Gender	No. of patients	Patients with Metabolic syndrome	Percent
Male	60	22	36.67%
Female	40	26	65%

**Table 5: Pattern of various components of metabolic syndrome in newly detected hypertensives.**

Sex	Increased Waist circumference	FBG $>$ 100 mg% /DM/IGT	Low HDL	High TGL
Male	20%(n=12)	40%(n=24)	40%(n=24)	30%(n=18)
Female	70%(n=34)	45%(n=18)	35%(n=14)	35%(n=14)
	46%	42%	38%	32%

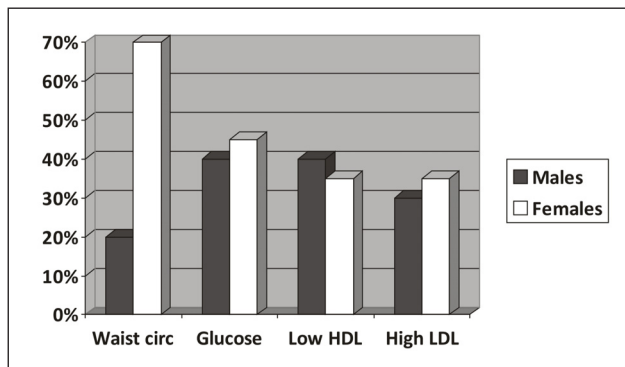


Fig. 1. Prevalence and Pattern of components of metabolic syndrome

## RESULTS

In the study, out of the total 100 patients 42% (n=42) were found to be in stage 1 hypertension and 58% (n=58) patients were in stage 2 hypertension. Out of the 100 patients with uncomplicated hypertension 10% patients (n=10) had diabetes, 32% (n=32) patients had impaired glucose tolerance. 42% of patients had impaired glucose metabolism (DM and IGT) which was previously undiagnosed. (Table 1). The study proves that impaired glucose metabolism is common in patients with essential hypertension and that impaired glucose tolerance (32%) is more prevalent than diabetes (10%). The prevalence of diabetes was equal (10%) in both males and females and that of impaired glucose metabolism was 30% in males; 35% in female hypertensives (Table 1).

Using the NCEP / ATP III criteria, the prevalence of dyslipidemia was: high cholesterol – 24%, hypertriglyceridemia 32%, low HDL 38%, high LDL 24% in this study (Table 2). The common forms of dyslipidemia noted in our study were low HDL and hypertriglyceridemia. Approximately more than 50% of hypertensive patients with any form of dyslipidemia had associated abnormal glycaemic metabolism also. (Table 2). Out of the 42 patients with impaired glucose metabolism (10 patients with DM and 32 with IGT), 30 patients had associated dyslipidemia (71.43%).

Totally 54% of patients with essential hypertension had some form of dyslipidemia. 65% (n=26) of hypertensive female patients were dyslipidemic while 46.67% of hypertensive males (n=28) were dyslipidemic (Table 3). 48 (26 females and 22 males) out of 100 patients (48%) fulfilled the criteria for metabolic syndrome. Metabolic syndrome was more common in females (65%) than males (36.67%) (Table 4).

46% of hypertensives had abnormal waist circumference; 30% had raised fasting glucose; 38% had low HDL and those with raised triglyceride were also 38%. Low HDL was predominant in males whereas abnormal waist circumference, raised TGL and glucose abnormalities were predominant in females. (Fig 1)

## DISCUSSION

Prevalence of previously undiagnosed impaired glucose metabolism in patients with essential hypertension is 42% (diabetes is 10% and impaired glucose tolerance 32%). Johnson et al<sup>10</sup> found a prevalence of 11.5% and 41% of T<sub>2</sub>DM and IGM respectively. In studies in India by Joglekar and Nanivadeker<sup>11</sup> 36% of patients with essential hypertension had impaired glucose metabolism. The high prevalence of abnormal glycaemic metabolism in hypertensive patients signals the need to perform an OGTT in them.<sup>12</sup> Essential hypertension is an insulin resistant state and insulin resistance correlates directly with the severity of hypertension.<sup>13</sup>

The prevalence of dyslipidemia was 54%. Joglekar and Nanivadekar<sup>11</sup> and Malhotra et al<sup>14</sup> in India have shown similar results. Studies from western countries<sup>15, 16, 17</sup> also show similar prevalence. More than 50% of hypertensive patients with dyslipidemia had associated impaired glucose metabolism in the study. Though physical activity is higher among rural population, but they have increased prevalence of smoking and the Indian diet is rich in carbohydrate. The urban population consumes high fat diet which increases the LDL-C levels. Other confounding factors for dyslipidemia like smoking and alcoholic consumption were not included in the study. The common causes of low HDL-C are carbohydrate rich diet, smoking, sedentary activity.

The proposed mechanism of these lipid abnormalities are likely to be due to hyperinsulinemia. Syndrome X is known to predispose hypertensive individuals to higher risk of coronary artery disease.<sup>18</sup>

Prevalence of metabolic syndrome in the study was 48% whereas a study by Kelminda Bulhoes<sup>19</sup> showed higher prevalence which was mainly due to the increased prevalence of abnormal waist circumference. This is due to the malnutrition widely prevalent in the low socio economic status group in which this study was done. Metabolic syndrome had higher prevalence in females in the study (65%), mainly due to the increased prevalence of abnormal waist circumference



in them (85%). The presence of metabolic syndrome is highly predictive of new onset diabetes and hypertension itself is a risk factor for diabetes and the study shows the co-existence of more than one metabolic abnormalities in patients with essential hypertension.

### CONCLUSION

Insulin resistance and hyperinsulinemia are considered as pathogenetic factors in both hypertension and dyslipidemia. All these metabolic abnormalities have synergistic impact in the development of coronary artery disease. Screening of patients with essential hypertension for glycaemic, lipid abnormalities and metabolic syndrome facilitates initiation of lifestyle modifications and early treatment to prevent morbidity.

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# Stroke with Hyperhomocysteinemia & Protein 'S' Deficiency in a Young Boy -A Rare Case Report

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## ABSTRACT

Hypercholesterolemia & Hyperhomocysteinemia are known risk factors for atherosclerosis. Although Protein S deficiency along with Hyperhomocysteinemia are associated with arterial thrombosis precipitating stroke & myocardial infarction, very few paediatric cases have been reported so far. We report such a rare case of Stroke associated with hypercholesterolemia, homocysteinemia & Protein S deficiency in a young boy.

A 16 yrs young boy presented with left sided weakness & deviation of lips to right side. On examination he was found to be overweight (BMI - 25.1) & had left hemiparesis with 7th cranial nerve palsy (upper motor neuron type). Laboratory investigations revealed hypercholesterolemia (267mg/dl) with elevated LDL (201mg/dl) levels. Serum Homocysteine levels were mildly elevated 33  $\mu$ mol/l (Normal range: 3- 17  $\mu$ mol/l) and protein S level was 17% (Normal range: 77- 143%). All other investigations relevant to stroke were within normal limits.

We emphasize the importance of measuring protein S levels along with serum Homocysteine levels as predisposing factors for arterial thrombosis especially in young children for better management of stroke & other thrombotic episodes.

**Keywords:** Hypercholesterolemia, Homocysteinemia, Protein S deficiency, Stroke

## INTRODUCTION

Ischemic stroke is a major problem in health care & one of the most common cause of death from neurological disorder. This disorder causes more morbidity than mortality and is regarded as the most debilitating neurological disorder.

There are various risk factors for the ischemic stroke such as non modifiable risk factors (age, sex, positive family history and ethnicity), modifiable risk factors (high blood pressure, cardiac diseases, diabetes mellitus, hypercholesterolemia, sedentary life style, cigarette smoking, alcohol consumption,

asymptomatic carotid stenosis & prior history of transient ischemic attack) and other factors (Hyperhomocysteinemia, protein C & S deficiency, lupus anticoagulants, anticardiolipin antibodies, sickle cell anaemia & drug abuse etc). <sup>1</sup>

Here we report such a rare case of stroke associated with hypercholesterolemia, hyperhomocysteinemia & protein S deficiency in a young boy.

## CASE DESCRIPTION

A 16years young boy presented with left sided weakness and deviation of angle of mouth to right side associated with slurred speech, right sided headache. On examination, Patient was conscious, Glasgow coma scale 14. Vitals- Normal, BMI 25.1 (obesity), muscle tone normal in both upper & lower limbs, muscle power right upper & lower limbs 5/5, left upper & lower limb 4/5. Babinski reflex showed extension on left side.

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Other systemic examinations found to be normal. Provisional diagnosis of left hemiparesis, upper motor neuron facial palsy probably due to embolic stroke involving internal capsule, right middle cerebral artery territory.

#### Laboratory investigations revealed

Complete blood count, renal function test, liver function test, thyroid function test were normal. Random blood sugar: 112mg/dl

Electrolytes: Na<sup>+</sup>- 143mg/dl, K<sup>+</sup>: 4.4mg/dl, Cl<sup>-</sup>:111mg/dl

Lipid profile: Serum Cholesterol: 267mg/dl, Triglycerides: 132mg/dl, HDL: 39mg/dl,

LDL: 201mg/dl(↑), VLDL: 26mg/dl.

ANCA profile: normal. Lupus anticoagulant: negative.

VDRL: Negative, Malarial parasite: negative

PT: 11.3sec, APTT: 25.4sec

Serum homocysteine levels: 33μmol/l (Normal range is 3- 17 μmol/l) (↑)

Serum Protein S : 17% (Normal range is 77- 43%)(↓)

Serum Protein C : 113% ( Normal range is 70- 130%)

Fundoscopy: normal, ECHO: normal,

CT Brain angiogram: Acute infarct in the posterior limb of internal capsule on right side of the cerebrum (Figure 1).

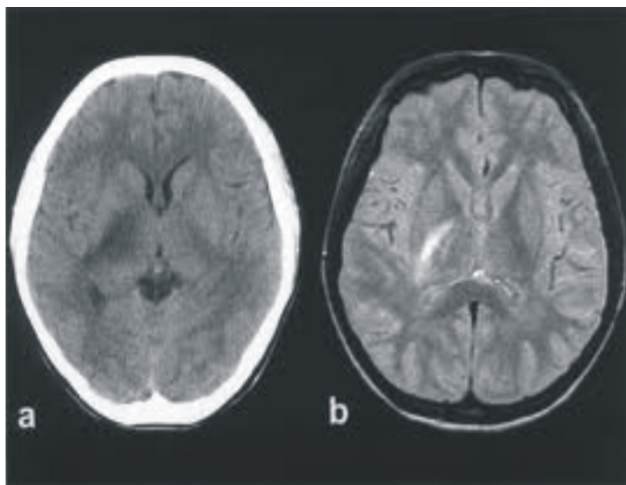


Fig. 1. CT Brain Angiogram showing the acute infarct in right cerebrum (posterior limb of internal capsule)

**Fundoscopy: normal, ECHO: normal.**

#### DISCUSSION

In our case young boy with BMI 25.1(obese) had hypercholesterolemia and mild elevation of Serum Homocysteine levels (33μmol/l) may be secondary to hypercholesterolemia, increase LDL levels.

Homocysteine is a thiol-containing amino acid derived from the metabolism of methionine. They result in the formation of cysteine and methionine, which can be further used by the body. If the pathways of either cysteine or methionine are blocked, then homocysteine levels may rise as shown. It circulates in plasma in 3 forms: as a single free amino acid (1%), as homocysteine or cysteine-homocysteine disulfides (20% to 30%), or bound to plasma proteins (70% to 80%). Together, these account for total plasma homocysteine (tHcy).<sup>2</sup> Hyperhomocysteinaemia induces endothelial cell injury and dysfunction and leads to arteriosclerosis and thromboembolism. The exact mechanism by which hyperhomocysteinaemia causes endothelial cell damage is not known. Generation of hydrogen peroxides, depletion of nitric oxide-mediated detoxification of homocysteine, enhanced endothelial cell factor V activity, and impaired endothelial thrombomodulin expression are possible etiologic factors.<sup>3,4,5</sup>

PROTEIN S deficiency may be due to genetic trait that predisposes to the formation of venous clots. Protein S system is the major regulatory system of hemostasis. Protein S are vitamin K dependent proenzymes which is synthesized in the liver. It inactivates factor Va and factor VIIIa (the 'a' denotes the active form). This function is carried out directly by protein C, and protein S which serves as a cofactor. The first step in this process is the activation of thrombomodulin by thrombin. Subsequently, protein C combines with thrombomodulin in order to produce activated Protein C. Activated protein C then combines with protein S on the surface of a platelet (platelets are the clotting cells that circulate in the blood and provide phospholipids to support that clotting process). Activated protein C can then degrade factor Va and factor VIIIa. There are three types of protein deficiency: type I characterized by low total and free protein S antigen level; type II characterized by normal free protein S level, but reduced activated protein C cofactor activity and type III, by a selective reduction in free protein S levels.<sup>6,7</sup>

Our Patient showed rapid improvement on physiotherapy, anticoagulant & vitamin supplements. His weakness had almost completely resolved suggesting thromboembolic phenomenon. In this case there is an association between three factors:

- a. Hypercholesterolemia having atherosclerotic tendency,
- b. Inherited (protein S deficiency) and
- c. Acquired (mild hyperhomocysteinemia).

The pro-thrombotic activity of the second factor became clinically evident in the presence of the third one. It is possible that if any of the risk factors were independent, they couldn't have generated such a significant thrombotic process.

### CONCLUSION

This case highlights the importance of measuring protein S levels as well as serum homocysteine level as predisposing factor for thrombotic episodes especially in young children for better management of stroke & other thrombotic episodes.

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# A Study of Obesity and Associated Factors in a Selected Rural Area of Mysore

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## ABSTRACT

**Background:** Obesity is often defined simply as a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be impaired. Obesity is often expressed in terms of Body Mass Index (BMI). In the past 20 years, the prevalence rates of obesity have tripled in developing countries that have been adopting a western life style involving decreased physical activity and over consumption of cheap, energy dense food. Although obesity should be considered as a disease in its own right, it is also one of the key risk factors for other non-communicable diseases such as non-insulin dependent diabetes mellitus, cardiovascular diseases, hypertension and cancer. In this study an attempt was made to estimate the prevalence of obesity and to identify the factors associated with obesity.

**Objectives:** The objectives were to estimate the prevalence of obesity in a selected rural area of Mysore and to identify the factors associated with obesity in the selected study population.

**Method:** A total of 1246 adults within the age group of 20-60 years constituted the study population. Pregnant women and lactating mothers were excluded from the study. Subjects with BMI  $\geq 30$  were considered as obese, BMI  $\geq 25-29.9$  as overweight (pre obese) and BMI  $< 25$  as non-obese. BMI is defined as weight in kilogram divided by the square of height in meter. Cross-sectional study was done to estimate the prevalence of obesity. Data was collected on certain selected factors such as age, sex, education, occupation, non-communicable diseases like hypertension and diabetes. Height and weight were measured according to the standard procedure and BMI was calculated. Statistical tests used were chi-square test.

**Results:** Prevalence rates of obesity in relation to selected variables were calculated. Overall prevalence rate of obesity was 1.4% and overweight was 8.4%. Prevalence rate of obesity was; highest in 50-60 years (3.1%), lowest in 20-29 years (0.5%), more in females (2.1%) compared to males (0.6%), low in higher educational status (0.8%) compared to illiterates (1.6%), more in occupation with sedentary type of work (2.4%) compared to moderate work (0.2%), more in known hypertensives (13%) compared to no hypertensives (0.8%) and more in known diabetics (20%) compared to no diabetes (1%).

**Conclusion:** Prevalence rate of obesity was 1.4% and overweight was 8.4% and factors found to be associated with obesity/ overweight were age, sex, occupation, diabetes and hypertension.

**Keywords:** Obesity; Body Mass Index; Factor; Prevalence; Association

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## INTRODUCTION

Throughout most of the human history, weight gain and fat storage have been viewed as signs of health and prosperity. Today, however as standards of living continue to rise; weight gain and obesity are posing a growing threat to the health of the people in countries all over the world.<sup>1</sup>

In the past 20 years, the prevalence rates of obesity have tripled in developing countries that have been adopting a western life style involving decreased physical activity and over consumption of cheap, energy dense food. The human and financial costs of obesity are also mounting. It has been shown to account for up to 16% of the global burden of disease, expressed as a percentage of disability adjusted life years.<sup>2</sup>

In India available data on prevalence of obesity from different published studies suggest that prevalence ranged from 10 to 20 percent.<sup>3,4,5</sup>

Hence a cross-sectional community based study has been undertaken to estimate the prevalence of obesity and to identify the factors associated with obesity.

### AIMS AND OBJECTIVES

To estimate the prevalence of obesity in a selected rural area of Mysore and to identify the factors associated with obesity in the selected study population.

### MATERIAL AND METHOD

#### Background information

The study was carried out in the rural field practice area of the Department of Community medicine, J.S.S. Medical College, Mysore. Primary health centre (PHC) Hadinaru was selected for the study. In that PHC Hadinaru, two villages Basavanapura and Hadinaru were selected randomly.<sup>6</sup>

It was a Cross-sectional community based study conducted over a period of six months. All the adults within the age group of 20–60 years were included in the study. Adults below 20 years and above 60 years and pregnant women and lactating mothers were excluded from the study.

A total of 1246 adults within the age group of 20–60 years constituted the study population.<sup>7,8</sup>

All the households in the study area, identified by their household number were numbered serially and then a sample of 535 households was drawn using random number table.

Participants satisfying the eligibility criteria of the study were interviewed to get the information on age, educational status, occupation, and any non-communicable diseases like hypertension, diabetes, and were recorded. Height and weight were recorded and BMI was calculated for each of the individual. BMI is defined as weight in kilogram divided by the square of the height in meter ( $BMI = \text{kg}/\text{m}^2$ ).

### RESULTS AND DISCUSSION

Out of 1246 subjects, 623(50%) were males and 623(50%) were females. Males and females were equally distributed.

**Table 1: Socio-demographic profile of study participants.**

Distribution of the subjects according to age	
20 – 29	407 (32.7%)
30 – 39	309 (24.8%)
40 – 49	240 (19.2%)
50 – 60	290 (23.3%)
Total	1246 (100%)
Distribution of the subjects according to education	
Illiterate	558 (44.8%)
Primary and Higher primary	318 (25.5%)
Higher secondary and college	370 (29.7%)
Total	1246 (100%)
Distribution of the subjects according to occupation	
Sedentary work	668 (53.6%)
Moderate work	578 (46.4%)
Total	1246 (100%)

The overall prevalence rate of obesity was 1.4% and prevalence rate of overweight was 8.4%. It was observed that, prevalence rate of obesity was higher (2.1%) among females compared to males (0.6%). This was found to be statistically significant. In the present study, prevalence rate of overweight was 10.4% in females and in males it was 6.4%. The difference in the prevalence rates was found to be statistically significant (table 2).<sup>9,10,11</sup>

In the present study, it was observed that, prevalence rate of obesity increased as the age increases. Prevalence rate was highest (3.1%) in 50–60 years and lowest prevalence rate of 0.5% was observed in the age group of 20–29 years. The difference in the prevalence rates among different age groups was found to be statistically significant (chart 1).<sup>9,10,11</sup>

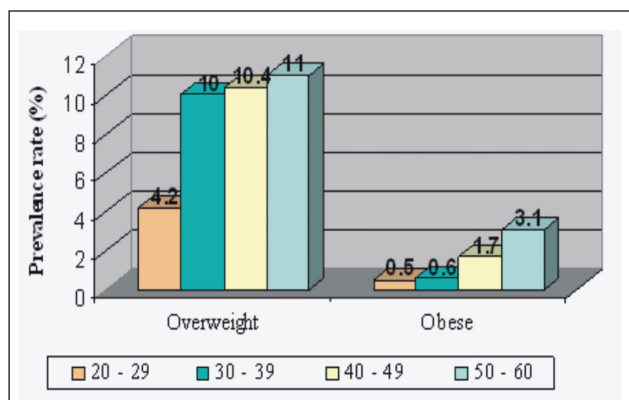
**Table 2: Association of overweight and obesity with sex and occupation** <sup>11, 12</sup>

Sex	No.	Overweight	Obesity
Male	623	40(6.4%)	4(0.6%)
Female	623	65(10.4%)	13(2.1%)
Total	1246	105(8.4%)	17(1.4%)
Test of significance $\chi^2 = 6.5$ ; df = 1; p < 0.05		$\chi^2 = 4.83$ ; df = 1; p < 0.05	
Occupation	No.	Overweight	Obesity
Sedentary work	668	88(13.2%)	16(2.4%)
Moderate work	578	17(2.9%)	1(0.2%)
Total	1246	105(8.4%)	17(1.4%)

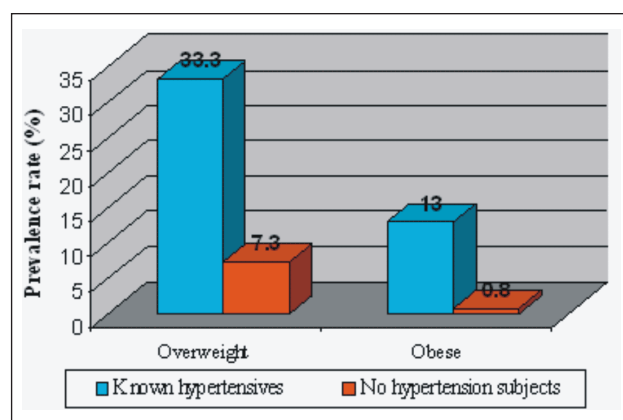
Test of significance  $\chi^2 = 42.04$ ; df = 1; p < 0.05

$\chi^2 = 11.37$ ; df = 1; p < 0.05

**Chart 1: Association of overweight and obesity with age**



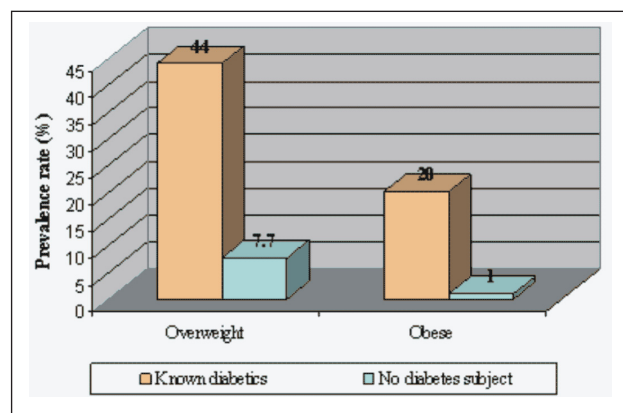
**Chart 2: Association of overweight and obesity with hypertension**



In the present study, it was observed that, prevalence rate of obesity was low in the higher educational status compared to lower educational status. 0.8% prevalence rate was observed in the group having educational level of higher secondary and college. In illiterates, 1.6% prevalence was observed. However the difference in the prevalence rates of obesity between different educational levels was not statistically significant

This study also provides information regarding the influence of increased body weight on chronic diseases like hypertension and diabetes. Both hypertension and diabetes were significantly higher among participants who were either overweight or obese (chart 2, 3).<sup>13, 14</sup>

**Chart 3: Association of overweight and obesity with diabetes**



## SUMMARY

A cross-sectional study was carried out in the rural field practice area of the Department of community medicine, JSS Medical College, Mysore. The objectives were to estimate the prevalence of obesity in the selected area and to identify the factors associated with obesity in the selected study population.

The study was conducted over a period of six months with 1246 study participants, which included all the adults within the age group of 20–60 years excluding the pregnant women and lactating mothers. Household was the sampling unit and they were selected by simple random sampling. Data was collected by house to house survey.

- Prevalence rate of obesity was 1.4% and overweight was 8.4%.
- Prevalence rate of obesity and overweight showed an increasing trend with an increase in age. Also obesity was more among females than males and this was found to be statistically significant. Obesity was significantly associated with those who were having sedentary life style.
- Prevalence rate of overweight showed an increasing trend as the educational level increases.
- Prevalence rate of overweight and obesity were significantly higher among participants with hypertension and diabetes.

## CONCLUSION

Prevalence rate of obesity in the study population was 1.4% and overweight was 8.4%. Factors which were significantly associated with overweight and obesity were age, sex, occupation, diabetes and hypertension.

· In simple terms, obesity is a consequence of an energy imbalance; energy intake exceeds energy expenditure over a considerable period.

· The 'New World Syndrome' is responsible for disproportionately high levels of morbidity and mortality in newly industrialized countries. Thus, while obesity is viewed by health professionals from a medical perspective, it also needs to be recognized as a symptom of a much larger global social problem.

**Conflict of Interest:** Nil

**Financial Assistance:** Nil

**Ethical Clearance:** Taken the consent from study subjects

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# Rationale of Local Sexually Transmitted Infections (STIs) Surveillance at Rural Health Centre of Himachal Pradesh

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## ABSTRACT

**Objective:** To understand the pattern of STIs and its associated factors among patients attending rural health centre of Himachal Pradesh, India.

**Material and Method:** Total 50 patients attended the clinic for STIs symptoms at rural health centre were randomly interviewed for nature of symptoms and sexual behavior.

**Results:** Total 50 patient (females: 52.0%) were interviewed. Majority were of 15-25 year of age and Three fourth of females reported no other sexual partner apart from their spouse. At the clinic, only 16.3% of the patients were counseled for STIs and HIV/AIDS and just 12.2% visited counseling and testing centre. Overall, 26 (52.0%) patients were suffering at the time of presentation and 14 (28.0%) were affected in the past, of which, genital ulcer was observed to be common (33.3%) present complaint among males and lower abdominal pain (26.9%) among females in the past.

**Conclusion:** Genital ulcerative disease was common presenting episode for presenting illness and lower abdominal pain was in the past. Clinic based information showed that very less patients were counseled for the STIs, and still risky sexual behavior was observed among the males than the females.

**Keywords:** STIs (Sexually Transmitted Infections), Surveillance, Rural area

## INTRODUCTION

Prevalence of Sexually Transmitted Infection (STIs) in India was reported to be 2.5% in the clinics<sup>1</sup>. It had been considered as an important risk for transmission of HIV infection. It was accounting 97, 420 Disability Adjusted Life Years (DALYs), and 6.5% total DALY of the world<sup>2</sup>. Evidences showed the changing epidemiology of STIs across different parts of the county<sup>3,4</sup>. High risk sexual behavior like unprotected sexual intercourse with non regular sexual partner increased the risk of STIs. In India, male were the usual visitors for treatment of STUs at the clinic. It could be due to asymptomatic nature of the symptoms among females or risky sexual behavior among males. Other factors like lack of social mobility for care from general hospital than the identified STI clinics might also contribute to differential treatment seeking among women<sup>5</sup>. As community based surveys reflects the true picture and gold standard for public health policies,

but regular clinic based epidemiological assessment of the attended patients could serve as a proxy towards prevalent pattern of disease in general population. Present study was planned with the objective to understand the pattern of STIs and its associated factors among patients attending rural health centre of Himachal Pradesh, India.

## METHODOLOGY

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. Present study was carried out at health centre in the rural area of district Shimla of Himachal Pradesh in the year 2006. After the examination, at the time of exit from the centre, the patients were interviewed using structured pre-tested questionnaire. Randomly 50 patients were interviewed over period of one month. Patients were interviewed at the isolated corner

-for privacy- of the courtyard of the centre to maintain the confidentiality. Every patient was interviewed about type and history of the symptoms. Most of the patients had more reported more than one type of syndromes. Each patient was interviewed about the history of sexual behavior and signs of the STIs. Each patient was asked about past and presenting episodes of STIs syndromes. Prior ethical clearance was sought from the Institutional Ethics Committee (IEC) of Indira Gandhi Medical College (IGMC), Shimla. None of the study participant was withdrawn him(er) self from the study.

**RESULTS**

Total 50 patients, half males (48.0%) and females (26; 52.0%) were interviewed. All were observed to be

heterosexual behavior. Majority (68.0%) visited the clinic for the treatment of syndromes. Significantly (p=0.00) majority of males (70.0%) were belonging to 15-25 year of age and were unmarried (50.0%) as compare to females. Most (44.0%) of the respondents were educated up to 12<sup>th</sup> standard. About 70.0% females were carrying household activities and 40.0% of males were unskilled labour. Three fourth of females reported no other sexual partner apart from their spouse (p=0.00). Two third of the respondents were residing in the same city and were non-migrants. Half of respondents stated use of condom sometimes and about 40.0% of patients never used condom at the time of sexual intercourse. At the clinic, only 16.3% of the patients were counseled for STIs and HIV /AIDS and just 12.2% visited counseling and testing centre (table: 1).

**Table 1: Demographic and sexual profile of patients with STIs symptoms at rural health centre, Himachal Pradesh, 2006.**

Characteristic	Male (24)	Female (26)	X <sup>2</sup> ; p value	Total (50)
<b>Age Group</b>				
15-25	70.0	28.0	9.6; 0.00	46.7
26-35	15.0	36.0	2.0; 0.14	26.7
36-45	10.0	24.0	1.0; 0.30*	17.8
46-55	5.0	12.0	0.1; 0.66*	8.9
<b>Education</b>				
Illiterate	12.5	30.8	2.4; 0.11	22.0
Literate (till 5 <sup>th</sup> standard)	29.2	19.2	0.6; 0.41	24.0
Literate (till 12 <sup>th</sup> standard)	45.8	42.3	0.0; 0.80	44.0
Literate (Graduate and above)	12.5	7.7	0.0; 0.92*	10.0
<b>Marital Status</b>				
Married	50.0	76.0	3.9; 0.04	63.3
Unmarried	50.0	8.0	11.0; 0.00	28.6
Widow/er	0.0	16.0	2.2; 0.13*	8.2
Dependents/Children (Mean)	2.6	2.4		2.5
Lives in the city	58.3	72.0	1.2; 0.27	65.3
Visit to spouse in year (8)	50.0	50.0	0.0; 1.00	50.0
<b>Sex Partners</b>				
0	12.5	76.9	20.5; 0.00	46.0
1	16.7	15.4	0.0; 0.79*	16.0
2-3	54.2	7.6	12.8; 0.00	28.0
>3	18.5	0.0	2.7; 0.09	10.0
Ever use condom	65.2	40.0	3.9; 0.04	52.1
Never	25.0	50.0	3.3; 0.06	38.1
Use condom sometimes	70.0	36.4	6.5; 0.01	52.4
Condom use with non regular partner	70.8	10.5	18.3; 0.00	44.2
ICTC visit	17.4	7.7	0.3; 0.58*	12.2
Counseled for STD/HIV/AIDS	26.1	7.7	1.6; 0.19*	16.3

\*Yates correction

Overall, 26 (52.0%) patients were suffering at the time of presentation and 14 (28.0%) were affected in the past, of which, among 9 (18.0%) patients genital ulcer was a common complaint at the time of presentation and abdominal pain in the past in 7 (14.0%) patients. More (18; 75.0%) males patients were seeking treatment for present episode and females (11;

42.3%) reported presence of symptoms in the past. Genital ulcer was observed to be common (33.3%) present complaint among males and lower abdominal pain (26.9%) among females in the past; among 5 (20.8%) male patients reported presence genital ulcer was present at the time of interview and in the past. (Table: 2).

**Table 2: Type of STIs symptoms among males and females at rural health centre, Himachal Pradesh, 2006.**

Genital Symptoms	Male			Female			Male + Female		
	PastN (%)	PresentN (%)	BothN (%)	PastN (%)	PresentN (%)	BothN (%)	PastN (%)	PresentN (%)	BothN (%)
Ulcer	3 (12.5)	8 (33.3)	5 (20.8)	2 (7.7)	1 (3.8)	0 (00.0)	5 (10.0)	9 (18.0)	5 (10.0)
Discharge	0 (00.0)	2 (8.3)	0 (00.0)	2 (7.7)	3 (11.5)	0 (00.0)	2 (4.0)	5 (10.0)	0 (00.0)
Abdominal Pain	0 (00.0)	0 (00.0)	0 (00.0)	7 (26.9)	1 (3.8)	0 (00.0)	7 (14.0)	1 (2.0)	0 (00.0)
Boils	0 (00.0)	4 (16.7)	0 (00.0)	0 (00.0)	0 (00.0)	0 (00.0)	0 (00.0)	4 (8.0)	0 (00.0)
Swelling	0 (00.0)	3 (12.5)	0 (00.0)	0 (00.0)	0 (00.0)	0 (00.0)	0 (00.0)	3 (6.0)	0 (00.0)
Itching	0 (00.0)	1 (4.2)	0 (00.0)	0 (00.0)	3 (11.5)	0 (00.0)	0 (00.0)	4 (8.0)	0 (00.0)
All	3 (12.5)	18 (75.0)	5 (20.8)	11 (42.3)	8 (30.8)	0 (00.0)	14 (28.0)	26 (52.0)	5 (10.0)

## DISCUSSION

STIs were an important group of infections and its burden reflects prevalent sexual behavior in the population. In the present study, majority of housewife females reported to clinic for treatment of STIs. Majority of them were suffering from genital discharge at the time of the interview. Unlike males, females did not report sexual intercourse with non regular partner. As sexual intercourse was found to be associated with the age, social norms and the environment; studies reported 25-44 year as a common affected age group<sup>6,7</sup> but, in the present study patients were affected at 15-25 year age group. It indicated towards the engagement of risky sexual behavior at very early age in life. Married couples expected to be less likely to have prevalent risky behavior. In present and other study<sup>6</sup>, the STIs were reported more among married individuals.

Ulcerative form observed to be indicative of disease severity. It indicated toward the engagement of risky sexual behavior and changing disease pathogen. Ulcerative type of STIs was more indicative of viral causes like herpes simplex, however, lower abdominal pain and discharge were more of bacterial in nature<sup>8,9</sup>. Evidence from world and India had showed that the rise in genital ulcerative and decline in discharge form of syndromes<sup>2,8,10</sup>. Present study reported genital discharge and lower abdominal pain as common

syndrome in the past, however, genital ulcer in the present. Rarely, patient presented with isolated symptoms of STIs, present study other<sup>8</sup>, reported combination of symptoms.

Changing pattern of type of STIs is possibly explained by the either improved syndromic surveillance or effective treatment of bacterial causes of STIs. Continuous disease surveillance system with regular and detailed analysis of the data at local level will help to understand the changing epidemiology of STIs syndromes and causative agents. In the study area, it was decided to further study the engagement in risky sexual behavior at early age among the males with the community awareness about STIs and available treatment, and drug management at centre for treatment of genital ulcerative disease.

## CONCLUSION

Genital ulcerative disease was found to be more common among males and lower abdominal pain among females.

**Recommendations:** Local level surveillance is important for timely operational action after understanding the changing epidemiology of behavior and disease in the area.

**Conflict of Interest:** None

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# A Study on Selective Inventory Control Methods in a Tertiary Care Hospital

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## ABSTRACT

**Objective:** To classify the existing inventories of the surgical stores and design appropriate levels of inventories to be maintained.

**Method:** A retrospective study was conducted in a tertiary care hospital for a period of one year i.e. from 1.04.2010 to 31.03.2011.

**Results:** The study revealed that for most of the items the Economic Order Quantities are greater than lead time consumption and in such cases maximum inventory at any point of time need not be greater than EOQ, provided that there is not much variation in lead time. The lead time for almost all items is less than one day and EOQ for high value, high consumption items is more than lead time consumption.

**Conclusion:** Any variations in lead time should be taken note of immediately and the reorder levels have to be adjusted accordingly. This extra effort may however be insignificant compared to benefits the inventory control system provides.

**Keywords:** ABC and XYZ analysis, VED Analysis, EOQ, Lead time, Buffer Stock, Safety Stock

## INTRODUCTION

Materials are the basic necessity for every human being to subsist, and this makes it imperative for all to acquire, accumulate, and make the most of it within the limited resources available.

Materials are defined as “relating to the production and distribution of economics, goods, and the social relationships of owners and laborers” (Webster. 2007). And Management is “the art, act or manner of handling controlling and directing”. Thus, materials management is the art of handling, controlling and directing the purchasing, production and distribution of goods.

Inventories are stored resources and its management is to determine how much to order? And when to order? Inventories include the sum total of items and the costs associated with all the supplies which are stored and not yet used in the organization.

Inventories are stored in different areas of the hospital, drug store surgical, general linen, stationery dietary and engineering & maintenance stores and of these the drug store and the surgical stores account for majority of the value of the total inventories and account for a huge percentage of the total costs.

The need of the hour is to apply sound scientific management practices on inventories of the hospital which will help improve productivity of capital by reducing the materials cost and preventing the large amounts of capital being locked up for longer periods and thus reducing the overall costs and making available to the patients quality care at affordable prices.

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With the unprecedented growth of hospitals and health care institutions—both for-profit and non-profit, have benefited with the infusion of sound managerial management concepts and strategies of which materials management is a relatively new concept in health care in our country and in the last few years there has been an increasing awareness of the importance of materials management, Hospitals have understood now what industry has taken to understood over a number of years, and accordingly customized it as 25-40% of the organization's budget is used for accomplishing this function. The aim of materials management in a hospital is to ensure that there is adequate stock and continuous supply of all the items whenever required, with the efficient use of available resources.

## METHOD

**For the purpose of the study the following tools and technique of inventory controls were used**

- Selective control such as ABC and XYZ analysis.
- Lead time analysis
- Determination of criticality of drugs used.
- Fixation of service levels.
- Consumption of pharmacy items for a period of one year i.e. from 1.04.2010 to 31.03.2011
- Calculation of consumption during lead time.
- Calculation of ordering cost.
- Calculation of carrying cost.
- Calculation of economic order quantity.
- Fixation of reorder levels making use of Q model to optimize the level of inventory.

## OBSERVATIONS

For the purpose of the present study of inventory management practices following data from Nizam's Institute Of Medical Sciences have been collected.

1. The data of consumption of the pharmacy and general items in the Cardiothoracic stores for the period 1<sup>st</sup> April 2010 to 31<sup>st</sup> March 2011.
2. Data relevant to ordering and carrying costs were collected for the same period

3. The Lead time for various items has been obtained from the Materials Manager and the data has collected. The material manager informed that lead time as one day as the vendors keep stock based on the projected demand produced to them well in advance.

## Techniques used for the purpose of inventory control

The raw data collected pertain into various items opening balance purchases, etc are made use of for the following purposes

### ABC ANALYSIS

ABC analysis is popularly known as "Always Better Control" or "Alphabetical Approach" or "Pareto's Law". The basis for ABC analysis is value of consumption.

Based on the consumption data of the Cardiothoracic Operation Theatre store items for the period of 12 months from 1-4-2010 to the 31-3-2011 ABC analysis has been worked out and is shown on table 1.

The abstract of ABC analysis showing the distribution of A, Band C items are shown in table below 4.2

As seen from the table no 4.2 ABC analysis there are 308 items currently used in the Cardiothoracic pharmacy out of which 43 items constitute a value of consumption of Rs.3,51,33,250 is accounting for 14 percent in terms of total number of items and 69 percent of total value of consumption.

**These items are classified as A items:** 58 items constituting 19 percent in terms of number account for a value of consumption of Rs.1,05,00,503/- which accounts to 21 percent.

**These items are classified as B class items:** The remaining 207 items accounting for 67 percent in terms of total number amounting for a value of Rs.50,03,321/- which amount 10 percent of value of consumption.

**These 207 items fall under C category items.**

### XYZ ANALYSIS

While ABC classification has the value of consumption as the basis, XYZ has value of inventory in store on a particular date as the basis. X items are those whose closing stock values are high, while Z item stock values are low. Understandably, Y items fall in

between the two. This classification helps to identify the items which are extensively stocked and also weed out moribund inventories.

Distribution of X,Y, and Z items are shown in table 2

As seen from the table 2, 53 items account for closing stock of Rs.35,68,403/- Which account for 17 percent in terms of numbers and 70 percent in terms of closing stock value. These items are called X category items.

21 percent of the items i.e. 68 number of items amounting to Rs.10,32,957 account for 20 percent value of closing stocks comes under the category of Y.

The remaining 196 items of whose closing value is Rs.5,19,077/- constituting 62 percent in terms of numbers and 10 percent of closing stock value are termed as Z items.

If the management is caught napping one can expect large number of A items in X category. Therefore ABC and XYZ in conjunction controls as shown earlier in table no 4.4 provides control matrix for AX, BY and CZ categories and so on. To suggest remedial measures to reduce XA category of inventory XYZ and ABC matrix is shown below

The control measures for rationalization of inventories based on XYZ and ABC matrix are discussed in later part of this report.

### Ordering and Carrying Cost

The costs that arise in any of the inventory problem are apart from actual cost of inventory itself are:

- Ordering cost / procurement cost / acquisition cost setup cost (Co)
- Inventory carrying cost (Cc)
- Overstock cost (KO)
- Stock out cost / under stocking cost / down time cost (KU)

The cost of ordering opposes inventory carrying cost. The cost of ordering and cost of carrying will help to (determine or) optimize number of orders and quantity of inventory to be ordered against each order.

The under stocking costs and over stocking costs helps to determine the service level that has to be maintain optimum level of inventory.

For the purpose of arriving at the cost of ordering and carrying cost the data has been collected from accounts department on salaries and wages paid to the purchase and stores personnel, opportunity cost on account investment in inventories etc. The cost per order works out to be RS.289 and that of inventory cost as 27 percent on the average inventories held in the hospital.

### Economic order quantity

One of the most important goals in inventory management is to strike a balance between cost of possession and cost of acquisition in determining the order quantity. This balancing function will answer the question how much quantity to be purchased at a time and the number of orders to be released in a year.

Thus we can define the Economic Order quantity as that quantity where ordering cost and inventory carrying cost are equal and the total cost of the two is minimum (optimum).

- a. For arriving at EOQ the following parameters are considered:
  - Cost of ordering
  - Cost of carrying
  - Landed unit price of the items procured
  - Annual consumption of each item (annual demand)
- b. Economic Order Quantities for various items is arrived at using EOQ formula .i.e.

$$EOQ = \sqrt{\frac{2 \times \text{Annual Demand} \times \text{Cost Per Order}}{\text{Unit Price} \times \text{Cost Carrying As Percentage On Average Inventory}}}$$

### Lead time Analysis

Lead time is defined as the period that "elapses between the recognition of the need to its fulfillment" i.e. The time taken for identification of need, placement of order, procurement of material from suppliers including shipping, transport, receipt and inspection of an item.

**To arrive at lead time the following factors have been considered.**

- Location source of supply
- number of source of suppliers
- proximity of supplier



- payment terms
- logistics etc.,

The lead time for various pharmacy items have been obtained from the Cardio-thoracic stores manager, and is made available.

Buffer stock is determined based on average consumption during average lead-time and safety stock is by making use of  $K\sqrt{D}$  formula. These are presented in annexure nos. VII and VIII respectively. Also the levels of inventories at maximum, average and minimum in terms of the number of items to be maintained in the stores are suggested in the annexure no. IX

The existing lead times 2 to 6 hrs for most of the items furnished by the store manager seems to be too optimistic for a real life situation. Hence for the purpose of the present study a lead time of one day is considered for all items except for few items. However for these items the Economic Order Quantities are much higher than the lead time consumption. Hence one can comfortably ignore more than one day as lead time.

#### Fixation of Reorder levels

- For most of the high value and high consumption items the average usage is in terms of fraction of unit of measurement per day.
- In majority of the cases EOQ is higher than the lead time consumption quantity this one way helps to reduce the average levels of inventory comfortably.
- Payments to the vendors are fulfilled in most of the cases as per the agreed terms of payment. This is plus-point for the hospital to have committed suppliers who keep up delivery commitment.
- Almost all the purchases are made from distributors and stockiest who are located locally.
- Projected demand for the drugs can be indicated in advance to the distributors and stockiest to keep adequate stocks to meet emergency requirement.
- Lead time for supply in most cases less than one day. However, one day has been taken as lead time for supplies from vendors.

#### DISCUSSION

The study revealed that for most of the items the Economic Order Quantities are greater than lead time

consumption and in such cases maximum inventory at any point of time need not be greater than EOQ, provided that there is not much variation in lead time. The lead time for almost all items are less than one day and EOQ for high value high consumption items average use per day is fraction of unit of measurement and EOQ is more than lead time consumption. This helps to reduce average inventory comfortably. The hospital may explore the possibility of keeping inventories on consignment basis to avoid unexpected delays. A pilot study to computerize order operating terminals at suppliers end and simultaneous linkage with buyers may be undertaken. The data pertaining to ordering and carrying cost are to be revised and updated.

There were 59 items, in whose annual consumption was zero and 43 items whose closing stock was zero. The continuance of these items in the list of inventories is otherwise to be examined. There are 28 items whose unit rate was zero. These items still exist in the stock maybe because their shelf life has expired and those items can be returned or exchanged back with suppliers. There were a large number of items which were found to be in surplus, requiring further investigation, whether to declare them as obsolete or otherwise. Similar exercise can be done for other items of inventory such as OT and engineering and maintenance stores etc.

#### RECOMMENDATIONS

- Classification of vendors as A, B and C to explore the possibility of strategic alliance with vendors. Preparation of purchase and stores manuals to provide suitable guide lines for operational staff.
- The stock levels are to be reviewed once a month to see that levels of inventories is as per suggested inventory norms
- Study of stores layout to make is more user friendly. Introduction of Vendor Managed Inventory (VMI) concept.
- Introduction of concept of bin location for easy location of stores items.
- Review of Payment terms, credit facilities availed, promptness in paying vendors stocking and location of drugs based on the FSN classification of issues.
- Negotiation with vendors to keep stocks on consignment basis.
- Computerized ordering, operating terminals at suppliers end and Simultaneous linkages with buyers

- Regular training and education to materials staff to develop Modern concept of Materials Management in general and inventory Control in particular.

**CONCLUSION**

Any variations in lead time should be taken note immediately and the reorder levels have to be adjusted accordingly. This extra effort will definitely be insignificant and compare to benefits the system provides.

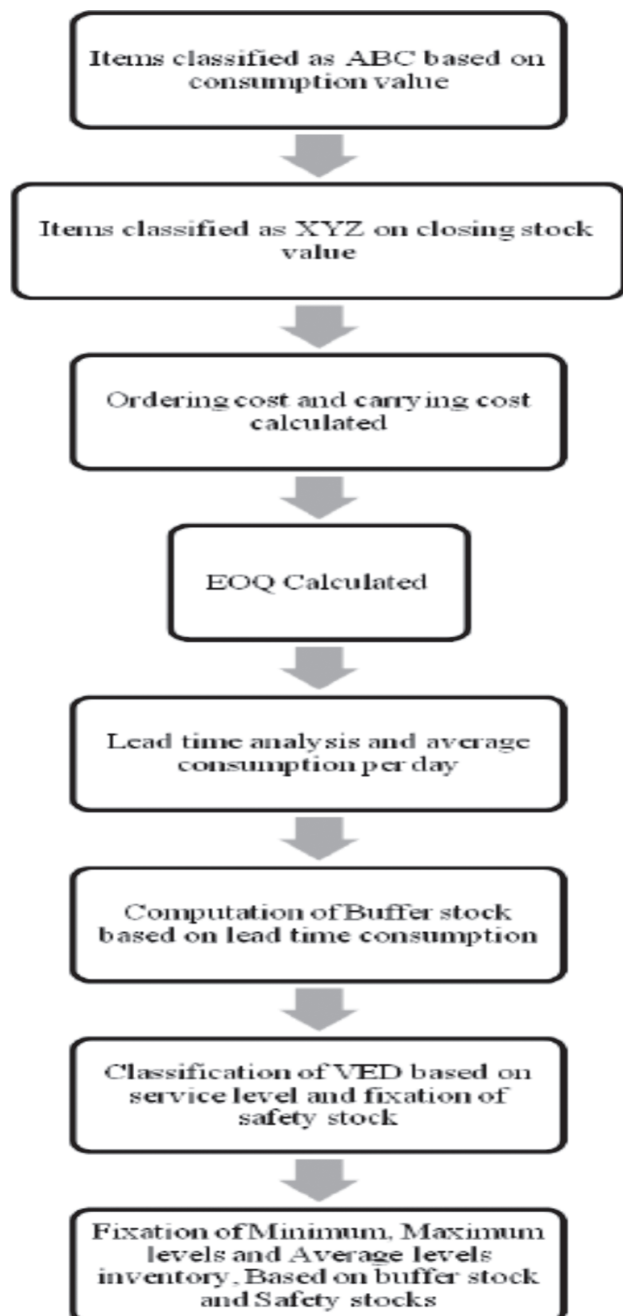


Figure No 1: Flow chart of inventory control techniques applied in this study

**Table 1: Abstract of ABC analysis based on consumption value.**

	No. of items	Percentage of items	Consumption of items	Percentage of consumption
A	43	14	3,51,33,250	69
B	58	19	1,05,00,503	21
C	207	67	50,03,321	10
Total	308	100	50,637,074	100

**Table 2: Distribution of closing stock values**

Category	No. of items	Percentage of items	Closing stock value	Percentage closing stock value
X	53	17	3568403	70
Y	68	21	1032957	20
Z	196	62	519077	10
	317	100	5120438	100

**Table 3 Control matrix for ABC and XYZ items**

	X	Y	Z
A	2267586 (28)	209893 (11)	18068 (3)
B	924116 (16)	478653 (30)	60428 (10)
C	376700 (9)	295184 (23)	374647 (156)

Note: The bracketed figures are number of items.

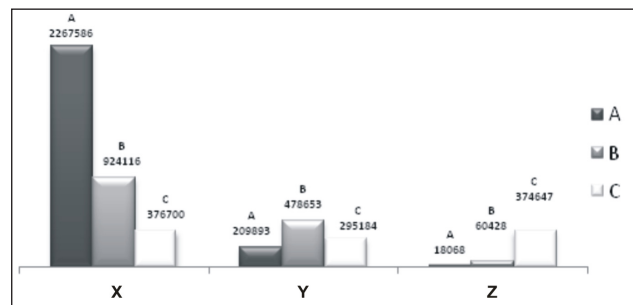


Fig. 4. Control matrix for ABC and XYZ items

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# Factors Influencing the Non-Usage of Condoms by Female Sex Workers and their Clients in Hyderabad - A Cross Sectional Study

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## ABSTRACT

**Background:** In India, total number of People Living with HIV/AIDS (PLHIV) is 2.31 million and 21% of them reside in the state of Andhra Pradesh<sup>1</sup>. The prevalence continues to be high among high risk group population in Andhra Pradesh in spite of several programmatic interventions<sup>2, 3</sup>. It was reckoned that some behavioral factors are impeding the HRGs to avail the services specially usage of condoms. Therefore, this study was planned to identify behavioral factors of HRGs especially FSWs and their clients, responsible for low usage of condoms.

**Methodology:** A cross sectional study was performed. Primary data was obtained from FSWs and their clients by visiting 6 hotspots in Hyderabad district of Andhra Pradesh. Simple random sampling technique was applied and 100 FSWs & 145 clients were selected for the study. The data was entered on MS Excel and was analyzed using SPSS version 16 software.

**Results:** It is observed that 60% of FSWs (n=100) have considerable amount of knowledge on STIs and 98% know about the correct usage of condoms. However, it is found that 68 % of FSWs (n=100) fail to use condoms with Regular Partners (RP) because of demand by RP for direct skin-to-skin contact (Penis-Vagina), trust on RP and violence & forced sex by RP. It was also observed that 61% FSWs (n=100) fail to use condoms with non-regular partner (NRP) as NRPs demand skin-to-skin touch and sometimes indulge in violence & forced sex. Similarly, analysis of clients of FSWs response showed that reasons for non-usage of condoms for RP and NRP - FSWs were force by the FSWs, forgot condoms in hurry, more pleasure with skin- to-skin contact and trust on FSWs. 58% (n=100) of FSWs responded that sometimes poor quality of condoms also prompted them for non-usage of condoms.

**Conclusion:** Awareness camps on condom usage and STI/HIVs should be arranged for the clients of FSWs and adequate and quality condoms need to be supplied.

**Keywords:** Condoms, Regular Partners, Non-regular partners and FSWs

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## INTRODUCTION

Demographically, India is the second largest country in the world,<sup>1</sup> and also has the third largest number of people living with HIV/AIDS<sup>1</sup>. Total number of People Living with HIV/AIDS (PLHIV) in India as per year 2007 estimates is 2.31 million and 21% of them reside in the state of Andhra Pradesh (AP)<sup>2, 3</sup>. The prevalence continues to be high among high

risk group population (9.74% FSWs, 17.04% MSMs and 19.72% STDs)<sup>2,3</sup>. According to APSACS annual action plan 2009, fuelling factors for HIV spread in the AP state are:

1. High prevalence of STIs among general population (6%) and High risk group (26%).
2. High Non regular sex partners and low Condom use (25%) with non-regular

partners<sup>3</sup>. Target Interventions (TI) for HRGs (Female Sex Workers (FSWs), Men having sex with Men (MSM) and Intravenous Drug Users (IDUs), Migrants and Truckers are planned under NACP-III and are implemented through TI NGOs<sup>4</sup>. Basic activities that are undertaken by TI NGOs are facilitation of Regular Medical Checkup (RMC)/ Treatment for sexually transmitted infections (Once in a quarter), regular HIV testing (once in 6 months), Condom promotion & provision, Behavior change communication, Linking them to care & support services<sup>4</sup>. In spite of doing several programmatic interventions for HRGs, prevalence of HIV and STIs remained at higher level. It was reckoned that some behavioral factors are impeding HRGs to avail the services especially with usage of condoms. Therefore, this study was planned to identify behavioral factors of HRGs especially FSWs and their clients, responsible for low usage of condoms.

### OBJECTIVES

1. Identify the reasons for low condom /non-usage of condoms by clients as well as FSWs.
2. Quantify the non-usage of condom based on reasons identified in this study.

### METHOD & MATERIALS

A cross-sectional and exploratory study was performed. A 'mixed design approach' was followed. Primary data was obtained from the FSWs and their clients by visiting hotspots in Hyderabad district of Andhra Pradesh. Simple random sampling technique was followed to collect the data. Sampling frame includes FSWs visiting hotspots and their clients. 100 FSW and 145 clients were randomly chosen for the study.

### Ethical Consideration

In order to protect the privacy of the respondents, de-identified data were collected and an informed consent was taken by the researcher prior to the interviews.

### DATA

In-depth interviews with FSWs and their clients were conducted with the help of a semi-structured questionnaire. Statistical analysis was done with the help of SPSS 16 software. We applied Chi-square test to assess the statistical significance of the difference of proportions of different indicators for different parameters. Adjusted Odds Ratio and 95% Confidence Interval (CI) were calculated to indicate statistical associations at 5% significance level.

### Inclusion Criteria

- FSWs and Clients visiting the hotspots
- FSWs and Clients those are willing to respond

### Exclusion Criteria

- FSWs unwilling to provide information.

### RESULTS

1. Condom Use by FSWs with regular & non-regular partners:

#### 1. a. Condom use with Regular Partners (RP)

It is found that only 32 % of FSWs (n=100) always use condoms with RP and 68% fail to use condoms with RP. Reasons identified for non-usage of condom with RPs during the study are as follows:

- a) It was observed that 72% of FSWs (49 out of 68 FSWs) responded that their regular partner demands/insists on direct skin-to-skin contact (Penis-Vagina).
- b) It is observed that trust in between the FSW and their regular partner also played a crucial role. 5% of the FSWs (08 out of 68 FSWs) responded that regular partners are loyal to them and also believed RP does not possess any STI/HIV infection.

- c) It is observed that Violence and Forced Sex (VFS) by the RP is also one of the factors for non-usage of condoms. 8% of the FSWs (12 of the 68 FSWs) responded that few times RP may beat and abuse FSWs to avoid condom use during intercourse. RP usually does this under the influence of alcohol, drugs.

### 1. b. Condom Use with Non-Regular Partner

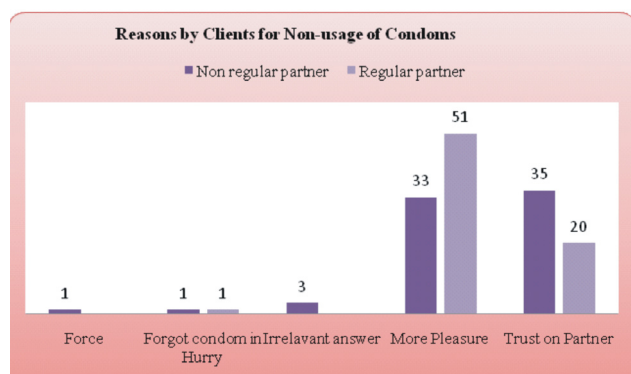
It is found that only 39 % of FSWs (n= 100) always use condoms with NRP (7% more than

Condom use with RP) and 61% fail to use to use condoms with non-regular partner. Reasons identified for non-usage of condoms with Non-Regular Partner (NRP) during the study are as follows:

- a) It is observed that 83% of FSWs (51 out of 61 FSWs) encounter non-usage of condoms with their NRP, as they demand skin-to-skin touch while intercourse.
- b) 5% of the FSWs (08 of the 61 FSWs) responded that few times NRP commits Violence and Forced Sex (VFS) to not to use condoms.
- c) It is found that trust plays insignificant role in case of NRP and contributes to 3 %. (02 out of 61 FSWs).

### 2. Clients / Partners Analysis on usage and non-usage of condoms

Clients/ partners analysis was interpreted by studying it under two sections – Reasons for condom usage and non-usage by RP and NRP FSWs. Reasons by RP and NRP for non-usage of condoms identified during the study are force by the FSWs, forgot the condoms in hurry, more amount of pleasure when skin-to-skin contacts, trust on FSW, others/irrelevant answers. It is observed that that out of five reasons, major role is played by demand for sexual pleasure and trust on the partner.



It is observed that non-regular partners appear to perform violence and forced sex more often than regular partners. It appears that RP seek more sexual pleasure from FSW than NRP and contributes to non-usage of condoms more than NRP. It appears that NRP gave more irrelevant answers in non-usage of condoms. It appears that NRP partners/clients showed more trust on FSWs about bearing no risk of HIV/STI infection from FSWs;

### Knowledge of FSW about STI/HIV spread

It is observed that 60% of FSWs (60 out of 100 FSWs) have considerable amount of knowledge on types of STI, its general symptoms and modes of spread of STI/HIV.

### 3. Knowledge of FSWs about Correct Use of Condom

It is observed that 98% FSW know about the correct use use and of condoms. Only 2% who did not know about condom use found out to be new entrants in the field.

### 4. Quality of Condoms

It is observed that quality of condoms has affected the usage by FSWs. 58% (n= 100) of FSWs responded that sometimes poor quality of condoms prompted non-usage of condoms.

## ASSOCIATION OF ATTRIBUTES

Association of attributes method was applied to check the effect of some of the above identified factors on condom use. The observations are as follows:

### 1. Association between condom use and knowledge on spread of HIV/STI

Lack of knowledge about the spread of HIV/STI may lead to non-usage of condom as there exists no fear about getting the disease and risk perception is low.

### 1. a. Condom use with RP and knowledge of FSWs about spread of HIV/STI

**Table-1: Measurement of association of condom use with RP and knowledge of FSWs about spread of HIV/STI**

PARAMETERS	Point	95%CI	
	Estimate	Lower	Upper
Odds Ratio (cross product)	0.9625	0.4087	2.2667(T)
STATISTICAL TESTS	Chi-square	1-tailed p	2-tailed p
Chi-square - uncorrected	0.0077		0.93
Mid-p exact		0.46	
Fisher exact		0.55	

It is inferred that there is no statistically significant association between knowledge about spread of HIV/STI and condom use with RP as calculated value of Chi-sq. test is less than table value ( $p = >0.05$ ).

### 1. b. Condom use with NRP and knowledge of FSWs about spread of HIV/AIDS

**Table-2: Measurement of association of condom use with NRP and knowledge of FSWs about spread of HIV/AIDS**

PARAMETERS	Point	95%CI	
	Estimate	Lower	Upper
Odds Ratio (cross product)	0.9324	0.4110	2.1153 (T)
STATISTICAL TESTS	Chi-square	1-tailed p	2-tailed p
Chi-square - uncorrected	0.0280		0.86
Mid-p exact		0.43	
Fisher exact		0.51	

It is inferred that there is no statistically significant association between knowledge about spread of HIV/STI and condom use with NRP as calculated value of Chi-square test is less than table value ( $p = >0.05$ ).

If the FSW does not know how to use a condom in a correct way then it may lead to non-usage of condom. Hence we tried to identify the association between correct knowledge of wearing a condom and condom use with RP and NRP.

### 2. Association between condom use and knowledge of correct use of condom

#### 2. a. Condom use with RP and knowledge of correct use of condom

**Table 3: Measurement of association of condom use with RP and knowledge of correct use of condom**

PARAMETERS	Point	95%CI	
	Estimate	Lower	Upper
Odds Ratio (cross product)	0.4627	0.0280	7.6420 (T)
STATISTICAL TESTS	Chi-square	1-tailed p	2-tailed p
Chi-square - uncorrected	0.3039		0.58
Mid-p exact		0.32	
Fisher exact		0.53	

It is inferred that there is no statistically significant association between knowledge of wearing a condom in a correct way and condom use with RP as calculated

value of Chi-sq. test is less than table value ( $p = >0.05$ ). This occurrence is just by chance.

**2. b. Condom use with NRP and knowledge of correct use of condom**

**Table 4: Measurement of association of condom use with NRP and knowledge of correct use of condom**

	Point	95%CI	
PARAMETERS	Estimate	Lower	Upper
Odds Ratio (cross product)	0.6333	0.0385	10.4304 (T)
STATISTICAL TESTS	Chi-square	1-tailed p	2-tailed p
Chi-square - Uncorrected	0.1038		0.74
Mid-p exact		0.39	
Fisher exact		0.63	

It is inferred that there is no statistically significant association between knowledge of wearing a condom in a correct way and condom use with NRP as calculated value of Chi-sq. test is less than table value ( $p = >0.05$ ).

Thus if no association exists between above mentioned factors and condom use then we can infer that trust on the partner, sexual pleasure demanded by the partner and violence and forced sex plays a huge and bigger role in non-usage of condoms during sexual encounter at 95% CL. This finding is also supported by Client Profile Study.

**DISCUSSION**

Data analysis has reflected that three factors- trust, sexual pleasure and violence forced sex played major role in usage/non-usage of condoms. These findings find coincidence with the study results that have been done in past<sup>5,6, and 7</sup>. Out of the three reasons, two found to be significant i.e. sexual pleasure (58% , n= 100) and trust on the female sex worker (38%, n=100) at 95% CL and in support of this our primary data is in concurrence with other studies conducted in United States, Mexico and Russia<sup>5, 7</sup>.

At 95% CL, 31% FSW said that they have trust on their RP which does not necessitate the use of condom<sup>8</sup>. 28% reported that their RP demand the skin to skin touch and not to use condom. There occurs to be only 9% contribution of violence and forced sex by RP for non-usage condom which is in accordance with studies done at New York and Connecticut states in USA<sup>9</sup>. Data from NRP identifies the existence of sexual pleasure and violence and forced sex. At 95% CL, 41% FSW reported that their NRP demands skin to skin touch and 17% violence forced sex. Trust plays merely no role (3%) in non-usage of condom. These findings were similar to the findings in the previous studies performed in Tijuana, Mexico<sup>11</sup>.

Non-usage of condom was also testified against the knowledge and condom use experience of FSW. At 95% CL, 60% FSW have the knowledge of spread of HIV/STI and 98% knows the correct use of condom. Controversy may arise as the bad quality of condoms is experienced by 42% of FSW which may have impacted 49% of FSW to think condom use as an unreliable way of making protected sex. Similar results finds correspondence with the studies conducted in India<sup>12, 13</sup>.

To rule out the association between quality of condom and its impact with usage of condom, we performed association of attributes method. Calculated value of chi-square in case of condom quality and condom use is for RP= 0.49 and NRP= 0.79, which is less than the table value of chi square proving no or negative association. Odd's Ratio (OR) for RP= 0.74 and NRP= 0.39 which is again <1 proving no association between condom use and condom quality. To rule out association between belief of FSW (Condom is not a reliable way of protected sex) and practices (Condom use) again chi square and OR was employed. Calculated value of chi square is RP = 0.77 and NRP =0.64 which is less than table value of chi square proving no association between FSW's belief and condom use. OR for RP= 1.13 and NRP= 1.20 determining the strength of association but p- value for RP= 0.46 and NRP= 0.40 which far more than 0.05 stating no significant association.

**CONCLUSIONS**

- More focus should be given to clients or partners and awareness camps on condom usage and STI/ HIVs should be arranged.
- FSW and clients should be taught about the benefits and needs of correct and consistent use of condoms. Condom quality should be improved.

**Acknowledgement:** We at Association for Rural and Urban Needy (ARUN) express our sincere gratitude to management, colleagues and administrative staff for rendering their support in smooth implementation of the study.

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# Evaluation of Digital Radiographs & Other Performance Parameters of Digital Radiographic System in Comparison to Conventional Radiography

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## ABSTRACT

**Objective:** To assess the quality of Digital Radiography (DR) with respect to various quality factors and parameters with conventional radiology(CR).

**Method:** The study population included patients of all age groups apart from various out-patient departments for radiographs of varied body parts, thousand radiographs selected at random during the period of four months, had been evaluated for various quality parameters. Bed-side and in-patient radiographs were excluded from the study.

**Results:** The study showed as the radiographic quality of digital radiography imaging does not show significant difference over conventional X-rays; however the digital radiography unit scores over conventional radiography in decreased number of re-exposures and has the advantage of archiving and retrieval system.

**Keywords:** Digital Radiography, Optimal Study, Suboptimal Study

## INTRODUCTION

Since the revolutionary advent of X-ray and X-ray films, the conventional film-screen is the most widely used method as it offers high spatial resolution, high sensitively, easy handling and low cost. The films also act as an image receptor, display medium and a source of permanent record. However, these systems are limited by the small exposure range of the film and are intolerant to exposure errors, necessitating re-exposure as the final image recorded is permanent and not amenable to any kind of manipulation.

A step further in the acquisition of images, has been Computed Radiography (CR) and Direct Digital Radiography (DR), which has been made possible with the use of computers.<sup>[1,2]</sup> The CR system involves exposing the cassette as in film radiography. The cassette is then to be moved from the inspection site to the reader location. The CR plate is digitally imaged and the image is evaluated on the PC. The plate is then erased for next exposure. The DR requires exposing the digital panel. Images are then immediately available for evolution on the monitor without moving the panel from the inspection site. Next exposures can be made immediately. Hence, in DR systems, images can be viewed and evaluated as they are being exposed in real time.

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Digital radiography is the latest advancement incorporating computer technology in the capture, display, enhancement and storage of direct radiographic images. Digital images offer some distinct advantages over film, but like any emerging

technology it presents new and different challenges for the practitioner to overcome.<sup>[3]</sup>

The newly installed DR unit in NIMS – DR 1000 has high sensitive CCD (Charge Coupled Device) sensor as an important component of the detector. Hence, evaluation of quality of the DR images taken at this unit, and the performance of the DR unit becomes important so as to decide its suitability for daily practice.

## METHOD

The study has been conducted in the Department of Radiology, NIMS, over a period of 4 months from Dec'09 to March'10. The study population included the patients of all age groups, referred from various OP departments for radiographs of varied body parts: These included

1. Chest, 2. Musculoskeletal, 3. C-Spine, 4. D-Spine, 5. L-Spine, 6. Abdomen & Pelvis, 7. Skull, 8. Pediatric. Chest, 9. PNS and others.

### First step

The patients were radiographed for the requested body part with Rotanode E-7239 X tube and tube housing manufactured by M/s Toshiba, Japan (Al filter- 2.5 mm)- Atomic Energy Regulatory Board (AERB) approved. The radiographs were taken after recording the demographics and clinical details of the patient. Along with the patient, the detectors were exposed simultaneously on a DR Unit and the image obtained immediately on the monitor. This image can be manipulated with respect to contrast and brightness and edited as per the requirement, before finally obtaining the hard copy.

This constituted the general work flow of DR Unit.

### Second step:

At the same time, an equal no. of radiographs of the various body parts of other patients with similar demographics was selected at the department conventional X-ray system. These X-rays were also assessed for the various quality parameters simultaneously and the two were compared.

### The exclusion criteria included were

1. The bedside and inpatient radiographs were excluded from the study.

2. The radiographs performed on DR unit were not re exposed on conventional system for comparison of pathological lesions as re exposure obviously cause increase in the radiation dose.

A total of 1000 DR's and CR's each, were randomly read and evaluated by an institutional radiologist and an external radiologist independently . The opinions of and the remarks of both the evaluations with regards to the quality of radiographs formed the basis for the evaluation of the performance of DR Unit.

The quality of a radiograph depends on the spatial or high contrast resolution and density or low contrast resolution.<sup>[4]</sup> Special resolution is the ability to distinguish two anatomical structures of high contrast E.g. the lungs and bones in a chest radiograph. Contrast resolution refers to the ability of distinction between two adjacent structures of low contrast E.g. the various soft tissues on a chest or abdominal radiographs. (These parameters are in turn decided by blur, motion artifacts, density of the object magnification etc).The quality of the radiographs was divided into 3 categories for a more objective evaluation: - good, optimal and suboptimal.

*Good study* indicates that the film shows complete radiographic information, sharp margins of the anatomical structures, adequate demonstration of shades of grey including fat planes. No artifacts, no repetition of the study.

*Optimal study* indicates adequately demonstrable radiographic information, few artifacts, and minimal blur of the anatomical structures, minimal grainy appearance, and no repetition of the study.

*Suboptimal study* indicates no appreciable radiographic information, significant artifacts, blurring of anatomical structures and grainy appearance, repetition of the study required.

The data was analyzed and the observations were tabulated. The inferences drawn from this, helped in evaluating the performance of the DR Unit in comparison to the conventional X- ray system.

### Third step

The performance parameters of any radiography unit include the productivity, speed of service, reproducibility and cost effectiveness apart from the acceptable quality of the radiographs. The productivity

is measured as the rate of patient throughput, i.e. mean number of patients moved through the DR Room for the examination per hour. Speed of service, calculated from the time the patient details are entered in the records to the time DR Film is available to the patient.

These parameters of both DR and Conventional X-ray system were also compared so as to evaluate the performance of the DR unit in comparison to conventional system. This would in turn help decide the cost effectiveness of installing a DR unit. It would also help in further recommending steps to improvise the primary version of this DR Unit by Electronic Corporation of India Limited (ECIL) company.

### OBSERVATIONS

The study included patients of ages 1 year to 73 years with a mean age of 37 years. The maximum number of patients radiographed, belonged to the 30-40 yr age group (504) followed by 41-50 years age group (236). (Table 1 and Table 2)

There was a male predominance of M: F of 2:1 (626 males against 374 females).

The maximum number of X-rays requested was the Chest radiographs (CXR). These constituted 60% of all the radiographs evaluated in the adult population. Of these, 50 pediatric CXR were included, which formed 0.4% of the study bulk. 10% each were the lumbar and cervical spine X-rays. The majority of spine X-rays were in the age group of 41-50 and 51-60 years as regards to the degenerative changes seen during the 4<sup>th</sup> and 5<sup>th</sup> decade.

The Chest radiographs included in the study were of patients of all age groups, from 1 to 72 years of age. Of the 600 CXR taken on DR Unit, 255 were good, 248 optimal and 97 were repeated as they were sub-optimal. In most of the optimal and suboptimal, the cause was the detector marks seen as grid on the soft tissues. Few optimal X-rays were operator dependent as contrast could be adjusted for still better films. This particularly was seen in robust and healthy patients and gave undesirable images, which could not be manipulated or edited even on the monitor, and hence were seen on the printed hard copy.

As against the equal number of good and optimal CXR on DR unit, a sharp rise in optimal CXR on conventional system (335/600). The good and suboptimal X-rays were 137 and 128 respectively. The

optimal and suboptimal CXR together on conventional system were 77% i.e. 463/600 due to various inherent factors of conventional system like exposures factors, contrast adjustment and the film developing process which show a linear response. These disadvantages of conventional system are successfully and efficiently dealt with in digital radiography.

### DISCUSSION

The overall image quality obtained with the DR unit does not show marked difference when compared to conventional X-Rays. This has been substantiated by various studies as well, the most striking being "DR vs. Conventional Radiography in chest imaging" by Garmer et al<sup>[5]</sup>.

The sharpness of the images, with this DR unit is overall less as compared to conventional X-Rays (even with X-Rays obtained with CR unit from outside clinics).

The maximum number of films was chest radiographs. The obvious advantage of DR radiographs over conventional x-rays was significant decrease in the number of re-exposures.<sup>[6,7,8]</sup> However, the overall imaging qualities on both the systems were equivocal with regards to pulmonary, interstitial, chest wall and mediastinal abnormalities. The DR has slight advantage in detecting spinal abnormalities and subtle foreign body or pulmonary nodules without being statistically significant.

The spine and musculoskeletal X-rays though have sharp spatial resolution, but the final prints obtained were overall hazy and grainy. This could be partly operator dependent and partly technical. This seems to be a lacuna with this unit as it has not been seen with other studies. The bony details are maximally detected on digital X-ray as the contrast and brightness can be adjusted even after acquisition of images and hence even subtle airline fracture can be seen with an advantage.

The digital X-rays are supposed to score over conventional system in pediatric population. However, it was not found to be so with this unit, where most of the X-rays were suboptimal. This is largely due to improper adjustment of factors on the X-ray machine and cumbersome tube and detector assembly.

**Advantages of DR unit over CR**

- 1) Dark room processing is not required; hence purchase and maintenance of chemicals can be avoided.
- 2) Patient details like name, age, sex and date of radiograph are available on the film.
- 3) The radiograph appears immediately on the monitor and the clinicians can read them simultaneously.
- 4) The contrast of the radiograph can be adjusted as required.
- 5) The radiographs taken by a DR unit can be stored in a computer/ CD as a permanent record and retrieve them even after months or years.
- 6) Repeated exposures are less compared to conventional radiography.

**Disadvantages of DR unit over CR**

- 1) The radiographs taken on DR unit show artifacts frequently. Rectangular and horizontal bar like artifacts are noted on the films. These were not able to be rectified even after repeated adjustments.
- 2) The factors required to take the radiographs of various body parts are operator dependent. Significant difference in the quality of the films was observed when different radiographers operated the machine.
- 3) The factors for pediatric radiographs are not properly set and the information from the radiographs is obtained with great difficulty.
- 4) The heavy X-ray tube and DR detector needs to be rotated manually each time of X-ray of different body parts is asked for, which leads to wear and tear of machine and physical strain to the operating personnel.

**CONCLUSIONS**

The radiographic quality of DR imaging does not show significant difference in radiographic quality over conventional X-rays. The DR unit scores over conventional radiography in decreased number of exposures. And has the advantage of archival and retrieving system. However, the DR system has its drawbacks such as, frequent detector artifacts noted, overall reduced sharpness and spatial resolution, and high operator dependence.

**Table1: Images taken by Digital Radiography Unit**

Radiographs requested	Total number of radiographs	Radiologists opinion (Good study)	(optimal study)	(Sub-optimal study)
Chest	600	255	248	97
Musculoskeletal	80	45	29	6
Lumbar spine	100	35	43	22
Cervical Spine	100	71	27	2
Abdomen & pelvis	10	7	3	-
Skull	10	8	2	-
Pediatric	50	10	21	19
Dorso-Lumbar Spine	40	21	14	5
PNS	10	3	5	2

**Table2: Images taken by Conventional X-Ray Unit**

Radiographs requested	Total number of radiographs	Radiologists opinion (Good study)	(optimal study)	(Sub-optimal study)
Chest	600	137	335	128
Musculoskeletal	80	33	26	21
Lumbar spine	100	60	28	12
Cervical Spine	100	74	12	14
Abdomen & pelvis	10	3	6	1
Skull	10	6	2	2
Pediatric	50	27	13	10
Dorso-Lumbar Spine	40	22	10	8
PNS	10	3	5	2

**Conflict of Interest:** None

**Source of Funding:** None

**Ethical Clearance:** Approved by Nizam's Institute of Medical Sciences Ethics Committee vide letter number: EC/NIMS/1090/2009 dated 24-02-2009

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# A Study of Seroprevalence of Hepatitis B Surface Antigen, Antibodies to Hepatitis C Virus and Human Immunodeficiency Virus in Patients Visiting Tertiary Care Centre in Bangalore

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## ABSTRACT

**Background:** Hepatitis B, Hepatitis C (HCV) and Human Immunodeficiency Virus (HIV) infections are a serious global and public health problem.

**Aim:** To find the seroprevalence of HBsAg, HCV and HIV among the patients visiting Dr B.R. AMCH.

**Objective:** To estimate the seroprevalence of HBsAg and antibodies to HCV and HIV in both the sexes and different age groups in patients visiting Dr B.R. AMCH.

**Materials and method:** Serum samples collected over a period of 12 months were subjected for the detection of HBsAg, anti-HCV Ab and anti-HIV Ab using rapid card tests in central laboratory. This was further confirmed by Qualisa.

**Statistical analysis:** The data entry was carried out using Microsoft Office Excel worksheet.

**Results:** The seroprevalence of HBsAg was found to be 1.1%, of anti-HCV as 5.5% and of HIV Ab as 1.3%. The study throws light on the magnitude of prevalence in this set up and provides a reference for further studies.

**Keywords:** Hepatitis B, Hepatitis C, HIV, Seroprevalence

## INTRODUCTION

The HBV infection is a global problem, with 66% of all the world's population living in areas where there are high levels of infection. More than 2 billion people worldwide have evidence of past or current HBV infection and 350 million are chronic carriers of the virus, which is harboured in the liver and causes an estimated 6,00,000 deaths from cirrhosis of liver and hepatocellular carcinoma. India has been placed into

the intermediate zone of prevalence of Hepatitis B (2-7% prevalence rates by WHO)<sup>[1]</sup>. Hepatitis B is highly infectious and can be transmitted covertly by percutaneous routes and overtly by blood transfusion. The hepatitis B surface antigen (HBsAg) in serum is the first serum marker to indicate active HBV infection either acute or chronic<sup>[2]</sup>. An effective vaccine is available for over 2 decades and has brought about remarkable changes in the global epidemiology of HBV infection.

Hepatitis C that accounts for 40% of chronic liver disease, is the most frequent indication for liver transplantation<sup>[3]</sup>. HCV is especially dangerous in that its morbidity is high as it establishes a state of chronic infection in as many as 85% of acutely infected patients<sup>[4]</sup>. Chronic hepatitis C is a ubiquitous disease affecting around 200 million people world wide<sup>[5]</sup>. The major channels of HCV transmission are all related to

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exposure to blood and blood products. The presence of anti Hepatitis C virus antibody(anti-HCV Ab) indicates previous exposure to Hepatitis C virus.This antibody is present only in 40% of acute infections but in more than 95% of chronic infections.<sup>[6]</sup> In India antibodies against HCV are present in approximately 15 million people with a prevalence rate of 2%.<sup>[7]</sup>

The HIV/AIDS epidemic is one of the largest public health crisis of 21<sup>st</sup> century, while the epidemic has spread over the past two decades, a cure or vaccine for HIV remains elusive. The HIV prevalence estimates have come under increased scrutiny in recent years and with availability of more reliable data,it was estimated that about 33.3 million people were living with HIV in the world, with 2.6 million newly infected people in India(2009)<sup>[1,8]</sup>.

The study was undertaken at Dr.B.R.AMCH, Bangalore to estimate the magnitude and dynamics of transmission of certain infections in community and for their control and prevention.

### MATERIALS AND METHOD

#### Study setting and design

This study was conducted in the central laboratory at Dr.B.R.AMCH for a period of one year from November 2010 to December 2011 in the Patients who registered at the OPD'S or were admitted to the Inpatient department for HIV and HCV antibody testing and Hepatitis B screening .

#### Sample collection and laboratory testing

A 5ml venous blood sample was collected from all the patients who came with the laboratory requisitions for the testing of HBsAg , HCV and HIV antibodies. The blood was allowed to clot for 45min at room temperature and the serum was separated after centrifugation at a low speed, was then subjected to requested tests. The serum was tested for HIV antibodies using a rapid card test- HIV TRIDOT Rapid HIV1 and 2 (J Mitra & Co).Samples testing reactive with this method were rechecked in-house by two other rapid tests-Comb Aids-RS(Span Diagnostics Ltd) and Signal HIV1/2(Span Diagnostics Ltd). Samples were further confirmed for HIV antibodies by Qualisa (Tulip Diagnostics).

IgG antibodies to HCV were determined using a rapid card method –HCV Tridot (J Mitra & Co).Samples reactive by this test were rechecked in-house by another rapid test (S. D. Bio- standard Diagnostics, Pvt. Ltd.), and were further confirmed by Qualisa (Tulip Diagnostics). HBsAg was determined using a rapid card method Hepacard(Biomed Industries).Samples reactive by this test were rechecked in-house by another rapid test (S. D Bio - standard Diagnostics, Pvt. Ltd.),and were further confirmed by Qualisa (Tulip Diagnostics).

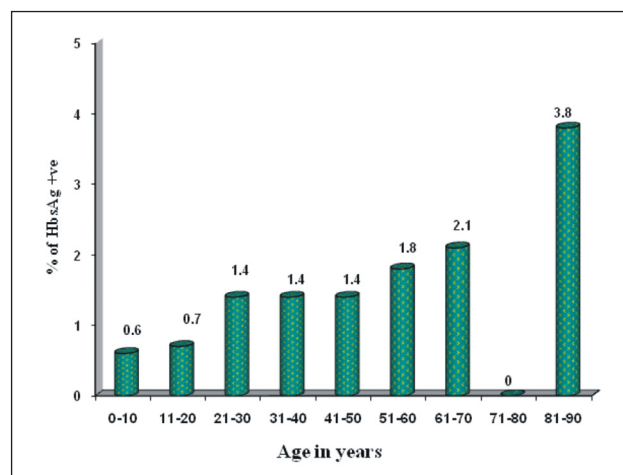
### RESULTS

Out of 4055 serum samples, 4001 were processed for HBsAg detection ,32 were tested for Hepatitis C antibodies, and 3267 were tested for HIV antibodies over the period of 12-months. The prevalence rates of HBsAg are shown in table( 1) .The highest prevalence of HBsAg was found in the age group of 20-40 yrs, Diagram(1). The seroprevalence of HIV antibodies among males(1.25%) was higher than females(1.05%),Table(4). The highest seroprevalence of anti-HIVantibodies was found in the age group of 31-40 years,Diagram( 2).

Table 1: Prevalence of HBsAg positive

HBsAg	Number	%
Negative	4001	98.7
Positive	54	1.3
Total	4055	100.0

Diagram: 1 Age distribution and prevalence of HBsAg



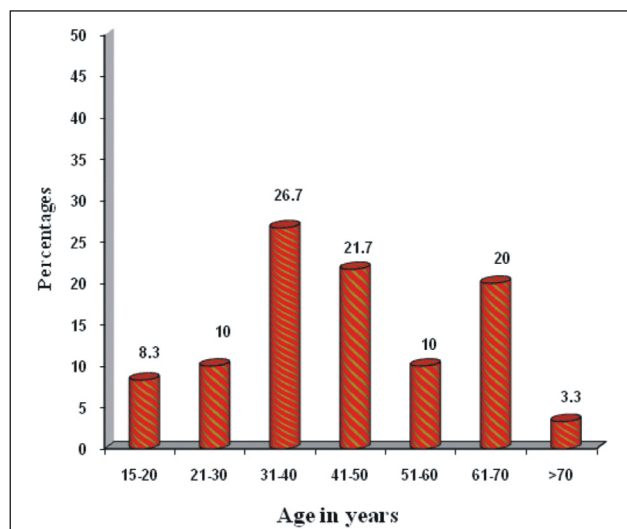
**Table 2: Gender distribution and prevalence of HBsAg**

Gender	Total Number	Number of screened as HbBsAg+ve	% of HBs Ag +ve
Male	1727	13	0.75
Female	2318	21	0.91
Total	4045	54	1.33

**Table 3: Prevalence of HIV**

HIV	Number	%
No	3267	98.9
Yes	38	1.1
Total	3305	100.00

Diagram:2 Age distribution and prevalence of HIV

**Table 4: Gender distribution and prevalence of HIV**

Gender	Total Number	Number of screened as HIV+ve	% of HIV +ve
Male	1681	21	1.25
Female	1617	17	1.05
Total	3298	38	1.15

## DISCUSSION

The seroprevalence of Hepatitis B surface antigen (HBsAg) of 1.1% was noted in our study. This is in accordance to other studies which suggested the true prevalence rate in India as 1-2%<sup>[9]</sup>. Similar results have been reported by other studies with prevalence of 2.5%<sup>[10]</sup> and 2.28%<sup>[11]</sup>. The prevalence of Hepatitis B varies from country to country and depends upon a complex mix of behavioural, environmental and host factors. In general it is lowest in countries with high standards of living (eg/- Australia, North America,

North Europe) and highest in countries with low socioeconomic levels (eg/- China, South East Asia, South America).

The seroprevalence of Hepatitis B among males and females in our study was 0.75% and 0.91% respectively. Similar studies have reported that prevalence in males and females did not differ significantly<sup>[12,13]</sup>.

The seroprevalence of HCV in this study was found to be 5.5%, similar studies were reported from Pondicherry [4.8%]<sup>[14]</sup>, Mauritius [5.9%]<sup>[15]</sup>, Ethiopia [6%]<sup>[16]</sup>, Pakistan [9%]<sup>[17]</sup>.

In our study the two cases positive for HCV antibodies belonged to age groups 30-40 yrs and >/61 yrs.

The small sample size of positive cases in our study does not allow data to be compared with other reports. In one of the studies on the seroprevalence of Hepatitis C, it was reported that the prevalence did not differ significantly according to gender but it was found to be increasing with age.<sup>[18]</sup>

The seroprevalence of antibodies to HIV was 1.3%. The seroprevalence among male and female in our study was 1.25% and 1.05% respectively. Other studies have reported the prevalence rates of 4.3% in males and 2% in females<sup>[19]</sup>.

**Conflict of Interest:** None.

**Source of Funding:** Self.

**Ethical Clearance:** Obtained.

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# Role of Micronutrients on Children with Attention Deficit Hyperactivity Disorder: A Contentious Issue

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## ABSTRACT

Attention deficit hyperactivity disorder (ADHD) is a heterogeneous disorder with a complex etiology and manifestation, which is, originally expressed in the brain. Neurotransmitters play a pivotal role in the efficient working of brain cells. They can be synthesized and maintained by balanced nutrition. The aim of the present paper is to review the literature related to the contentious role of nutrients in ADHD. Evidences were reviewed to outline the role of two nutrients- vitamins, and minerals in ADHD. It was concluded that there is a more need of standardized long term clinical trials for drawing a concrete association of these nutrients with ADHD. Also, probably an integrated nutrient approach would be better protocol for combating ADHD than supplementation of single nutrient.

**Keywords:** ADHD, Minerals, Neurotransmitters, Vitamins

## INTRODUCTION

In *Diagnostic and Statistical Manual of Mental Disorders-IV-TR* (DSM-IV-TR), attention deficit hyperactivity disorder (ADHD) is defined as a persistent pattern of inattention and/or hyperactivity-impulsivity that is more frequently, displayed and more severe than is typically observed in individuals at a comparable level of development (Criterion A).<sup>1</sup> Criterion B involves the age of onset for the diagnosis, where, the child will generally have symptoms severe enough to cause impairment before the age of 7 years and Criterion C states that some impairment must be present in at least two settings, generally, home and school or other places the child attends daily.<sup>2</sup>

The prevalence of ADHD in preschool children is estimated to be 2-8%, in elementary school-age children 4-12% and in adolescence 6% and it is quite stable worldwide, with rates that are comparable to those in United States, in both industrialized and

developing countries.<sup>3</sup> Boys are affected three to six times more commonly than girls.<sup>4</sup> This estimation indicates toward the magnitude of the problem and the necessity of probing into the etiological as well as moderator factors.

The etiology of ADHD, constitute five paradigms: neurobiological comprising neuropsychological as well as neuropsychological, cognitive, psychological, behavioral and social-familial system.<sup>5</sup>

But this childhood disorder cannot be adequately understood without creating an insight in the moderator variables operating along with the etiological aspects of the problem. Moderator variables like poverty, family dysfunction, poor parent management of children and nutrition further act as an additive to the difficulties in the management of ADHD. While preparing the treatment strategy of ADHD, it is essential to consider the moderator variables functioning with the etiological factors.

Nutrition has been one of the most controversial moderator variables. Hence, the present study attempts to review studies to analyze the micronutrients implicated with ADHD, to create an insight in the supportive nutritional management of the problem and to explore further avenues of research in this arena.

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## Nutrients

The contentious micronutrients nutrients can be categorized into two viz., minerals and vitamins. These nutrients has been associated with the ADHD in dual manner either their deficiency leads to ADHD or during ADHD their deficiency is observed.

### MINERALS

Amongst various minerals, magnesium, zinc, iron and copper have proven to be most effective in ADHD. Magnesium deficiency is observed more frequently in children with ADHD compared to healthy children and on supplementing ADHD children with magnesium a reduction in hyperactivity was observed.<sup>6,7,8,9</sup>

Besides magnesium, other bioelements like copper, iron and zinc were also found to be deficient in children suffering from ADHD compared to the healthy ones.<sup>10</sup> Zinc is associated with aetiopathogenesis and treatment of ADHD.<sup>12, 13</sup> Evidences point that deficiency of zinc was seen in children suffering from ADHD and supplementation of zinc in the form of zinc sulfate resulted in improvement of the behavioral symptoms in ADHD. Zinc supplementation decreased hyperactivity and impulsivity in children significantly although no effect on attention was observed.<sup>14, 15, 16</sup>

The information has been extended by a recent study, which, concluded that children suffering from ADHD had lower levels of not only zinc but also copper compared to population norms. A study<sup>17</sup> conducted by investigators at the University of British Columbia and the Children's and Women's Health Centre in Vancouver, Canada, and presented at the American Academy of Child & Adolescent Psychiatry 56th Annual Meeting, showed that the rates of zinc and copper deficiency among 44 children aged 6 to 12 years with ADHD were 45% and 35%, respectively. But on the other hand, elevated level of copper has been shown to be linked with behavioral disorder, though not specifically on ADHD children.<sup>18</sup>

Iron is another vital mineral which has been observed to be related to ADHD. Low iron stores may attribute to the severity of ADHD,<sup>19, 20, 21</sup> and subsequently lower brain iron.<sup>22</sup> Supplementation of iron as ferrous sulfate, lead to a significant reduction in ADHD rating scale and improved iron stores among the ADHD children.<sup>23, 24</sup>

More researches in this regard are required because in few studies<sup>25,26</sup> either the causative role of low serum ferritin in attention-deficit hyperactivity disorder has not been confirmed or lower ferritin levels were shown to be associated with higher hyperactivity scores as recorded by parental ratings but not with cognitive measures in ADHD cases.

### Possible Mechanism

Magnesium is known to be an indispensable element for neuronal activities and fatty acid enzymes.<sup>27</sup> In humans, magnesium deficiency, enhances catecholamine secretion and sensitivity to stress, which may promote aggressive behavior.<sup>28</sup> Zinc is postulated to be necessary in the metabolism of melatonin hormone which, in turn, plays an important role in the regulation of neurotransmitter dopamine. Dysfunction of the dopamine transporter is involved in the pathogenesis of ADHD. Also, it acts as coenzyme of enzyme desaturase which is important in the anabolism of long chain poly unsaturated fatty acids (PUFA).<sup>29</sup> Zinc supplementation in zinc-deficient ADHD patients improves the binding status of insufficiently occupied zinc binding sites on the dopamine transporter.<sup>30</sup>

The findings on the role of copper are debatable because not many studies have been conducted on impact of copper on ADHD. Also, due to the reason that copper is known to be essential for development and function of nervous system but excess copper also cause brain injury.<sup>31</sup> However, researches have elucidated the fact that copper is a stimulant for the enzymes tyrosinase and dopamine hydroxylase which are important for synthesis of dopamine, epinephrine, norepinephrine - neurotransmitters.<sup>32, 33</sup> It also assists the synthesis of melanin.

Iron is known to interfere with proper brain function. Dopamine is a major neurotransmitter in the brain, iron is highly concentrated in the dopamine pathways, and animal studies have shown that iron deficiency may cause learning deficits and consequent behavioral impairment by diminishing not only dopamine neurotransmission, but also serotonin and norepinephrine, which also have a potent influence on behavior.<sup>28, 34</sup> Iron deficiency also has effect on myelination, dendritogenesis, neurometabolism in hippocampus and striatum, gene and protein profiles, and associated behaviors.<sup>35</sup>

## Vitamins

Vitamins have also been found to play a vital role in pathogenesis of ADHD and probably alleviation of its symptoms. Supplementation of pyridoxine (also known as vitamin B<sub>6</sub>) along with magnesium significantly modified the clinical symptoms of ADHD, namely, hyperactivity and hypermotivity, reduced aggressiveness and improved school attention.<sup>8,9</sup> Supplementation of pyridoxine helped to elevate the serotonin level to normal in hyperactive children.<sup>36</sup>

On the contrary, some studies revealed that megavitamin regimen (niacin, Vitamin C, pantothenic acid and pyridoxine) were ineffective in management of ADHD.<sup>37, 38, 39, 40</sup> Although, a latter study,<sup>41</sup> elucidated the fact that the combination of vitamin C with alpha linolenic acid (ALA) helps in significant improvement in the symptoms of ADHD which was measured in terms of total hyperactivity scores. A preliminary study,<sup>42</sup> has shown supplementation of niacin may be helpful for the symptoms of hyperactivity, deteriorating school performance, perceptual changes and inability to acquire or maintain social relationships among children. An article<sup>43</sup> has quoted case studies in which successful control of hyperactivity syndrome was observed in children with supplementation of vitamin B<sub>3</sub> (niacin) and C.

Ample of researches are required to support the role of vitamins specifically in ADHD children. Since, the studies are scarce; it will be too early to interpret any association.

## Possible Mechanism

The possible action behind efficacy of vitamin B<sub>6</sub> may be that it is essential for normal brain development and is essential for the synthesis of brain chemicals including serotonin, dopamine and norepinephrine.<sup>44</sup> Vitamin C may be helpful due to its antioxidant property. Vitamin C is a cofactor for dopamine β-hydroxylase, dihydropterin reductase, and dopamine-adenyl cyclase, which are involved in the synthesis of dopamine and nor adrenaline. Niacin in the form of nicotinamide adenine dinucleotide (NAD) is a cofactor for hepatic tryptophan pyrrolase, which is required for the synthesis of 5-hydroxytryptamine.<sup>45</sup>

## CONCLUSION

Certainly, micronutrients play an indispensable role in aetiopathogenesis of ADHD. Children with

ADHD show micronutrient imbalances. ADHD children have lower levels of micronutrients compared to their control counterparts but supplementation of these micronutrients is helpful in the management of ADHD is still premature to conclude. The mounting controversies can be upheld and more consistent results can be obtained by conducting further controlled clinical trials with appropriate number of ADHD subjects; optimizing the amount or dosage of supplementation; checking the hyper toxic effect, if any; controlling the duration of study; selecting a reliable and sensitive method for measuring the primary outcomes.

Since nutrient deficiencies are common in ADHD, supplementation with minerals and vitamins is suggested for ameliorating the symptoms. Both these nutrients can work synergistically to maintain proper brain functioning. Currently, some advances are being made in this arena but more scope still persists for the further research. An integrative approach is required to combat the symptoms of ADHD, where nutrient therapy can play a supportive role.

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# Assessment of Anthropometric Measurement Changes as Prognostic Tools for Early Diagnosis of Breast Cancer among Urban Women in Northern & Southern India

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## ABSTRACT

**Background:** In India, outcome of breast cancer is worse as cases are usually presented in final stages so early diagnosis by simple means is important; therefore association of simple clinical changes such as in anthropometric measurements (Height, Weight, Body Mass Index (BMI), and Mid-Upper Arm Circumference (MUAC)) with early detection is assessed in this study.

**Methodology:** A unmatched case-control study was performed on 1024 women aged between 30-60 yrs. Cases (n =512) included were newly diagnosed and treated for early breast cancer at two cancer hospitals in Bhopal and Hyderabad cities and controls (n=512) were from same age/sex group visiting the same hospitals and are without breast cancer between January 2011 to December 2011.

**Results:** The study showed that mean weight of cases (67.7Kgs) was higher than controls (66.5Kgs) and statistically significant ('independent t' test = 4.3 and p = < 0.05). No significant difference with respect to their mean height was observed. Mean MUAC of cases (36.5cms) was higher than controls (35.7cms) and is statistically significant ('independent t' test = 2.7 and p = < 0.05). No statistically significant association of age groups was observed. Females having BMI > 24.99 were 1.56 times more at risk than females having BMI < 24.9 (OR: 1.5, at 95% CL and CI - 1.22-2.00). Postmenopausal females with BMI > 24.9 were 1.6 times more at risk than postmenopausal females having BMI < 24.9 (OR: 1.6, at 95% CL and CI - 1.20-2.35).

**Conclusion:** These results showed that identification of changes in anthropometric measurements at an early stage helps in early diagnosis of breast cancer.

**Keywords:** Anthropometric Measurements, Breast Cancer, Postmenopausal Obesity

## INTRODUCTION

Globally, breast cancer has become one of the major causes of death in women among non-communicable diseases<sup>1</sup>. It is observed that majority of women suffering with breast cancer were between 25 to 40 years of age<sup>2</sup>. In India 48.46% of the population is

presented by females<sup>3</sup> and showed 22.9% incidence of breast cancer and 11.1% feminine mortality because of breast cancer<sup>2</sup>. Numerous studies which have been conducted across the globe established the relationship of changes in anthropometric factors with the increased risk of developing breast cancer<sup>4, 5</sup>. Studies also suggested that body fat can store toxins and become the continuous source of carcinogens<sup>6</sup> and moreover, body fat serves as a locus for producing the oestrogen which may promote the tumour growth<sup>7, 8</sup>. However, paucity of research conducted in Indian in recent times related to breast cancer, led us to explore the effects of overweight and obesity on Breast cancer.

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### OBJECTIVES:

1. Identify age related risk of developing breast cancer in women
2. Correlate the changes in anthropometric parameters with risk of developing breast cancer in women

### METHODOLOGY

This study was an unmatched case-control study performed at 2 private cancer hospitals of Bhopal, Madhya Pradesh and Hyderabad, Andhra Pradesh states of India. Convenient sampling technique was used through which 1024 people visiting the study site from January 2011 to December 2011 were chosen as a study population. Cases (n=512) included were newly diagnosed and treated for early breast cancer at two cancer hospitals in Bhopal and Hyderabad cities and controls (n=512) were from same age/sex group visiting the same hospitals and are without breast cancer.

#### Inclusion criteria for Cases

- All females between the age group 30-60 yrs.
- Should be proven cases of breast cancer by histopathology/cytopathology
- Should have not undergone any treatment specific for breast cancer.
- Should not have suffered from any major chronic illness in the past, before the diagnosis of breast cancer so as to change their dietary pattern
- Should not be on corticosteroid therapy or suffering from hepatic disorders or severe malnutrition.

#### Inclusion criteria for Controls

- Age group 30-60 yrs.
- Did not suffer from any major illness in the past
- Should not be on corticosteroid therapy or suffering from severe malnutrition.

### DATA

All the investigations to be performed were explained to the subjects (prior to data collection) and those who consented for participation were included in the study. A semi-structured data collection tool was

prepared for data collection. Demographic details and anthropometric parameters (Height, weight, BMI and Mid-Upper Arm Circumference) were collected. Average age (47.5 years)<sup>9</sup> of menopause in Indian women was considered for age related analysis. Procedure of Lohman et al<sup>10</sup> was used for measuring the height and weight. Body mass index was calculated using Quetlet's Index – Weight in Kg/ Height in m<sup>2</sup>. We used the standard measurement for categorization of BMI: i) BMI 20–24.9 (normal); ii) BMI 25–29.9 (overweight); and iii) BMI ed 30 (obesity)<sup>11</sup>. The mid upper arm circumference (MUAC) was measured with TALC MUAC tape as suggested by Prof. David Morley<sup>12</sup>.

**Statistical tests used:** Unpaired-'t' test was used for comparing the means of cases and controls for anthropometric measurements. Hypothesis was tested by 'chi-square test' at 95% Confidence Interval.

#### Ethical Consideration

Ethical consideration was obtained from ethics review committee of EEHS. Consent about the participation in the study was obtained from every patient/subject and data was collected abiding to the strict confidentiality as requested by Hospitals.

### RESULTS

**Descriptive demographic statistics:** 71% Cases and 76% controls were from urban area of residence. 64% cases were married, 16% cases were widowed and 30% cases were divorcee. In controls, 88% were married, 8% were widowed and 4% were divorcee. In cases, 89% were literate and in controls, 92% were literate. In cases, 42% women were employed, 40% left their job because of the breast cancer and in controls, 73% women were employed and rest were housewives.

**Descriptive anthropometric statistics:** It was observed that the mean weight of cases (67.79 Kg (SD- 4.77)) was statistically higher than the controls (66.53 Kg. (SD- 4.99)) and tested for comparison of means with 'independent t' test value 4.3 (p =< 0.05). The patients and controls had no significant difference with respect to their mean height. It was also observed that the mean MUAC of cases (36.55 Cm (SD- 4.67)) was statistically higher than the controls (35.76 Cm (SD – 4.45)) and tested for comparison of means with 'independent t' test value 2.7 (p =< 0.05).

It was observed that the mean weight of cases (26.05 (SD – 3.04)) was statistically higher than the controls



(25.11 (SD – 2.51)) and tested for comparison of means with ‘independent t’ test value 5.37(p = < 0.05).

**Table-1: Comparison of BMI values with development of cancer**

BMI	Non-Cancer	Cancer	TOTAL
Above 24.99 BMI	234	291	525
Row %	44.6	55.4	100
Col %	45.7	56.8	51.3
Up to 24.99 MI	278	221	499
Row %	55.7	44.3	100
Col %	54.3	43.2	48.7
Total	512	512	1024
Row %	50	50	100
Col %	100	100	100

It was observed that the females having BMI levels more than 24.99 were 1.56 times more at risk of developing breast cancer than females having BMI less than 24.99 (OR: 1.56, at 95% Conf. level & CI- 1.22-2.00 and p = < 0.05).

**Table-2: Comparison of BMI values in Post-menopausal females with development of cancer**

Post-Menopausal BMI	Non-cancer	Cancer	TOTAL
Above 24.99	150	186	336
Row %	44.6	55.4	100
Col %	52.3	64.8	58.5
Up to 24.99	137	101	238
Row %	57.6	42.4	100
Col %	47.7	35.2	41.5
Total	287	287	574
Row %	50	50	100
Col %	100	100	100

**Post-menopausal statistics:** It was also observed that the postmenopausal females having BMI levels more than 24.99 were 1.68 times more at risk of developing breast cancer than postmenopausal females having BMI less than 24.99 (OR: 1.68, at 95% Conf. level and CI- 1.20-2.35 and p = < 0.05).

### DISCUSSIONS:

This study showed that there exists a strong association among increase in anthropometric parameters (weight, BMI, MUAC) with risk of developing breast cancer and has concurrence on mean weight with the Case control study conducted at AIIMS that also showed that patients had a statistically higher mean weight (59.75 ± 10.92 kg) as compared to the controls (56.44 ± 11.24 kg)<sup>13</sup>. Another case control study conducted in Tehran is in accord with the our

study results related to BMI which showed a significant difference in between cases and controls indicating that the mean BMI was higher in cases as compared to controls (P = 0.004) and are more at risk of developing cancer<sup>14</sup>. Similarly study done at AIIMS also showed that risk increases with increased levels of BMI and their results showed that Overweight and obese women had OR of 1.06 (95% CI: 0.76–1.47) and 2.27 (95% CI: 1.28–4.01) as compared to women with normal weight<sup>13</sup>

It is observed in this study that postmenopausal obesity bears a strong association of developing a breast cancer among women. A similar result was observed in the study done in Tehran which also showed that women with a BMI in the obese range had a threefold increased risk of breast cancer [odds ratio (OR) = 3.21, 95% confidence interval (CI): 1.15-8.47].<sup>14</sup> On the other side, Swedish population based prospective cohort study also confirmed the association of post-menopausal obesity and risk of developing breast cancer<sup>15</sup>.

The results of this study confirms strong association between increase in weight above normal, above normal BMI and postmenopausal obesity bears the strong risk of developing breast cancer among women and are in concurrence with many similar studies, performed across the globe<sup>16-19</sup>.

### CONCLUSIONS

- Overweight and obese females are more at risk of developing breast cancer
- Post-menopausal obesity makes women vulnerable to breast cancer
- Age does not play significant role in developing breast cancer if the dietary patterns are maintained to control normal BMI

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# Significance of Ischemia Modified Albumin in Subclinical Hypothyroidism Patients - A Pilot Study

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## ABSTRACT

**Introduction:** Subclinical Hypothyroidism (sHT) is characterized by normal serum free thyroxine concentrations with elevated serum thyroid-stimulating hormone concentrations. It has been associated with atherosclerotic cardiovascular disease. The present study was conducted to determine the significance of Ischemia modified albumin (IMA) as a novel marker of atherosclerosis in sHT patients with normal lipid profile.

**Materials and Method:** 50 subclinical hypothyroidism (Isolated TSH elevation) patients of either sex > 18 years and 50 age and sex matched euthyroid controls were subjected to lipid profile, Thyroid profile (T3, T4, TSH) & IMA (marker of Atherosclerosis) estimations.

**Results:** It was observed that sHT patients had normal lipid profile along with normal T3 and T4 levels. Increase in TSH ( $26.87 \pm 1.63$ ) levels were observed in sHT patients compared to controls ( $p < 0.05$ ). IMA which was expressed in Absorption Units (ABSU) was higher in sHT ( $0.46 \pm 0.06$  ABSU) compared to the controls ( $0.32 \pm 0.026$ ) ( $p < 0.05$ ).

**Conclusion:** IMA elevation with progression of sHT signifies atherosclerotic burden before the onset of dyslipidemia. This study might be helpful to plan for better optimizing levothyroxine therapy and avoid the possible future cardiovascular disease in sHT patients.

**Keywords:** : Ischemia Modified Albumin, subclinical hypothyroidism, Oxidative stress

## INTRODUCTION

Subclinical hypothyroidism (sHT), also known as biochemical hypothyroidism is defined as elevated TSH level in the range 4-10  $\mu$ IU/ml with normal free thyroid hormone levels and may be associated with mild non specific symptoms. Overt hypothyroidism is diagnosed when the serum concentration of TSH is at or above 10 uIU/ml with a low serum thyroxine (T4) level. Subclinical or mild hypothyroidism is,

however probably part of a continuum of thyroid function from normal individuals to overt hypothyroidism. The prevalence of subclinical hypothyroidism is 4 to 8% in the general population and upto 15 to 18% in women, who are over 60 years of age. It is also associated with goitre more commonly and 50-80% has TPO antibody positivity. Most available evidence for cardiovascular complications in subclinical hypothyroidism is based on surrogate markers such as adverse lipid profile, endothelial dysfunction, increased arterial stiffness, and cardiac performance but they are controversial or inconclusive.<sup>1,2</sup>

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This study aims at determining the significance of ischemia modified albumin (IMA) as a marker of ischemia in sHT patients before the onset of dyslipidemia.

## MATERIALS & METHOD

A pilot study was conducted at ESIC Medical College – PGIMSR & Model Hospital, Rajajinagar, Bangalore. The study group were comprised of patients with sHT (Isolated TSH elevation between 5-10  $\mu$ IU/ml), of either sex (Males- 23, Females -27 ) with age >18 years [n=50]. The blood samples of age and sex matched euthyroid patients were the controls [n=50]. Obese (BMI  $\geq$  30 kg/m<sup>2</sup>) subjects, dyslipidemia, smokers, hypertension, diabetes mellitus, chronic renal failure, chronic liver disease, known atherosclerotic cardiovascular disease or malignancies, patients taking lipid lowering drugs, antioxidant vitamin supplements, acetylsalicylic acid, antihistamines, antihypertensives etc were excluded from the study.

### Objectives of the study were

- To measure and compare serum T3, T4 and TSH (Thyroid function tests), IMA & lipid profile parameters between patients with subclinical hypothyroidism and the euthyroid control group and
- To correlate IMA with TSH in both the groups.

After overnight fasting, blood samples were collected under aseptic precautions from antecubital venipuncture into plain vacutainer tubes. Samples were then centrifuged at 2500 rpm for 10 minutes within one hour of collection and separated serum were analyzed for the biochemical parameters.

Plasma glucose & lipid profile were measured by standard enzymatic methods using Roche Diagnostics reagents in a fully automated Biochemistry analyzer (Cobas 400 integra). T3, T4 & TSH levels were estimated using Access-2 Enhanced Chemiluminescence Autoanalyzer.<sup>3</sup>

### Albumin Cobalt Binding Assay:<sup>4</sup>

The assay is based on the principle that myocardial ischemia causes changes in human serum albumin (HSA) that are demonstrated by reduced exogenous cobalt (II) binding. The concentration of ischemia modified serum albumin can be determined by addition of a known amount of cobalt (II) to a serum specimen and measurement of the unbound cobalt (II) by colorimetric assay using dithiothreitol (DTT). An inverse relationship thus exists between the level of

albumin bound cobalt and the intensity of the color formation. Absorbance was read in a spectrophotometer at 470 nm (Dual beam, SYSTRONICS), using a serum-cobalt blank without dithiothreitol, and the results were reported in absorbance units (ABSU). IMA assay was standardized in the Department of Biochemistry, and a standard curve was prepared in the range of 10.0–60.0 g/L of commercially available Human Serum Albumin (HSA) & analyzed by linear regression (Figure 1).

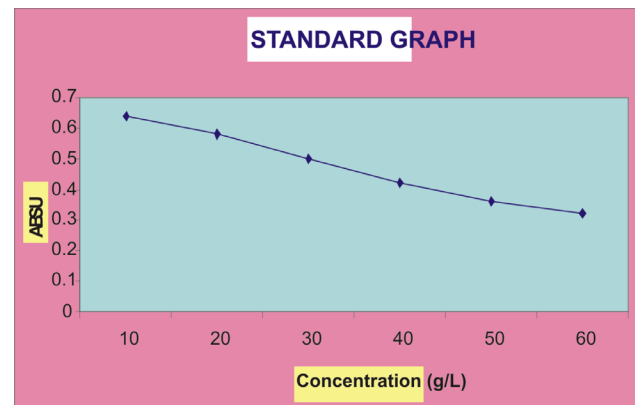


Fig. 1: Standard Graph of Ima

## RESULTS & DISCUSSION

Dyslipidemia is a common metabolic abnormality in patients with overt or sHT and constitutes the end result of the effect of thyroid hormones in all aspects of lipid metabolism including synthesis, mobilization, and degradation. The association of subclinical hyperthyroidism with coronary heart disease risk and cardiovascular mortality is still unclear. It is more controversial whether mild (or subclinical) hypothyroidism should be treated, since available evidence of a link between subclinical hypothyroidism and cardiac morbidity and mortality is not very clear, as mentioned above, and no trials have been able to show a clear benefit.<sup>5</sup>

IMA is an albumin which has altered binding capacity to bind metal ion such as cobalt (Co), copper (Cu) and nickel (Ni) in N- terminus region. It is produced when the serum albumin convenes with ischemic heart tissues. During ischemia there are series of chemical reactions that alter albumin into IMA. IMA is produced continuously during ischemia, which means that IMA blood level will change rapidly.<sup>6</sup>

In the Whickham Survey, an association was found between incident coronary heart disease and related mortality in patients with subclinical hypothyroidism over the 20yrs of follow up, which was attenuated after levothyroxine treatment.<sup>7</sup> In support of this, few meta-analysis studies suggested that subclinical hypothyroidism is associated with a significant risk

of coronary heart disease and cardiovascular mortality.<sup>8,9</sup> Increased intima-media thickness of the common carotid artery has been found in some studies in subclinical hypothyroidism.<sup>10</sup> In our pilot study, IMA was increased in sHT patients compared to controls, but the increase was statistically not significant. ( $p > 0.05$ ) (Table 1 & Figure 2)

**Table 1: Measured Parameters Among Controls & Cases**

PARAMETERS	CONTROLSN = 50	CASESN = 50	p value
Total Cholesterol (mg / dl)	170±19.4	177.7±18.3	0.02*
Triglycerides (mg / dl)	147.4± 9.03	153.4±12.3	0.003*
LDL (mg / dl)	99±18.3	108.9±17.2	0.003*
HDL (mg / dl)	41.4±2.1	41.5±3.9	0.43
T3 (ng / dl)	110.3±8.1	121.6±7.9	0.00*
T4 (µg / dl)	8.6±3.4	8.4±2.4	0.63
TSH (µIU/l)	2.6 ± 0.5	9.2 ± 1.6	0.00*
IMA (ABSU)	0.32 ± 0.026	0.46 ± 0.06	0.00*

(\*  $p < 0.05$  significant)

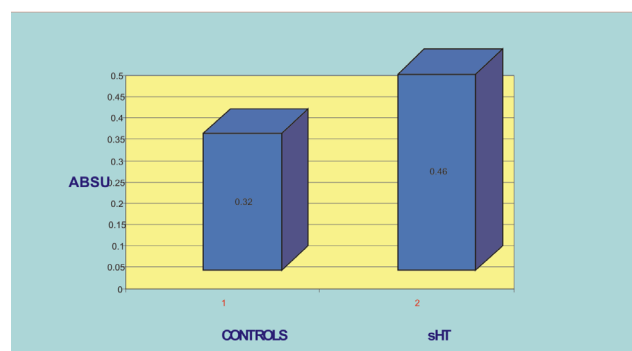


Fig. 2. Comparison of ima among controls & cases

Another meta-analysis by Razvi et al. showed that the incidence and prevalence of coronary heart disease and the risk of cardiovascular mortality were higher in subclinical hypothyroidism, in patients younger than 65 years old and more prevalent in women.<sup>11</sup> IMA is one of the markers that show myocardial ischemia earliest. There is a parallel association between IMA levels and hemodynamic parameters of the patients. Since IMA is an early marker, measurement of IMA levels may contribute to patient follow up and initiation of treatment at early stages.<sup>12</sup> Many studies have also suggested the beneficial effects of treatment for hypothyroidism in reducing cardiovascular risk at an early stage.<sup>13,14</sup>

In our study, Significant positive correlation was observed between IMA & TSH was observed among sHT patients. ( $r = 0.65$ ,  $p < 0.05$ ).

## CONCLUSION

The increased IMA levels in subclinical hypothyroidism patients correlating positively with TSH levels indicate the progressive cardiovascular morbidity and necessitates for early intervention. However, to demonstrate such a benefit would require very large clinical trials with a long follow-up period. Ideally, randomized placebo-controlled clinical trials of levothyroxine therapy in different patient groups should be performed to evaluate the effectiveness of treating sHT thereby reducing cardiovascular morbidity & mortality.

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# A Survey on Awareness of Oral Cancer among Undergraduate Medical and Dental Students of Gujarat and Punjab

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## ABSTRACT

**Objectives:** To assess the knowledge and awareness of oral cancer among 3rd, 4th and 5th year undergraduate medical and dental students of Gujarat and Punjab states during the academic year of 2010-2011.

**Material and Method:** A validated questionnaire which tested oral cancer awareness was given to medical and dental students of 3rd year, 4th year and 5th year of both the states. The total of 5593 questionnaire was delivered from which 5490 students returned it in complete form. Pearson Chi-Square test was applied.

**Results:** The overall response rate of the students was 98.16% with the mean age of 21.29 years. Significantly more dental students were aware than medical students and students of Gujarat were found to be more knowledgeable as compare to students of Punjab regarding the oral cancer.

**Conclusion:** This study highlights to improve the education about oral cancer of undergraduate students in both medical and dental groups of both the states and it can be achieved by information packages, seminars, and by the clinical training.

**Keywords:** Oral Cancer, Awareness, Education, Dental Students, Knowledge

## INTRODUCTION

Oral cancer is one of the major health problems of India and accounts for almost one-third of all cancers.<sup>1</sup> It is a heterogeneous group of cancers which involves

the tongue, lips, floor of the mouth, soft palate, tonsils, salivary glands, or back of the throat with different predisposing factors. It is the sixth most common cancer reported globally with an annual incidence of over 3, 00,000 cases, of which 62% arise in developing countries. Its incidence varies in different regions of the world as in India the age-adjusted rates vary from over 20 per 1, 00,000 populations, in the U.S. 10 per 1, 00,000 populations, and in the Middle East less than 2 per 1, 00,000 populations.<sup>2</sup> Despite the advancement in the science and technology the mortality and morbidity rates for the disease have not improved greatly.<sup>3</sup>

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Oral mucosa is the most vulnerable part of the body as it is exposed to various substances like tobacco, lime and betel nut which have mutagenic, carcinogenic and teratogenic potentials. Prolonged exposure to these substances causes structural and functional abnormalities in the oral epithelium so pre-cancerous lesions develop which may be the first sign of oral cancer. Each individual with oral cancer have different signs and symptoms. India is the fourth largest consumer of tobacco in the world and the third largest producer of it after China and Brazil.<sup>4</sup> Therefore knowledge regarding its prevention and detection is the fundamental for the treatment modality, as advanced stage of this disorder needs more invasive treatment and ultimately leads to a poor prognosis.<sup>5</sup> Health Professionals play a key role in early detection as well as alarming the community regarding the risk of using these substances, giving real hope for primary prevention.

Previous studies<sup>6,7,8</sup> of dental and medical students have shown that health professionals are not as knowledgeable about oral cancer as they should be and also they do not perform prevention and detection procedures on a uniform basis. The professional delay, system delay or lack of public awareness has an important effect on the treatment of oral cancer. Since dental and medical undergraduate students are likely to be in best place to make an early diagnosis of oral cancer, therefore we decided to assess the awareness regarding this disorder in Indian medical and dental students. In our study medical and dental students of different academic years from Gujarat and Punjab states were assessed and comparison was made between the students of two states because in Gujarat people are generally non-alcoholic and have tobacco chewing habit while in Punjab the people have habit of alcohol drinking and smoking.

To the best of our knowledge no previous reports regarding this on Indian medical and dental students exist. The present study was planned with the objectives of assessing the knowledge and awareness of oral cancer in 3<sup>rd</sup> and 4<sup>th</sup> year and interns equivalent to 5<sup>th</sup> year of other countries amongst medical and dental students of Gujarat and Punjab states during the academic year of 2010-2011.

## MATERIAL AND METHOD

The oral cancer awareness of medical and dental students of India from the states of Gujarat and Punjab was assessed by means of a questionnaire based survey during the academic year 2010-2011 which followed a cross-sectional research design. The questionnaire which was used had been designed and used by Carter LM and Ogden GR.<sup>9</sup>

As the general dental and medical education in India is a 5 and 5 1/2 year course respectively and students from 3<sup>rd</sup> year have clinical exposure, therefore 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> year students were included. The total of 5593 questionnaire were delivered, of which 103 were found incomplete and hence were not included in the study, while 5490 were returned in a complete manner. Among which 2634 were medical students and 2856 were dental. Receiving information about oral cancer during lectures in oral pathology and oral medicine sessions for dental students as well as entering clinical experiences in the medical students was considered as inclusion criteria of the study.

Twelve questions were asked, investigating: Oral cancer screening/oral mucosal examination habits; regarding risk factors for oral cancer; opportunity to examine patients with oral lesions; knowledge and confidence regarding appearance of oral changes associated with oral cancer; point of referral selection; and opinions on sufficiency of individual knowledge on oral cancer detection and prevention, desire for further information/training and the format of such information/training.

The questionnaire was easy to understand and could be independently completed by participants without difficulty. The participating students were made aware that the data would be used for research purposes. The results have been presented in the form of tables and figures. Chi square test had been used for data analysis where p value <0.05 considered as statistical significance limitations.

## RESULTS

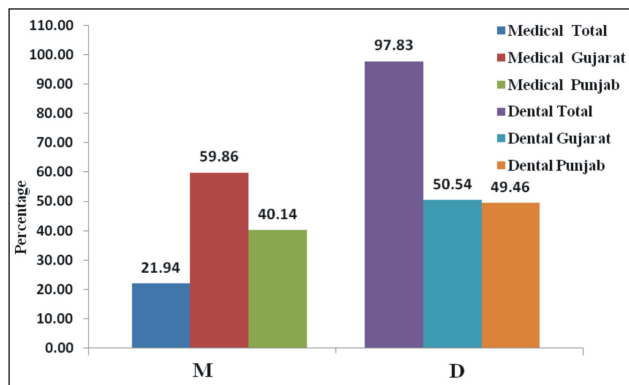
From both the states 5593 students had participated in this study and 5490 had returned their filled up questionnaire with an overall response rate of 98.16%.



**Table 1: Age and Sex wise distribution of Medical and Dental Students of Gujarat and Punjab.**

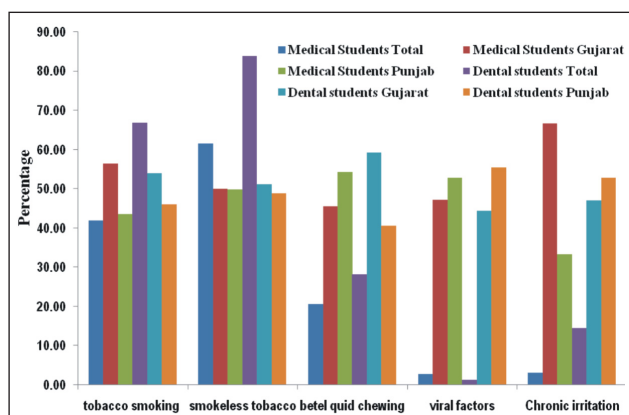
Group	Total No. %	3 <sup>rd</sup> year			4 <sup>th</sup> year			5 <sup>th</sup> year		
		M	F	Age range	M	F	Age range	M	F	Age range
Medical	263447.98	41015.57	43616.56	19.86	42015.95	45617.31	20.95	42416.10	48818.53	23.11
Dental	285652.02	46616.31	47416.60	19.69	45215.83	42814.99	21.13	48617.02	55019.26	22.97
Total	5490	876	910		872	884		910	1038	

From them 2658 were males (48.42%) and 2832 were females (51.58%) with a mean age of 21.29 years.



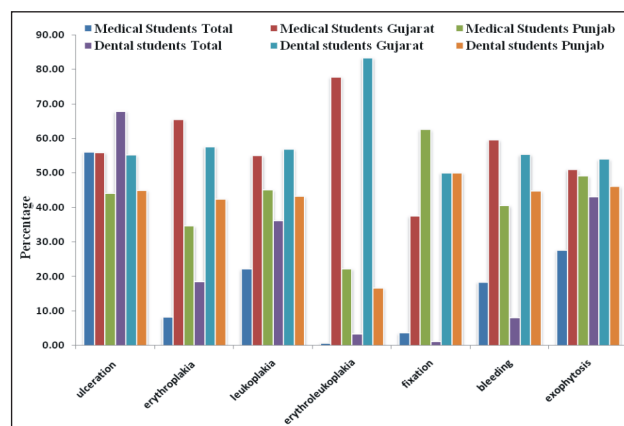
**Fig. 1. Bar diagram showing routine examination of oral mucosa by medical and dental students of Gujarat and Punjab.**

There was no difference found among the different academic years regarding the knowledge of oral cancer. Significantly, more dental students ( $P < 0.001$ ) routinely examined patient's oral mucosa than medical students and comparatively the medical students of Gujarat examined it more frequently than the Punjab as shown in figure 1.



**Fig. 2. Bar diagram showing risk factors identified by medical and dental students of Gujarat and Punjab.**

Dental students identified significantly greater number of risk factors ( $P < 0.001$ ), specifically smoking tobacco and smokeless tobacco than medical students. But two factors i.e. viral factors and previous cancer was identified better by medical students than dental students. The interstate comparison showed that medical and dental students of Gujarat state identified greater number of risk factors than Punjab state as shown in figure 2.



**Fig. 3. Bar diagram showing oral changes identified by medical and dental students of Gujarat and Punjab.**

Changes like ulceration, erythroplakia, leukoplakia, erythroleukoplakia and exophytosis was identified much well by dental students as compare to medical students whereas factors like induration, fixation and bleeding were identified better by medical students. But no significant difference was noticed except for bleeding ( $P = 0.86$ ). The interstate difference showed that students of both the groups of Gujarat state were more aware of oral changes than the students of Punjab. The medical students of Punjab state (62.5%) had identified only fixation much better than Gujarat state (37.5%) but dental students of both the states had equally (50%) identified it as shown in figure 3.

**Table 2: Percentage of Medical and Dental Students of Gujarat and Punjab Having Knowledge of Oral Cancer**

Student Group	Knowledge				Students Having Sufficient Knowledge			
	No		Yes		Gujarat		Punjab	
	No.	%	No.	%	No.	%	No.	%
Medical	1511	57.37	1123	42.63	664	59.13	459	40.87
Dental	943	33.02	1913	66.98	1077	56.3	836	43.7
Total(5490)	2454	44.70	3036	55.30	1741	57.35	1295	42.65

On seeing these findings it appeared that dental students (66.98%) had sufficient knowledge regarding oral cancer than medical students (42.63%). The interstate comparison showed that both the groups of students of Gujarat state have sufficient knowledge which was 59.13% in medical group and 56.30% in the dental group while in Punjab it was 40.87% and 43.70% respectively as shown in table 2.

### DISCUSSION

Oral cancer incidence in India is increasing day by day, therefore its prevention and early detection is the best way to decrease the mortality and morbidity by this disease. For that its knowledge in undergraduate medical and dental students is prime important. To find out the awareness of oral cancer in medical and dental students we had planned the questionnaire based study in medical and dental undergraduates of Gujarat and Punjab states of India. The response rate was 98.16% which was fairly similar of different academic years in both the groups. There were 48.42% males and 51.58% females with mean age of 21.29 years. The study showed that significantly ( $P < 0.001$ ) more dental students i.e. 98.83% routinely examined the patient's oral mucosa while 21.94% medical students examined it and that also in relation to oral problems which was also reported by Ogden GR<sup>6,9</sup> and Uti OG.<sup>10</sup>

Amongst the various risk factors tobacco smoking and smokeless tobacco were well identified by both the groups of students even though significantly more dental students had identified it than medical students as these are the part of dental curriculum. Betel quid chewing was identified by fewer students of both the groups, whereas poor knowledge was appeared in both the groups for other less important factors like poor oral hygiene, radiation, HPV and Candida but Farah CS<sup>11</sup> and Salaspuro V<sup>12</sup> had shown link between these factors and oral cancer. The interstate comparison showed that both the group of students of Gujarat were more aware of risk factors for oral cancer than Punjab that might be due to lack of curriculum guidance and

clinical education in Punjab. Oral changes associated with oral cancer such as ulceration, erythroplakia, exophytosis, leukoplakia and erythroleukoplakia were identified by majority of both the groups of students in Gujarat but it was somewhat less identified by students of Punjab that might be due to lack of oral cancer education.

Except erythroleukoplakia the study findings confirmed the reports of Ogden GR<sup>6,9</sup>, in the present study both the groups of students of Gujarat had much better knowledge than the Punjab. Both the groups of students of Punjab and medical students of Gujarat had poor knowledge of reference and they prefer to refer to plastic surgery, ENT, GP and others. On the other hand dental students of Gujarat had actual knowledge of proper referral and they prefer OMFS, OM and others which confirmed the results of Ogden GR.<sup>6,9</sup> From both the states more than 50% of students requested for further information in both medical and dental groups of students. More than 70% of both the groups of students wanted further information and keen to learn more information regarding oral cancer which was similar to the findings of previous reports Ogden GR<sup>6,9</sup> and that can be done by information packages and seminars on oral cancer.

This study confirmed that even though oral cancer till today lack specific therapeutic regimen, therefore its prevention and early detection is better way to help the society but the knowledge in medical and dental undergraduates of both the states appeared deficient and ultimately it will be reflected in future medical and dental practitioners. Therefore it is highly emphasized to improve the oral cancer education in dental curriculum as well as to add it as a part of the medical curriculum in India, so that dental and medical professionals can identify people at risk and guide them for its preventive measures.

### CONCLUSION

The results of this study showed a continued need to improve education of undergraduate medical and

dental students regarding oral cancer. Some students in this field always feel that more information is required regarding oral cancer, since in a modern curriculum all the facts for each disorder cannot be covered. This study highlights the need to address the educational needs of medical and dental students on oral cancer by improving the curriculum and clinical training, in particular more instructional time should be devoted for prevention and detection of oral cancer.

**Conflict of Interest:** Nil

**Source of Funding:** Nil

**Ethical Clearance:** Taken from Institutional (GDC, Ahmedabad) ethical clearance board

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# Evaluation of Line Probe Assay for Diagnosis of Multidrug Resistant Tuberculosis in a Tertiary Care Centre- A Preliminary Report from Western Uttar Pradesh

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## ABSTRACT

Conventional methods for detection of Mycobacterium tuberculosis from culture can take up to 8 weeks. Simple and sensitive methods that enhance the detection of Mycobacterium tuberculosis (M.tuberculosis) from clinical specimens are needed, to achieve early diagnosis and effective treatment of pulmonary tuberculosis. To facilitate the rapid detection of Mycobacterium tuberculosis complex and its drug sensitivity pattern by line probe assay was performed in our study.

**Objectives:** To assess the prevalence of MDR-TB through a rapid, feasible, reliable method in a tertiary care centre of western Uttar Pradesh.

**Materials & Method:** 110 consecutive smear-positive sputum specimens collected from clinically suspicious cases of pulmonary tuberculosis at C.S.S.H, Subharti Medical College, Meerut, India were subjected to Line probe assay which was performed according to the manufacturer's instructions.

**Results:** Out of 110 AFB positive sputum samples, 30 were both Rifampicin and Isoniazid sensitive, 31 were resistant to both Rifampicin and Isoniazid, 4 were resistant to Rifampicin & sensitive to Isoniazid, 5 were sensitive to Rifampicin & resistant to Isoniazid and 40 were not showing TB complex band in the test strip.

**Conclusion:** The Line probe assay is a simple, rapid and a reliable molecular method for diagnosing MDR.

**Keywords:** Tuberculosis, MDR TB, Molecular diagnosis, INH, RMP

## INTRODUCTION

Tuberculosis (TB) is endemic in developing countries<sup>1</sup> and emergence of drug-resistant strains of *Mycobacterium tuberculosis* is an increasing problem. *Mycobacterium tuberculosis* (MTB) is a slow-growing organism, which makes recovery and drug susceptibility testing (DST) on solid media laborious and time consuming<sup>2</sup>. Rifampicin (RMP) and isoniazid

(INH) are important components of effective multidrug antitubercular therapy. However, widespread use of these agents and failure of patients compliance have led to the emergence of multidrug resistant tuberculosis<sup>3</sup>. MDR TB is defined as resistance to both rifampicin and isoniazid.

Recently, nonradiometric fully automated systems that are used to screen for resistance and that have technical and safety advantages have been introduced<sup>4</sup>. However, the time for resistance testing is still about 7 to 10 days, beginning from a time that a positive culture is obtained<sup>4</sup>. The most rapid results could be achieved by direct testing of patient specimens by fast molecular methods<sup>5,6</sup>. These methods are based on the knowledge that resistance to RMP and INH in

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*M.tuberculosis* is most often attributed to mutations in the *rpoB*, *katG*, and *inhA* genes. The GenoType MTBDRplus assay identifies MDR strains with mutations in the *rpoB* gene, mutations in the codon 315 of *katG* and also mutations in the regulatory region of *inhA*. In this assay the time taken for detection of MDR is around 24-48 hrs.

To control MDR-TB, drug resistance patterns should be available to guide the therapy of the patient at the earliest. Phenotypic drug susceptibility testing (DST) is a time-consuming process because it requires culturing, which may take up to two months or longer. As long as no DST results are available, the patient will be treated with standard first-line anti-TB drugs. Rapid diagnosis of MDR-TB will thus permit an earlier start with second-line drug treatment for patients with MDR-TB and may decrease the risk of treatment failure, relapse, amplification of Drug resistance, and continuing transmission of MDR-TB.

In 2008, the World Health Organization (WHO) endorsed the use of molecular line-probe assays for MDR-TB screening<sup>7</sup>, and thus the GenoType® MTBDRplus assays has since been introduced for routine practice in various countries<sup>8,9-12,13</sup>. The WHO recommends that before using this assay in routine TB treatment and control, the performance of the assay in relation to the locally circulating *M. tuberculosis* bacteria should be validated<sup>7</sup>. In view of the above recommendation of WHO, the present study was conducted.

The aim of the present study is to determine the sensitivity and accuracy of the MTBDRplus assay for detection of INH and RMP resistance –associated mutations in *rpoB* gene, *katG*, and *inhA* from culture specimens and directly from smear-positive clinical specimens from local patients reporting to our hospital.

**MATERIALS AND METHOD**

A total of 110 consecutive smear-positive pulmonary specimens were taken for study, from samples coming for routine diagnosis to the TB laboratory, department of Microbiology. Samples were liquefied and decontaminated with N-acetyl cysteine-2 % NaOH concentrated centrifugation<sup>14,15</sup>. After centrifugation and supernatant removal, the sediment was resuspended in 1.0-1.5ml of phosphate buffer for smear preparation (Ziehl-Neelsen staining), and DNA extraction. Smear grading was performed using WHO recommendations<sup>16</sup>. The selected samples were

subjected to the GenoType® MTBDRplus test according to the manufacturer’s instructions<sup>17</sup>.

The following steps as per the manufacturer’s instructions were followed: DNA extraction, a multiplex amplification with biotinylated primers, and a reverse hybridization. By multiplex PCR the *rpoB*, *katG* and *inhA* genes were amplified and the resulting biotin-labeled amplicons were hybridized to DNA probes bound to membrane strips. Hybridization was detected by addition of a streptavidin/alkaline phosphatase (AP) conjugate and an AP mediated staining reaction. The membrane-bound DNA probes included eight *rpoB* wild-type probes, four *rpoB* mutant probes, one *katG* wild-type probe, two *katG* mutant probes, two *inhA* wild-type probes and four *inhA* mutant probes

**RESULTS**

Readable GenoType® MTBDRplus assay results were obtained for 110 DNA extracts obtained from pulmonary samples. Of these 30 were pan-susceptible strains (Fig. 1), 31 were multi-drug resistant strains i.e. showed resistance to Rifampicin & Isoniazid both (Fig. 2), 4 strains showed only RMP resistance (Fig. 3), 5 strains showed only INH resistance (Fig. 4) and, 40 strips had no bands indicating the presence of non-TB Mycobacteria (Fig. 5).



Fig. 1. Sensitive to RMP & INH



Fig. 2. Resistant to Rifampicin & Isoniazid both

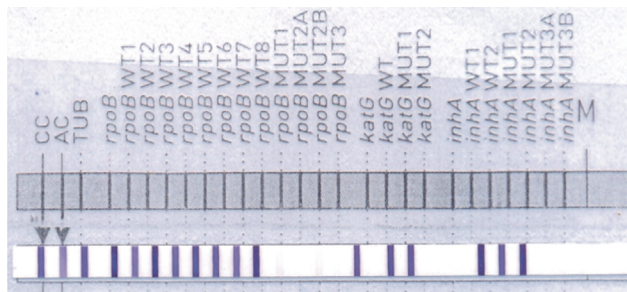


Fig. 3. Sensitive to INH & Resistant to RMP

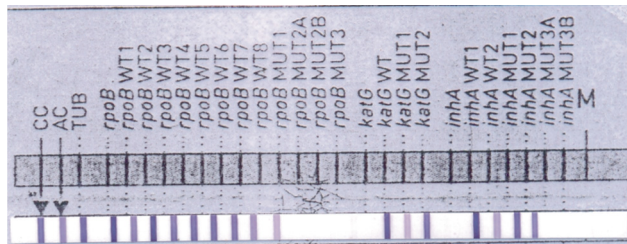


Fig. 4. Sensitive to RMP & Resistant to INH

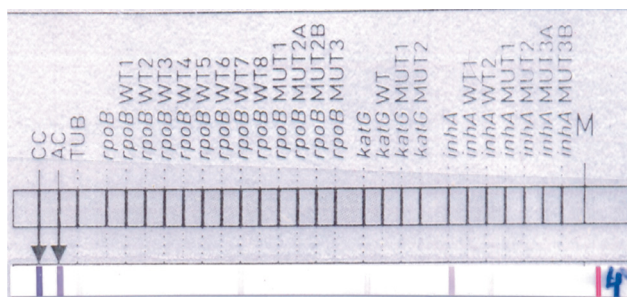


Fig. 5. TB complex band absent

### DISCUSSION

In the current study we evaluated the performance of the molecular assay (HAIN Lifescience GmbH GenoType® MTBDRplus) for rapid detection of resistance to the most important anti-TB drugs (RIF and INH) on the pulmonary samples in the western Uttar Pradesh area. For the initiation of effective chemotherapy, ensuring successful treatment of the patient and preventing further spread of drug-resistant isolates<sup>3</sup>, the MTBDRplus assay is found to be valuable tool that allows detection of resistant *M.tuberculosis* isolates within one working day and can easily be included in routine workflow. Rapid detection of drug-resistance would help not only to optimize treatment of MDR-TB but also in breaking transmission and identification of any hot spot regions in the country for proper implementation of the TB control programs.

### CONCLUSION

High sensitivity, short turnaround times and the potential for screening large numbers of specimens rapidly, make the GenoType® MTBDRplus assay suitable as a first-line screening assay for drug resistant TB. Incorporation of the molecular test in the National Tuberculosis Program is an important step forward in the rapid diagnosis of MDR-TB among suspected patients in the Programmatic Management of Drug - Resistant Tuberculosis (PMDT) program.

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# An Update on Oral Candidiasis : An Opportunistic Infection

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## ABSTRACT

Candidiasis, a common opportunistic fungal infection of the oral cavity, may be a cause of discomfort in dental patients. There are few local factors that make the oral tissues susceptible to Candida infection. These factors include acid saliva, xerostomia, night use of prosthetic dentures, tobacco, carbohydrate rich diets and patients that receive radiotherapy and chemotherapy in maxillofacial structures. Maintenance of oral hygiene and early diagnosis of this condition is very important.

**Keywords:** Candidiasis, Candida Albicans, Opportunistic Infection, Fungal

## INTRODUCTION

Fungi are free-living, eukaryotic organisms that exist as yeasts (round fungi), molds (filamentous fungi), or a combination of these two (dimorphic fungi). Oral candidiasis is one of the common fungal infection affecting the oral mucosa. These lesions are caused by the yeast *Candida albicans*. *Candida albicans* are one of the components of normal oral microflora and around 30% to 50% people carry this organism. Rate of carriage increases with age of the patient. *Candida albicans* are recovered from 60% of dentate patients mouth over the age of 60 years. There are many types of candida species which are seen in the oral cavity.<sup>1,2,3</sup>

## HISTORY

Infection with the yeast like fungal organism *Candida albicans* is termed as candidiasis.<sup>4</sup> The first known description of *Candida* infections, oral candidiasis (thrush) in two patients with other

underlying diseases may be found in Hippocrates' "Epidemics" from the fourth century B.C.<sup>5</sup> Rosen von Rosenstein (1771) was the first to attempt to divide the disease into categories based on the severity and distribution of the lesions.<sup>6</sup> The fungus now known as *Candida albicans* was isolated by Bennett (1844) from the sputum of a tuberculosis patient, by Wilkinson (1849) from vaginal candidiasis. Robin (1853) was the first to observe concomitant thickening of the epithelium in lesions resembling thrush.<sup>7</sup>

### General Factor<sup>2</sup>

There are three general factors which helps the *Candida albicans* infection to develop in the patient's body. They are:

1. Immune status of the patient
2. Oral mucosal environment
3. Strain of *Candida albicans*

### The main factors which increase susceptibility of oral candidiasis are :

- i. Immunosuppression
- ii. Endocrinopathies
- iii. Nutritional deficiencies
- iv. Malignancies

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- v. Dental prosthesis
- vi. Epithelial alteration
- vii. High carbohydrate diet
- viii. Infancy and old age
- ix. Poor oral hygiene
- x. Heavy smoking

## RISK FACTORS

### Pathogen

Candida is a fungus and was first isolated in 1844 from the sputum of a tuberculous patient.<sup>8</sup> They require environmental sources of fixed carbon for their growth. Filamentous growth and apical extension of the filament and formation of lateral branches are seen with hyphae and mycelium, and single cell division is associated with yeasts.<sup>9</sup> Adhesion of candida to epithelial cell walls, an important step in initiation of infection, is promoted by certain fungal cell wall components such as mannose, C3d receptors, mannoprotein, and saccharins.<sup>10,11,12</sup> Other factors implicated are germ tube formation, presence of mycelia, persistence within epithelial cells, endotoxins, induction of tumour necrosis factor, and proteinases.<sup>13-18</sup> Phenotypic switching which is the ability of certain strains of *C. albicans* to change between different morphologic phenotypes has also been implicated.<sup>19</sup>

## HOST

### Local factors

*Impaired salivary gland function* can predispose to oral candidiasis.<sup>20</sup> Antimicrobial proteins in the saliva such as lactoferrin, sialoperoxidase, lysozyme, histidine-rich polypeptides, and specific anticandida antibodies, interact with the oral mucosa and prevent overgrowth of candida.

*Drugs* such as inhaled steroids have been shown to increase the risk of oral candidiasis by possibly suppressing cellular immunity and phagocytosis. The local mucosal immunity reverts to normal on discontinuation of the inhaled steroids.<sup>21,22</sup>

*Dentures* predispose to infection with candida in as many as 65% of elderly people wearing full upper dentures.<sup>23</sup> Wearing of dentures produces a microenvironment conducive to the growth of candida

with low oxygen, low pH, and an anaerobic environment. This may be due to enhanced adherence of *Candida* spp to acrylic, reduced saliva flow under the surfaces of the denture fittings, improperly fitted dentures, or poor oral hygiene.<sup>24, 25</sup>

*Other factors* are oral cancer/leukoplakia and a high carbohydrate diet. Growth of candida in saliva is enhanced by the presence of glucose and its adherence to oral epithelial cells is enhanced by a high carbohydrate diet.<sup>26</sup>

### Systemic factors

*Drugs* such as broad spectrum antibiotics alter the local oral flora creating a suitable environment for candida to proliferate.<sup>27</sup> Immunosuppressive drugs such as the antineoplastic agents have been shown in several studies to predispose to oral candidiasis by altering the oral flora, disrupting the mucosal surface and altering the character of the saliva.<sup>28, 29, 30</sup>

*Other factors* are smoking, diabetes, Cushing's syndrome, immunosuppressive conditions such as HIV infection, malignancies such as leukaemia, and nutritional deficiencies— vitamin B deficiencies have been particularly implicated.<sup>31,32</sup>

### Laboratory Diagnosis of Oral Candidiasis

A correct diagnosis provides the specific treatment of a fungal infection and may prove life saving or stave off the complications produce there in.<sup>33</sup>

The specimen should be kept moist or in a transport medium and stored in a refrigerator at 4°C.<sup>34,35</sup> Due to variety of clinical forms of oral candidiasis a number of different types of specimens may be submitted to the laboratory.

**Smear:** Smears are taken from the infected oral mucosa, rhagades and the fitting side of the denture, preferably with wooden spatulas. Fixed immediately in ether/alcohol 1:1 or with spray fix. Dry preparations may be examined by Gram stain method and PAS method.

**Swabs:** Swabs are seeded on Sabouraud's agar (25°C or room temperature), on blood agar (35°C), on Pagano-Levin medium (35°C) or on Littmann's substrate (25°C). Incubation at 25°C is done to ensure recovery of species growing badly at 35°C. Sabouraud's dextrose agar is frequently used as a primary culture medium. Since mixed yeast infections are seen in the oral cavity more frequently than

previously thought, particularly in immunocompromised or debilitated patients, Pagano-Levin agar or Littmann's substrate, are useful supplements, because they enable distinction of yeasts on the basis of difference in colony color.

**Biopsy:** Biopsy specimen should in addition be sent for histopathological examination when chronic hyperplastic candidosis is suspected.

**Imprint Culture Technique:** It is useful for quantitative assessment of yeast growth in different areas of the oral mucosa and is thus useful in localizing the site of infection and estimating the candidal load on a specific area (Budtz-Jorgensen, 1978, Olsen and Stenderup A, 1990).<sup>34-38</sup>

**Impression Culture Technique:** taking maxillary and mandibular alginate impressions, transporting them to the laboratory and casting in 6% fortified agar with incorporated Sabouraud's dextrose broth. The agar models are then incubated in a wide necked, sterile, screw-topped jar for 48-72 hours at 37°C and the CFU of yeasts estimated.

**Saliva:** The number of Candida expressed as CFU/ml of saliva is estimated by counting the resultant growth on Sabouraud's agar using either the spiral plating or Miles and Misra surface viable counting technique.<sup>39</sup> Patients who display clinical signs of oral candidiasis usually have more than 400 CFU/mL.<sup>40</sup>

**Oral Rinse Technique:** It was first described by Mckendrik, Wilson and Main (1967) and later modified by Samaranayake et al (1968).<sup>41</sup>

**Paper Points:** An absorbable sterile point is inserted to the depth of the pocket and kept there for 10 sec and then the points are transferred to a 2ml vial containing Moller's VMGA III transport medium.<sup>34</sup>

**Commercial Identification Kits:** The Microstix-candida (MC) system consists of a plastic strip to which is affixed a dry culture area (10 mm x 10 mm) of modified Nickerson medium (Nickerson, 1953) and a plastic pouch for incubation. The O Yeast-Ident system is based on the use of chromogenic substances to measure enzyme activities. ricult-N dip slide technique is similar to, but of higher sensitivity than M-C system.<sup>34</sup>

### Histological identification

The specific fungal stains such as Periodic Acid Schiff stain (PAS), Grocott-Gomori's Methenamine Silver (GMS) and Gridley stains are widely used for demonstrating fungi in the tissues, which are coloured intensely with these stains.<sup>36</sup> Calcoflour White Stain 30 staining can be done in formalin fixed paraffin embedded specimens but a fluorescence microscope is required for visualization.

### Physiological tests

The main physiological tests used in definitive identification of Candida species involve determination of their ability to assimilate and ferment individual carbon and nitrogen sources.<sup>36,43</sup>

**Table 1 : Assimilation reactions**

Candida species	Glu	Mal	Suc	Lac	Cel	Gal	Tre	Raff	Mel	Xyl	Ino	Dul
C.albicans	+	+	+	+	+	+	+	-	-	+	-	-
C.tropicalis	+	+	+	-	+	+	+	-	-	+	-	-
C.kefyer	+	-	+	+	+	+	-	+	-	+	-	-
C.parapsilosis	+	+	+	-	-	+	+	-	-	+	-	-
C.guilliermondii	+	+	+	-	+	+	+	+	+	+	-	+
C.krusei	+	-	-	-	-	-	-	-	-	+	-	-

**Note:** Glu = Glucose, Mal = Maltose, Suc = Sucrose, Lac = Lactose, Cel = Cellobiose, Gal = Galactose, Tre = Trehalose, Raf = Raffinose, Mel = Melibiose, Xyl = Xylose, Ino = Inositol, Dul = Dulcitol; + = Positive reaction, - = Negative reaction.

**Table 2: Fermentation reactions**

Candida species	Glucose	Maltose	Sucrose	Lactose
C. albicans	AG	AG	-	-
C. tropicalis	AG	AG	AG	-
C. kefyer	AG	AG	AG	-
C.guilliermondii	AG	-	AG	-
C. parapsilosis	AG	-	-	-
C. krusei	AG	-	-	-
C. glabrata	AG	-	-	-

**Note:** A = Acid Production, G = Gas Production.

## Phenotypic methods

**Serotyping:** Serotyping is limited to the two serotypes (A and B), a fact that makes it inadequate as an epidemiologic tool.

**Resistogram typing:** resistograms do not correlate with pathogenic potential, and even though improvements have been made in the method growth end-points often present problems because of inoculum size, interpretation, and reproducibility.

**Yeast 'Killer Toxin' typing:** These authors initially used nine killer strains, developing a triplet code to distinguish between 100 strains of *C. albicans*, and found 25 killer-sensitive types. This method was expanded by using 30 killer strains and three antifungal agents, which appeared to discriminate between sufficient numbers of strains of *C. albicans*.

**Morphotyping:** This method has been used in a study of the morphotypes of 446 strains of *C. albicans* isolated from various clinical specimens.<sup>44</sup>

**Biotyping:** Williamson (1987)<sup>45</sup> has proposed a simpler method. This system comprised three tests, the APIZYM system, the API 20C system, and a plate test for resistance to boric acid. This system was found to distinguish a possible 234 biotypes of which 33 were found among the 1430 isolates of *C. albicans* taken from oral, genital and skin sites.

**Protein typing:** Non-lethal mutations of proteins during the yeast cell cycle yield proteins of differing physical properties between strains, which may be distinguishable by one or two dimensional gel electrophoresis.

**Serological Tests:**<sup>46</sup>

### Serological Tests for Invasive Candidiasis:

1. Detection of antibodies
2. Nonspecific Candida Antigens
3. Cell Wall Components:
4. Candida Enolase Antigen testing

**Immunodiagnosis:**<sup>36</sup>

The use of specific antibodies labelled with fluorescent stain permits causative organisms to be diagnosed accurately within minutes. However, the preparation of specific antisera and purified polyclonal

or monoclonal antibodies entails a much more extensive technical outlay, so the application of these reagents need only be considered when a very precise diagnosis is of therapeutic consequence.

## CONCLUSION

The prognosis is good for oral candidiasis with appropriate and effective treatment. Relapse when it occurs is more often than not due to poor compliance with therapy, failure to remove and clean dentures appropriately, or inability to resolve the underlying/predisposing factors to the infection.

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# A Study to Compare the Endothelial Cell Loss in Different Techniques of Cataract Surgery

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## ABSTRACT

**Objective:** To compare the endothelial cell loss in different technique of cataract Surgery.

**Materials and Method:** A Prospective study, included 100 cataract cases in the Age group of 50-75 yrs was conducted between Aug 2009 to Sept 2011 at Navodaya Medical College and Research Centre, Raichur. 50 eyes Underwent planned ECCE (Extra capsular Cataract extraction) and 50 eyes underwent SICS (Small incision cataract surgery) and the Endothelial cell loss was compared in 2 different technique of cataract surgery. Endothelial cell Loss was estimated using specular microscope (Sp 2000) and all patients were followed up on 1st day, 6th week and 3rd month post-operatively.

**Results:** Endothelial cell loss was more in superior quadrant in both planned ECCE and SICS (i.e. 12.5% and 12.3% respectively). Central quadrant endothelial cell loss had no Statistical significance in both the groups (Planned ECCE 11.8% and SICS 12.1%). Descemets membrane detachment occurred in one case which later developed Bullous Keratopathy. Vitreous loss occurred in two cases. 87% of the eyes which underwent Planned ECCE and SICS showed post operative visual acuity of more than 20/40.

**Conclusion:** From this study we conclude that endothelial cell loss occurred within Physiological range and it does not lead to corneal decompensation or loss of vision. It was also observed that endothelial cells got stabilized around 3rd month. Lastly there was not much difference in endothelial cell loss in two different types of surgical techniques.

**Keywords:** Extra capsular Cataract Extraction, Small Incision Cataract Surgery, Endothelial Cell Loss

## INTRODUCTION

As we know corneal endothelial layer play a major role in maintaining the stroma in a state of relative deturgescence and thus the corneal transparency.

Similar to the central nervous tissue, the cells of the human corneal endothelium are essentially amitotic after birth However, corneal endothelial cells have a remarkable ability to enlarge and to maintain normal function in the face of cellular inadequacies or deficiencies as are seen during the postnatal growth of cornea, during normal cell loss in the aging process and cell loss caused by intraocular surgery and trauma<sup>1</sup>.

At birth cell densities ranges from 3,500-4000cells\mm<sup>2</sup> where as the adult cornea normally has densities of 1,400 to 2,500 cells\mm<sup>2</sup>. Endothelial cell count is estimated using non- contact specular microscope<sup>2</sup>.

Ademis in 1985 showed staining of human endothelium with antibodies against neuron specific enolase but it failed to stain with antibody against factor viii related antigen which stained other vascular endothelium. Thus they postulated that corneal endothelium is neuroectodermal in origin<sup>3</sup>.

Stroma of the cornea tends to imbibe water due to the charge characteristics of the proteoglycans of the stromal ground substance. In spite of the swelling pressure of the stroma, it does not swell in vivo under normal condition <sup>4</sup>.

Two factors contribute to the prevention of stromal swelling and maintenance of its water content at 78%. These are the barrier and pump function of the endothelium. The barrier function is incomplete compared to the epithelial barrier <sup>5,6</sup>.

Both qualitative and quantitative assessments of the corneal endothelium can be made. Qualitative cellular analysis identifies abnormal endothelial structures and grades the endothelium either according to the number or size of the abnormal structures present or on the basis of an overall visual assessment of endothelial appearance. The goal is to provide a subjective evaluation of the endothelium, not to assign a precise numerical value to the specular photomicrograph. This type of analysis provides a rapid clinical evaluation of

the endothelium to assess the risks of intraocular Surgery to establish a diagnosis, or to decide on treatment. Complete qualitative analysis requires that several parameters be evaluated <sup>7</sup>. Although a qualitative description of the corneal specular image suffices for many applications, more quantitative information is desirable for others. The aim of quantitative analysis is to assign a number (or set of numbers) to the specular photomicrograph that can provide a measure of the endothelial status <sup>8</sup>.

Following cataract extraction, some degree of endothelial cell loss occurs. Numerous investigators have reported their findings, and the data show a degree of variability. In uncomplicated cases, mean cell loss varies from approximately 6% to 17%.

There is specular microscopic evidence that, after cataract extraction, endothelial damage is greatest in the area of maximal manipulation. The inferior portion of the cornea is least affected and shows the least endothelial cell loss <sup>9</sup>.

## RESULTS

The following results were obtained in our present study

**Table 1: Changes in endothelial cell density after Planned ECCEsurgery (cells/mm<sup>2</sup>)**

Variables	Pre-Operative value (mean)	Post-Operative value (mean)			% of cell loss
		1 <sup>st</sup> day	6 <sup>th</sup> week	3 <sup>rd</sup> month	
No. of Eyes	50	48	43	40	
Cell Density (cells/mm <sup>2</sup> )	—	—	—	—	—
Central	2345	2102	2079	2073	11.8%
Superior	2412	2152	2108	2070	13.5%
Inferior	2365	2135	2124	2113	10.6%
Temporal	2401	2170	2150	2143	10.7%
Nasal	2285	2099	2086	2077	10.7%

**Table 2: Changes in endothelial cell density after SICS (cells/mm<sup>2</sup>)**

Variables	Pre-Operative value (mean)	Post-Operative value (mean)			% of cell loss
		1 <sup>st</sup> day	6 <sup>th</sup> week	3 <sup>rd</sup> month	
No. of Eyes	50	49	47	45	
Cell Density (cells/mm <sup>2</sup> )	—	—	—	—	—
Central	2465	2224	2202	2191	12.1%
Superior	2352	2115	2024	1972	14.3%
Inferior	2412	2252	2221	2212	8.7%
Temporal	2242	2078	2053	2040	8.9%
Nasal	2301	2102	2076	2064	10.4%

**Table 3: Summary of Intra and Postoperative Complications**

Complications	No. of Eyes
<b>Intra Operative</b>	
1. Descemet's Membrane Detachment	1
2. Iris Prolapse	2
3. Pseudo Phakos Contact	3
<b>Early Postoperative</b>	
1. Wound Leak (Ac Shallow)	3
2. Anterior Uveitis	2
<b>At One Month</b>	
Secondary Glaucoma	1
<b>At Third Month</b>	
Bullous Keratopathy	1

**Table 4: Post Operative Visual Acuities**

Visual acuity	Eyes	
	At one month N = 90	At Third month N = 85
20/20 to 20/40	79	74
20/50 to 20/100	10	10
Worse than 20/100	1	1

**Table 5: Changes in endothelial cell density and central corneal thickness after planned ECCE <sup>10</sup>**

Variable	Preoperative (mean value)	Post operative (mean value) with Percentage of cell loss			
		1 month	3 <sup>rd</sup> month	1 Year	2 Year
No. of eyes	70	70	70	61	43
<b>Cell density (cells /mm<sup>2</sup>)</b>					
1. Central	2,450	2,170 (11%)	2,145(11.6%)	2,110(12%)	2,080(12.5%)
2. Superior	2589	2,109(20%)	2,092(20.3%)	2084(20.6%)	2,050(21%)
3. Inferior	2,384	2,230(5%)	2,222(5.2%)	2,214(5.5%)	2,201(6%)
Central corneal thickness (mm)	0.54	0.61	0.54	0.54	0.54

This above study showed that after two years of follow-up, there was an 11% +/- 2% decrease in central cell density, a 20% +/- 2% decrease in superior cell density, and a 5% +/- 3% decrease in inferior cell density. Central endothelial cell loss from extra capsular cataract extraction with shearing posterior chamber intraocular lens implantation was correlated with age, as well as with preoperative superior endothelial cell density (P< .01)<sup>10</sup>.

In this study the effects of the shearing posterior chamber lens, we found no progressive damage to the endothelium during the two-year follow-up period. Endothelial cell density one month post-operatively stabilized and did not increase with longer follow-up<sup>10</sup>.

The above table shows post-operative visual acuity recorded at one month and third month after surgery.

One eye showed visual acuity less than 20/100 which has developed descemets membrane detachment intra operatively.

**DISCUSSION**

Seventy eyes in the age group of 51-95 Years underwent planned extra capsular cataract extraction and implantation of a shearing posterior chamber Intra Ocular Lens. Both corneal endothelial cell density (cells/mm<sup>2</sup>) and corneal thickness (mm) was determined by the same ophthalmic surgeon with his specular microscope<sup>10</sup>.

Each patient underwent medical and ocular examination. Complete endothelial photography (Central, superior and inferior quadrants) was done preoperatively and at one month, sixth month and one year postoperatively. The results showed the following observations.

**Table 6: Intra & Post Operative Complications (effects of the shearing posterior chamber intraocular lens on the corneal endothelium)**

Complications	No. of Eyes
<b>Early post operative</b>	
1. Uveitis	2
2. Wound leak	1
3. Dislocation of implanted lens	1
4. Iris prolapse	1
<b>At one year</b>	
1. Bullous keratopathy and corneal transplant	1
2. Secondary glaucoma	1
3. Optic atrophy, macular changes	1
<b>At Two years</b>	
1. High intraocular pressure	1
2. Old pigmented keratic precipitates	1



**Table 7: Postoperative Visual Acuity**

Visual acuity	Eyes	
	At Sixth month(No.=61)	At One Year(No.=43)
20/20 to 20/40	55	36
20/50 to 20/100	6	5
Worse than 20/100	0	2

Twenty eyes in the age group of 35-85 years underwent extra capsular cataract extraction with posterior chamber IOL implantation. A 10 mm arch length incision was used. All surgeries were performed by the same surgeon. Wide field regional specular microscopy using a specular microscope (Keeler-Konon) was performed one day before the surgery in that first week, one month, third month and sixth month postoperatively<sup>11</sup>.

**Table 8: Changes in endothelial cell density after planned ECCE <sup>11</sup>**

Variable (Quadrants of Cornea)	Pre-Operative value (mean)	Post-Operative value (mean)			% of cell loss
		1st Week	3rd Month	6th Month	
Central	2790±90	2599	2581	2570	7.5%
Superior	2960±110	2530	2500	2480	17.9%
Inferior	2900±80	2755	2738	2720	5.1%

P value was less than 0.05 as compared with preoperative values. The Co-efficient of variation of cell size (%) of central quadrant preoperatively was 27.9% it increased to 34.3% at first month postoperatively but it returned to preoperative value by 6<sup>th</sup> month.

The above study shows that endothelial cell loss and damage is greatest in the superior quadrant of cornea because the incision is placed superiorly and the lens extraction itself is most traumatic to the superior endothelium. This finding supports our present study.

The study has also shown that in the immediate post operative period, the surviving endothelial cells lose their regular hexagonal shape and uniformity of size as they elongate and migrate to cover the defect left by the damaged and sloughed cells. The cells return to the normal morphological configuration within three months.

This study also showed significant increase in corneal thickness of superior (11.1%) and central cornea (8.5%) but they returned to pre operative values at one month after surgery. This data also supports our present study which showed the return of corneal thickness to preoperative values after one month of surgery.

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**Conflict of Interest:** None

**Sources of Support:** None

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# Rare Gastro Intestinal Stromal Tumour (GIST)- A Case Report

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## ABSTRACT

**Background:** A gastrointestinal stromal tumor (GIST) is one of the most common mesenchymal tumors of the gastrointestinal tract (1-3% of all gastrointestinal malignancies). Mesenchymal tumour arising from myenteric plexus, the motor neuron regulator of gastro intestinal tract in muscularis propria of the greater curvature of stomach wall.

**Presentation of the case:** This was described in the following. A 45 year old female admitted at Alluri Sita Ramaraju Academy of Medical Sciences Hospital with complaints of pain in epigatric and umbilical region and dragging sensation, weight loss and weakness. Pain was not associated with vomitings, no distension and no signs of any obstruction and no history of malaena and haematemesis. Following admission patient was subjected to routine investigations and specific investigations including ultrasound abdomen, upper GI endoscopy and CT scan abdomen. CT abdomen revealed space occupying lesion at intra peritoneal region and out side stomach wall of greater curvature. Confirmation of diagnosis was made by post operative specimen biopsy report as Gastro Intestinal Stromal Tumour.

**Keywords:** Age, Sex, Abdominal Pain, Diagnosis, Ultrasound, CT scan, Biopsy, GIST tumour

## INTRODUCTION

Gastro Intestinal Stromal Tumours (GISTs) occur in 10-20 per one million people. The true incidence might be higher, as novel laboratory methods are much more sensitive in diagnosing GISTs. A gastrointestinal stromal tumor is one of the most common mesenchymal tumors of the gastrointestinal tract (1-3% of all gastrointestinal malignancies). They are typically defined as tumors whose behavior are driven

by mutations in the Kit gene or PDGFRA gene, and may or may not stain positively for Kit <sup>1</sup>. Histopathologists generally did not distinguish between the types, as this did not affect either therapy or prognosis. Subsequently, CD34, and later CD117 were identified as markers that could distinguish the various types. Various classifications have been proposed to identify malignant potential based on tumour size, mitotic index, and presence of necrosis, infiltration of adjacent structures, and presence of lymph node metastasis. Numbers of different treatment modalities have been postulated for the management of gastro intestinal stromal tumours. Some of the pioneers advised radical resection followed by surveillance with serial endoscopes and regular post operative imaging. Some experts in this field advised, chemotherapy regimens are now largely outdated since the advent of an effective medical therapeutic drug imatinib approved by FDA in 2001 <sup>6</sup>.

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## CASE REPORT

A 45 year old female admitted at Alluri Sita Ramaraju Academy of Medical Sciences Hospital with complaints of dull pain in epigastric and umbilical region and dragging sensation, weight loss and weakness. No signs of bowel or menstrual irregularities. Pain was not associated with vomitings, no distension and no signs of any obstruction and no history of malaena and haematemesis. Following admission patient was subjected to routine investigations and specific investigations including ultrasound abdomen, upper GI endoscopy and CT scan abdomen. Clinical examination revealed pallor, a firm tender mass (14X18 cm) in the right lower abdomen and extending inferiorly. Haematological investigations showed anaemia (Haemoglobin 9.1gms%). CT abdomen revealed space occupying lesion at intra peritoneal region and out side stomach wall of greater curvature, suggestive of Mesenchymal tumour. Histo pathology report shown as spindle shaped cells with no necrosis and rare mitoses with indistinct cytoplasm, uniform nuclei, and a variable degree of matrix production. Immuno cytochemistry report shown as staining positive for Kit (CD117). Immuno cytochemistry confirmed the diagnosis of a GIST.

**Operative Procedure:** Exploratory laparotomy done by mid line incision started in epigastrium and peritoneum opened. Some clear serous fluid about 20ml noted. It suggests no haemorrhagic fluid. Incision extended to 3 cm below the umbilicus, peritoneum lifted upper side over the stomach. Transverse colon, meso colon lifted upper side and then tumour was below the umbilicus with adhesions at the below umbilicus 3 cm midline peritoneum both sides like flanges manner. Tumor was arising from body of the stomach and greater curvature and showing a nodule which having a globus tumour encapsulated soft, shiny having some dyschromic patches suggesting some haemorrhages inside the tumour and but not came outside the tumour. Capsule was intact. The blood supply was very well demarcated coming from left gastric artery. Tumour was freed from the adhesions by clamping and dissecting and tumour easily delivered out side the operative wound showing very clearly origin over the greater curvature of the stomach. Examine the intra peritoneum by palpation,

Liver was smooth and hilar lymphatic nodes, spleen was normal, not enlarged. Both flanks and paracolic gutters normal. Para aortic glands not present. Seedling in the peritoneum not there and mesentery normal and uterus and pelvis are normal. Resected the tumour and enmass by doing resection over the longitudinal part of the stomach widely away from the tumour and opened the stomach under vision. Sutured the stomach and abdomen closed in layers without drain. Post operative period was uneventful and incision healed healthy. Patient discharged on 13 th day of operation with treatment that is tablet Imatinib 400mg twice in a day for 6 months. Advise the patient to visit the hospital every three months for the follow-up.

## DISCUSSION

Surgical considerations for the management of gastro intestinal stromal tumours have recently undergone considerable change. Although surgical resection remains the standard form of treatment of primary gastro intestinal stromal tumour, the efficacy of the KIT-targeted oral agent imatinib mesylate has transformed therapeutic considerations into a multimodality paradigm. Histologically, 70% are spindle celled, 30% are epitheloid, and less than 1% are both spindle celled and epitheloid. These latter tumours are more malignant and their prognosis is worse.

Gastric tumours that are more proximally located, less than 5 cm in diameter and have fewer than 5 mitoses per 50 high power fields are considered low risk. Borderline cases are those with 5-10 motoses per 50 high power fields. High risk patients are those with tumours are more than 5 cm in diameter and have more than 10 mitoses per 50 high power fields<sup>5</sup>. In our case also tumour size more than 10 cm in diameter and more than 10 mitoses per 50 high power fields.

In our hospital, patient was undergone radical surgery of the primary lesion or debulking of large lesions followed by adjuvant Imatinib mesylate given for the period of 6 months. Post operative period was uneventful and patient is under follow up for further evaluation of any recurrences of the tumour development. However, most of these studies are still at the early follow up stage, hence longer follow up and many studies correlation is required.



Fig. 1. This picture shows separating adhesions from the tumour

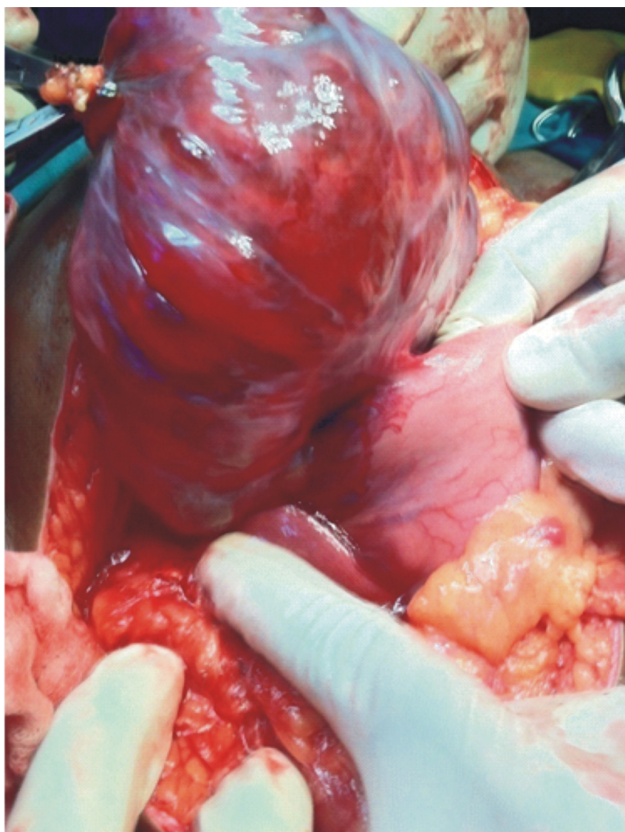


Fig. 2. This picture shows bulk of the tumour and attachment to greater curvature of stomach wall.

## CONCLUSIONS

This was clearly a GIST Tumour having mitotic index more than 10 and tumour size is also more than 10 cms suggesting malignant potentiality. It fulfills the criteria of the GIST malignant showing haematogenous spread and no lymphatic involvement. Other organs were not invaded except anterior peritoneum below umbilicus 3cm. Patient is under observation.

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# Staff Perception of Work Culture in Conventional Radiology Department at Nizam's Institute of Medical Sciences

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## ABSTRACT

**Objective:** To determine staff attitudes and work culture in conventional radiology department and the effective utilization of available manpower and equipment.

**Method:** A structured questionnaire composed of 16 dichotomous questions or closed ended type of question was prepared. Of these, 8 Questions were asked to all participants and remaining 8 Questions were directed specifically to the technical staff. The sample size of 80 was selected at random which included radiographers, nursing staff and doctors of Nizam's Institute of Medical Sciences.

**Results:** The study revealed that training is given to only new recruits. The work is not getting finished in time. Although the employees cooperate with each other, a majority of them are dissatisfied as neither on job training is given to them nor performance appraisal programs are conducted. There is also no proper checking of equipment before procedures. Staff is also not satisfied with the location of Department. Clinical staff gets corrected by technical staff.

**Keywords:** Human Resource, Conventional Radiology, Quality, Motivation

## INTRODUCTION

Health care organization is facing new challenges to the management process due to new treatment techniques, equipment and proliferation of services. "The efficiency of hospital service depends more on the personnel management than the area of sophisticated machines".<sup>[1]</sup> Quality management is the scientific research for most effective way to deliver the best care to the patient. Quality improvement should focus on monitoring and evaluation of all important aspects of patient care.<sup>[2]</sup> Motivated employees can provide timely and high quality results, which are fundamental to the success of any organization. It is important to define the job description of each employee and update it from time to time. These

principles of proper management and quality applies to Radiology Department in particular as Radiology equipment is costly and likely to become obsolete in course of time, and as such should be put to greatest use during their life time.

### Conventional Radiology in NIMS

This facility is available round the clock with three shifts—1<sup>st</sup> shift is for outpatients, emergency patients; 2<sup>nd</sup> shift for both OPD and inpatients; and 3<sup>rd</sup> for inpatients and emergency cases. There are five units dealing with special procedures as well as normal radiography. Per day about 450-500 cases are evaluated. Technical staff includes 16 Radiographers, 7 Dark Room Assistants and 4 nursing staff. The Conventional Radiology is located in the OPD Block and is away from the main radiology department

This paper highlights the performance appraisal of the Department of radiology and remedies are suggested based on this. The Department is part of a post graduate teaching and research institute with 27 Departments, bed strength of 975 with total staff of 2154 as on date.

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## METHOD

A structured questionnaire composed of 16 dichotomous questions or closed ended type of question was prepared. Of these, 8 Questions were asked to all participants and remaining 8 Questions were directed specifically to the technical staff. The sample size of 80 was selected at random which included radiographers, nursing staff and doctors of Nizam's Institute of Medical Sciences a tertiary care Teaching Institute.

The data collected was screened for errors and incompleteness and the data was entered into an excel sheet for further analysis.

## OBSERVATIONS

- Only 37% respondents were satisfied with the location. Among nursing staff 60% did not like the location. (Table 1) (Figure 1)
- Only 44% respondents are satisfied with round the clock service offered by the conventional radiology, however radiographers indicated otherwise, stating that the staff available in night shift was less.
- 60 out of 80 felt that radiology reports get rejected /damaged/go wrong. Most of the doctors and radiographers are not satisfied in this regard.
- 75 out of 80 feel that the department has an important role in final diagnosis.
- 37 out of 80 said that there is sufficient use of resources, time and budget. Radiographers are dissatisfied in this regard.
- 64 out of 80 responders are happy with the quality of reports.
- Out of 22 doctors only one was not satisfied with quality of reports.
- 56 out of 80 said that they interact with department staff on any case.
- 65 out of 80 say that they get corrected by other staff if any error is made.
- 28 out of 30 radiographers get orientation and training when newly recruited.
- Only one third of staff is able to finish their work in time.

- 17 out of 30 Radiographers check the equipment before conducting a test. (Table 2)
- Most of the staff agrees that there is co-operation and interaction among the employees.
- Majority of personnel (23 out of 30) interact with each other.
- Majority are not satisfied (18 out of 30).
- Majority of the radiographers reported that they had no job training nor performance appraisal programmes.

## DISCUSSION

Taking both clinical and technical staff together, it is found that majority are not satisfied with the location of department; mostly as the Conventional Radiology unit functions as a satellite unit away from the main Radiology Department the opportunity to interact with departmental staff is less. Furthermore, there is a delay in communication of changes in policy and practices due to absence of direct supervision of departmental heads.

Most of the radiographers feel that reports get damaged/ rejected during reporting in spite of the fact that the department has an important role in diagnosis of various diseases. Cited reasons include pressure by patients and physicians for speedy delivery of films and reports resulting in insufficient time for staff to conduct and process radiographic procedures as per defined standards, error in positioning of patient, incorrect selection, method of preparation or concentration of contrast agent ect. This can be overcome by displaying and communicating to all parties concerned, the minimum time required for film processing and reporting or by establishing fixed timings for collecting reports of investigations performed during the preceding time period. A recent initiative by the management of the hospital with regard to introduction of digital radiography is also expected to go a long way in addressing these issues.

The observations pertaining to technical staff revealed that most of the staff is unable to complete their work on time – the reasons being given range from issues related to equipment malfunction, poor patient compliance during procedures and duplication of work due to faulty techniques.

Although the employees cooperate with each other, majority expressed helplessness in helping out/

correcting their coworkers when needed due to lack of time, increased workload per staff and rarely in order to avoid conflict between staff of different seniority.

There is no proper system or checklist for equipment before starting procedures on a particular shift. This is partly attributable to continuous use during the daytime, when demand is more and absence of technical maintenance services after working hours or on holidays.

Absence of continuous education, skill enhancement and performance appraisal programmes by the management is a requirement to which the response was unanimous from the staff.

Training, as on date, is given to only new recruits although scientific process of training evaluation (e.g. the four level model of evaluation through reaction, learning, behavior and result as propounded by Donald Kirkpatrick<sup>[8]</sup>) is the need of the hour.

If continuity of care is accepted as an important element of quality in health care, attention must be given to developing strategies which support system continuity and to gaining a better understanding of the role that continuity of care can play in improving patient care.<sup>[9]</sup>

**RECOMMENDATIONS**

**As over burdened staff in the department are losing their efficiency and effectiveness, the following recommendations are made**

- Studies show a correlation between better health

outcomes and the number of health-care workers. In this connection recruiting additional staff will improve patient better outcomes.

- Assessing the current status of the workforce and capacities for policy implementation in regard to finance, education and policy making; identify priority requirements and actions based on the current status.
- Providing on job training to technicians.
- Introduction of appraisal programs to keep the staff motivated.
- Expected workload for the department has to be forecasted annually for proper planning.
- Ensure that all concerned in providing radiological services appreciate the various dimensions of continuity of care, including its potential significance as something which goes beyond healthcare and beyond the care of individual patients.
- The use of approaches that seek to gain an understanding of workers’ interpretations of their experience, i.e. the psychological process through which Human Resource Management can affect individual performance, may shed some light on how these processes work in practice.<sup>[10]</sup>

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**Table 1: Questions posted to the entire staff of radiology department**

Sl No	Questions	Doctors		Nurses		Radiographers	
		YES	NO	YES	NO	YES	NO
1	Are you satisfied with the location of Conventional Radiology department?	10	12	8	20	12	18
2	Are you satisfied with the round the clock service provided by Radiology department?	7	15	10	18	10	20
3	Do Radiology reports get rejected or damaged or go wrong?	20	2	19	9	21	9
4	Do you agree that department has an important role in final Diagnosis?	20	2	27	1	28	2
5	Is there sufficient use of resources, time and budget?	12	10	12	16	13	17
6	Are you happy with the quality of reports generated by the Conventional Radiology Department?	21	1	22	6	21	9
7	Do you interact with the department staff on any case?	16	6	18	10	22	8
8	Do you get corrected if you happen to make any error in the procedure?	20	2	26	2	19	11



**Table 2: Questions asked specifically to Radiographers**

Sl.No	Questions	YES	NO
1	Is orientation and training given to new recruiters?	28	2
2	Will you be able to finish your work on time?	10	20
3	Do you check the equipment or instrument before conducting the test or procedure?	17	13
4	Do the employees cooperate with each other in the department?	21	9
5	Do you interact with department staff on any case?	23	7
6	Are you satisfied with the job?	12	18
7	Is there any on the job training given?	9	21
8	Is there any performance appraisal program conducted in your department?	1	29

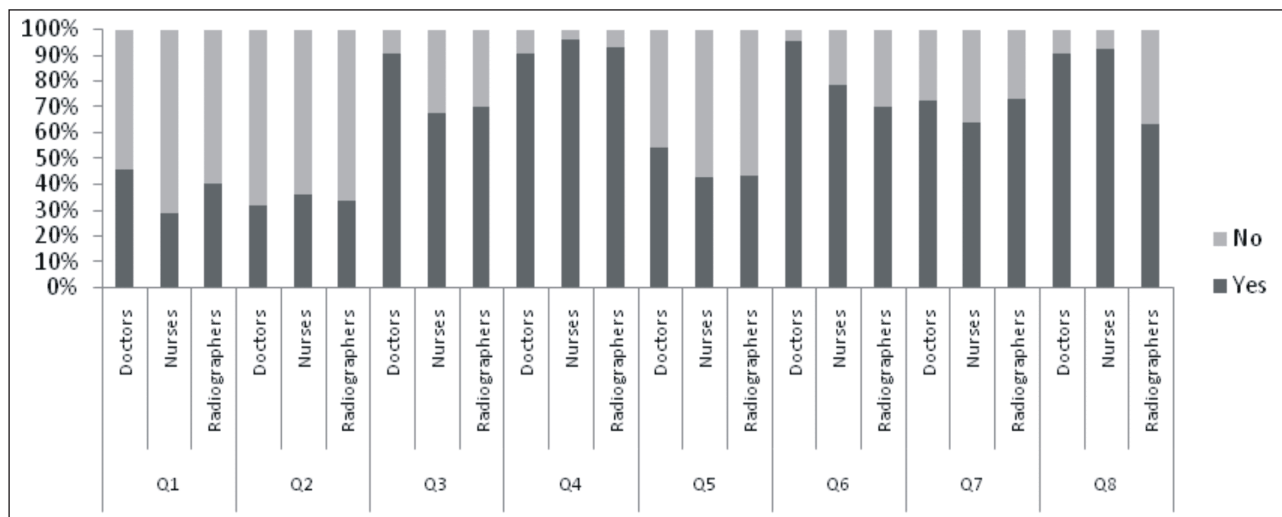


Fig. 1. Graphical representation of responses as in Table 1

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# Predictors of Parental Pedestrian Safe Road Behaviour in Rural Areas in Malaysia

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## ABSTRACT

**Objective:** The study was done to assess the predictors of pedestrian safe road behaviour of parents with their children in the rural areas of Rembau, Negeri Sembilan, Malaysia.

**Method:** A cross sectional survey was conducted among parents in the rural areas of Rembau, Negeri Sembilan from September to December 2010. The simple random sampling method was used for selection of the respondents for the study and data were collected through face-to-face interviews using a structured questionnaire.

**Results:** A total of 202 respondents participated in the research with a 78% response rate. There is a significant mean difference between parental safe road behaviour and education status ( $p=0.012$ ), household income ( $p=0.000$ ), occupational class ( $p=0.012$ ) and the presence of playgrounds ( $p=0.014$ ). However, in multiple linear regression analyses only household income emerged as a significant factor ( $p=0.004$ ).

**Conclusion:** Parents with higher income showed higher safe road behaviour while being a pedestrian walking their children on the road.

**Keywords:** Children, Parental Road Behaviour, Rural

## INTRODUCTION

It is becoming increasingly difficult to ignore road traffic injuries as a worldwide pandemic with 1.2 million people dead and 50 million more injured every year.<sup>1</sup> One fifth of road traffic deaths involve children, with 33% involving the death of child pedestrians while 65% were car passengers, bicyclists and motorcycle riders.<sup>2</sup> Overall, 90% of the deaths were reported in the low and middle income countries despite having only 48% of the world registered vehicles.<sup>1</sup>

The rapid development of Malaysia from an agricultural based to an industrial based country has contributed to the remarkable growth in the population, economy, industrialization and motorization. This issue causes road traffic crashes to become a major public health problem in the country.

The number of road crashes among children aged 0 to 15 years has increased by 43.7% from year 2004 to 2010.<sup>3</sup> Police data showed that child pedestrian casualties aged 0 to 15 for year 2010 accounted for 28.9% of the total 22,161 pedestrian casualties.<sup>3</sup>

Parental factors have been recognized as a crucial element for research since children are basically under their parents' guidance.<sup>4</sup> Aside from protecting children from any undesirable event; they also play an important role in shaping their character through role modelling. Children learn and imitate parents' behaviour as they grow older. Role modelling by parents' can affect the behaviour of their children<sup>5</sup> as a result of imitating their parents' behaviour through observation.<sup>6</sup> Thus, it is important for parents to demonstrate road safety behaviour so that their children are able to emulate their behaviour.<sup>7</sup>

Understanding parental behaviour is essential since it would provide valuable input in the process of planning and implementing injury prevention strategies for parents. Modification of safety advocacy for parents may reduce road traffic crashes involving children.

Lam<sup>7</sup> demonstrated that half of the parents claimed that they were concerned about road safety when they accompanied their children in crossing the road. Further analysis revealed that parental safe road behaviour was positively related with road risk perception and age of children, whereby parents with younger children showed more safety concern compared to parents with older children. Another two interesting findings from Lam's study were: safe road behaviour among parents who previously had prior injury in the household was significantly low and that parents' of non English speaking families' demonstrated significantly higher safe road behaviour than those from an English speaking background.

In the study done by Morrongiello et al.<sup>8</sup> they concluded that parents modelled safe crossing practices more with boys, especially younger sons as compared to girls.

However, little attention has been paid to parental factors for road traffic injuries among children, especially in developing nations such as Malaysia. The aim of this study is to determine the predictors of pedestrian safe road behaviour of parents with their children in rural areas. This research will be a reference point for other developing countries to conduct similar research for the conception of respective countries' safety programmes in addition to filling the gap in the existing literature.

## **MATERIALS AND METHOD**

This cross-sectional study was carried out in the rural district of Rembau, in the State of Negeri Sembilan from September to December 2010. Rembau was chosen as it has the highest number of road traffic crashes among rural districts in Malaysia with 995 road crashes out of the 14,188 crashes that occurred throughout Malaysia.<sup>9</sup>

### **Sample and data collection**

The children involved in this research were selected randomly from Road Safety Research Centre (RSRC), Universiti Putra Malaysia (UPM) using computer

generated<sup>10</sup> random numbers. The parents were approached at their houses. The respondents were informed about the purpose of the study through an information sheet and verbally by the researcher. Written consent was obtained from the respondents prior to the study. Face-to-face interviews using a structured questionnaire were conducted in the Malay language and the sessions took approximately 15 to 20 minutes. Prior to commencing the study, ethical clearance was sought from the Medical Research Ethics Committee of the Faculty of Medicine and Health Science, UPM.

### **Sample size**

The sample size formula was based on Lemeshow.<sup>11</sup> The proportion of parental safe road behaviour was calculated based on the study by Sevketođlu<sup>12</sup> yield to 0.1. Using a confidence level of 95% ( $z=1.96$ ) and sampling error of 5%, the minimum sample size of  $n=138$  is required.

## **MATERIAL**

The parental road safety behaviour questions used in this study were adapted from Lam.<sup>7</sup> There are 6 items to assess in determining parental safe road behaviour as pedestrians. The respondents were required to indicate how often they practiced the behaviour with their children as pedestrians on the Likert scale (1=never to 5=always). The score for these six behaviours were later combined to form the score of parental safe road behaviour as pedestrians, which ranged from 6 to 30 with higher scores indicating safer practices.

## **DATA ANALYSIS**

The data were coded into SPSS PASW Statistics version 18. The bivariate analyses were used to find the association of the independent variables and parental safe road behaviour (summated score). Then, the significant variables were subjected to stepwise multiple linear regression analyses to determine the predictors of parental road risk perception and parental safe road behaviour.

## **RESULTS**

A response rate of 78% was achieved and the majority (58.9%) of the respondents were fathers of the child. The average age of respondents was 43.2 (SD = 6.5). Almost half (49.5%) completed upper secondary

school and the majority (81.2%) of respondents were of Malay ethnicity. The association between parental safe road behaviour and other independent variables

are as shown in Table 1. Table 2 presents correlations between the predictors and parental safe road behaviour.

**Table 1: Association between categorical independent variables and parental safe road behaviour**

Children and Parents Characteristics	n (%)	Mean (S.D)	Test Significance, P-value
<b>Gender of child</b>			
Male	89(44.1)	22.62(3.36)	t(200)=0.91,p=0.363
Female	113(55.9)	22.17(3.58)	
<b>Involvement in crash year 2009 (Child involved in the study)</b>			
No	136(67.3)	22.91(3.37)	t(200)= -1.55,p=0.123
Yes	66(32.7)	22.10(3.52)	
<b>Number of Crashes year 2009 (Child involved in the study)</b>			
≤ 1	46(69.7)	22.85(3.27)	t(64)= -0.22,p=0.825
> 2	20(30.3)	23.05(3.63)	
<b>Relationship</b>			
Father	119(58.9)	22.31(3.54)	t(200)= -0.27,p=0.787
Mother	83(41.1)	22.45(3.42)	
<b>Ethnicity</b>			
Malay	164(81.2)	22.51(3.52)	F(2,202)= 2.04,p=0.133
Chinese	7(3.5)	19.86(4.67)	
Indian	31(15.3)	22.16(2.78)	
<b>Age</b>			
≤ 30	2(1)	22.50(2.12)	F(2,202)= 0.55,p=0.576
31 to 40	74(36.6)	22.03(3.11)	
> 40	126(62.4)	22.56(3.70)	
<b>Marital Status</b>			
Married	188(93.1)	22.43(3.43)	t(200)= 0.89,p=0.377
Single Parent	14(6.9)	21.57(4.22)	
<b>Education Status</b>			
No Education	4(2)	21.00(4.24)	F(6,202)= 2.81,p=0.012*
Primary School	19(9.4)	21.84(3.42)	
Lower Secondary School	37(18.3)	21.16(3.74)	
Upper Secondary School	100(49.5)	22.25(3.17)	
Certificate	8(4)	23.22(3.96)	
Diploma/STPM/Matriculation	20(9.9)	24.10(3.19)	
University and higher degree	14(6.9)	24.43(3.61)	
<b>Household Income</b>			
Never Revealed	22(10.9)		t(178)= 3.727,p=0.000*
≤ 1000	95(47)	21.63(3.63)	
> 1000	85(42.1)	23.38(3.01)	
<b>Occupation Class</b>			
Professional Group	41(27.5)	23.68(3.82)	t(147)= 2.54,p=0.012*
Non-Professional Group	108(72.5)	22.06(3.33)	
<b>Employment Status</b>			
Full time	131(64.9)	22.72(3.54)	t(200)= 1.96,p=0.051
Part Time/Unemployed	71(35.1)	21.72(3.30)	
<b>Health Problem</b>			
No	175(86.6)	22.54(3.48)	t(200)= 1.79,p=0.076
Yes	27(13.4)	21.26(3.35)	

**Table 1: Association between categorical independent variables and parental safe road behaviour (Contd.)**

Children and Parents Characteristics	n (%)	Mean (S.D)	Test Significance, P-value
<b>Sibling Order</b>			
First child/ Single child	54(26.7)	22.90(3.28)	t(200)= 1.34,p=0.183
Second child or higher	148(73.3)	22.17(3.54)	
<b>Ownership of Vehicle</b>			
Yes	5(2.5)	21.40(2.70)	t(200)= -0.63,p=0.531
No	197(97.5)	22.39(3.50)	
<b>Year of Family Residency</b>			
≤ 2 years	17(8.4)	23.47(3.24)	t(200)= 1.37,p=0.172
> 2 years	185(91.6)	22.26(3.49)	
<b>Child Health Problem</b>			
No	185(91.6)	22.40(3.56)	t(200)= 0.46,p=0.651
Yes	17(8.4)	22.00(2.60)	
<b>Playground near house</b>			
No	83(41.1)	21.65(3.60)	t(200)= -2.48,p=0.014*
Yes	119(58.9)	22.87(3.32)	
<b>Previous Injury in Household</b>			
No	159(78.7)	22.29(3.57)	t(200)= -0.61,p=0.547
Yes	43(21.3)	22.65(3.18)	
<b>Type of previous injury</b>			
Road crashes	32(74.4)	23.00(3.27)	t(41)= 1.24,p=0.224
Non road crashes	11(25.6)	21.64(2.77)	

\* Significant  $\alpha = 0.05$

**Table 2: Correlations between continuous independent variables and parental safe road behaviour.**

Characteristics	Mean(SD)	Skew	r, P-value
Number of Children <sup>b</sup>	4.15(1.86)	1.28	r=-0.042,p=0.557
Number of Male Children <sup>a</sup>	2.11(1.425)	0.73	r=-0.072,p=0.311
Number of Female Children <sup>b</sup>	2.03(1.396)	1.37	r=-0.052,p=0.461

<sup>a</sup>Pearson Correlation

<sup>b</sup>Spearman Rho

\* Significant  $\alpha = 0.05$

**Bivariate analysis of parental safe road behaviour and other variables under investigation**

Tables 1 and 2 show the results obtained from the bivariate analysis of parental safe road behaviour and other variables of interest. Levene’s test of homogeneity of variance, which was conducted prior to the ANOVA, did not indicate the assumption that homogeneity of variance was significantly violated ( $p > 0.05$ ). Four variables were found to be significantly associated with parental safe road behaviour.

A significant mean difference of parental safe road behaviour in respect of their education status ( $p < 0.05$ ) was found with an increasing safety behaviour score trend from no education to higher education. There was also a significant mean difference between

parental safe road behaviour and household income in the study ( $p < 0.05$ ). The mean score was found to be in an increasing trend from low-income to high-income households. Another finding was the significant mean difference of parental safe road behaviour in respect of parental occupational class ( $p < 0.05$ ). Professional occupational class parents scored more compared to the non-professional group parents. The most striking result to emerge from the data is that parents who reported having a playground near the house, scored significantly higher in safety behaviour compared to those who reported not having a playground ( $p < 0.05$ ).

**Multiple linear regression analysis**

Multiple linear regression analyses were performed by regressing the significant variables in the bivariate

analyses. The results show that there is a significant linear relationship between parents with an income of more than RM1,000 ( $p < 0.05$ ) and parental safe road behaviour. This suggests that a household income of more than RM1,000 in the family significantly

contributes 5.9% ( $r = 0.243$ ) variation in parental safe road behaviour [ $F(1,138) = 8.685, p < 0.05$ ]. The model summary for the parental safe road behaviour is presented in Table 3.

**Table 3: Results of multiple linear regression analyses**

Model	Unstandardized Coefficients		Standard Coefficients	<i>t</i>	<i>p</i> value
	B	Std. Error	Beta		
1 (Constant)	21.567	0.394		54.674	0
Income more than RM 1000	1.692	0.574	0.243	2.947	0.004
Overall significance of the model: $F(1,138) = 8.685, p < 0.05, R^2 = 0.059, R^2_{adj} = 0.052$					

\*Note: No Multicollinearity problem

## DISCUSSION

It can be traced from the literature that this particular area of research has been neglected in the developing world although the burden of child road crashes is high in this continent. This study is an attempt to fill the gap of knowledge in the existing literature.

Bivariate statistical analysis revealed that there are four important predictors that influence the parental safe road behaviour on the road as pedestrians with their children. This study confirms that parental education status is associated with safety behaviour.<sup>12,13,14</sup> Educated parents are more aware of the safety practices and keen to translate the knowledge into a safety act when on the road.

The findings of the current study are consistent with previous studies,<sup>12,13,15</sup> which found that income also plays an important role in the practice of safety behaviour. Although this study does not require the parents to invest in any safety devices or gadgets that indicate the safety behaviour as other studies have done, the results still appeared to be significant. The current research further supports that the socioeconomic status of parents determines the safe road behaviour although it required no expenditure. Further addressing this type of issue requires a qualitative research in order to thoroughly understand the circumstances.

Another valuable finding in this research is that parental occupational class is directly associated with safety behaviour and inconsistent with the findings of Sellström et al.<sup>16</sup> Professionals groups are generally exposed to a lot of safety training, as required by

management, and they are mandated to deliver the training to lower level employers. Thus, the first hand knowledge and safety experience increases the awareness of safety, which is rendered into other safety practices such as road safety behaviour.

Surprisingly, the existence of playgrounds in the neighbourhood plays an important role as predictors of safe road behaviour of pedestrians with children. Ellaway and Macintyre<sup>17</sup> have shown that neighbourhoods can influence the health related behaviour. A possible explanation for this might be that when there is a playground near the house, parents will aid the children in getting to the playground since the children are still young. This will create a situation for them to practice safety behaviour as pedestrians as well as together with children. Those parents who report that there is no playground, claimed that their children play in the yard of their house or in the house where there is no opportunity for parents to accompany children as pedestrians.

Various strategies have been employed to minimize bias in the research. The simple random sampling technique has been used to select the respondents to represent the community of the targeted rural area population. Furthermore, pictures representing the safety behaviour act were shown to the respondents to increase the level of comprehension of the questions. This indeed increases the accuracy of the answers given by respondents.

## CONCLUSION

Household income emerged as a significant factor for parental safe road behaviour after it was adjusted

with other significant variables. Parents play a very important role in developing good behaviour in their children by being a good example. These findings have important implications for developing road safety intervention where targeted parents are role models for their children in cultivating a "safety culture" on the road to reduce the number of road traffic crashes in the country.

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# Vivax Malaria and Thrombocytopenia

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## ABSTRACT

Severe thrombocytopenia is common in isolated falciparum and mixed falciparum/vivax malaria and is rare in isolated P. vivax infection, but the trend is changing. We hereby report 14 cases of P. vivax with thrombocytopenia, with 8 cases requiring blood/blood product transfusions. It is therefore a challenge to differentiate vivax malaria, falciparum malaria and dengue fever.

**Keywords:** Vivax Malaria, Thrombocytopenia

## INTRODUCTION

Malaria is the commonest cause of relapsing fever which is caused by mosquito bite. Other than fever, malaria can have wide variety of symptomatology. It is a well known fact that Plasmodium falciparum malaria is life threatening but Plasmodium vivax malaria cannot be underestimated, although most Plasmodium vivax infections are relatively milder and run a benign course<sup>1</sup>. However, with implementation of molecular diagnosis, it has become evident that P. vivax monoinfection could also be involved in multiple organ dysfunction and severe life threatening disease as seen in P. falciparum infections.<sup>2,3</sup>

## MATERIALS AND METHOD

This prospective study was conducted over a period of 3 months from July to Sept 2012 at G.G.S Medical College and Hospital, Faridkot (Punjab). Patients of vivax malaria admitted through emergency or OPD to Medicine or Pediatric wards were investigated for detecting thrombocytopenia. Formal approval of hospital ethical committee was obtained.

### Selection criteria

Adult and pediatric patients with vivax malaria and no evidence of falciparum infection by rapid diagnostic test.

### Exclusion criteria

Patients with falciparum malaria or other concurrent infection or mixed infections.

### Diagnostic methods

Rapid diagnostic test: Malaria antigen rapid diagnostic test kit p.f HRP11/p.v p LDH.

CBC: done by automated hematology analyzer system-1000 in Pathology department

In our study patients were divided into three subgroups based on platelet count. Thrombocytopenia was considered severe if platelet count was < 50000 cells/cmm, moderate if 50000-100,000 cells/cmm, and mild if 100,000 – 150,000 cells/cmm.

Dengue test- rapid test for detection of Dengue virus NS1 Ag and differential detection of IgM and IgG antibodies (J Mitra & Co Pvt. Ltd). Other than these, LFT, RFT, Blood sugar, widal test, complete urine exam, ECG, X-ray chest PA view, viral markers were done. Ultrasound and other special investigations were done in selected cases.

## RESULTS

In our study, total P. vivax cases were 30 during the period of 3 months with age varying from 4 years to 90 years. 14 patients had thrombocytopenia & of



these 8 were males and 6 females. Out of these 14 patients, 11 were admitted through Emergency department. Mild thrombocytopenia observed in only 1 case, moderate thrombocytopenia in 2 cases, and severe thrombocytopenia in 11 cases. 2 cases had leucopenia. Duration of fever ranged from 1 day to 30 days with 5 patients having fever more than 7 days duration and only 1 case having fever more than 3 weeks. Patients presented with varied symptomatology with seizure and loss of consciousness in 2 cases, Psychiatric behaviour in 1 case, Gastroenteritis in 2 cases, symptomatic coagulation abnormality in 3 cases ( 1 case each of echymotic patches, gum bleeding & haematuria ). One case presented with acute renal failure with

jaundice and one case had ascites. In our study, 7 patients had anemia ( Hb less than 10 gm/dl) with mean Hb of 8.31 gm%. Blood and blood products were used in 8 cases. Severe thrombocytopenia was seen in 7 cases out of which 4 patients had platelets less than 10000/cumm. Lowest platelet count in our study was 1000/cumm. Pancytopenia was observed in 2 cases. In our study, 10 cases were treated by artemisinin derivative either artesunate or arteether and 4 with chloroquine. Artemisinin derivative showed good response in present study. Average length of stay in the hospital was 6 days. All patients but 1 recovered and discharged in satisfactory condition (case with ARF & jaundice expired).

**Table 1: Clinical Profile of patients**

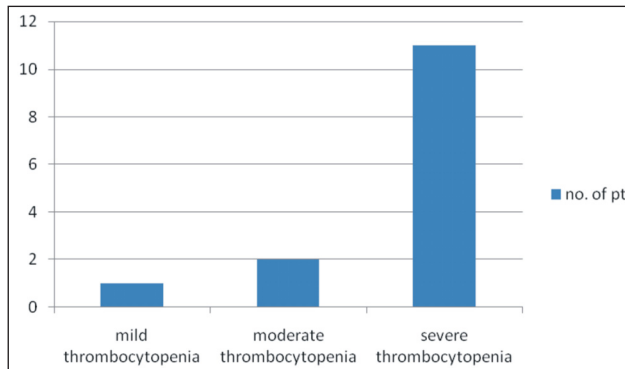
Sr. No.		Case I	Case II	Case III	Case IV	Case V	Case VI	Case VII	Case VIII	Case IX
1	Age (in years)	18	40	12	18	27	10	19	17	30
2	Sex	M	F	F	M	M	F	M	M	M
3	Fever (days)	5	5	6	15	6	15	3	1	10
4	Symptom-atology	Seizure	Psychitric Behaviour	-ve	No	Hematuria	No	GE	GE	Seizure
5	Hepatom-egaly	+	+	+	+	No	+	-	No	+
6	Splenom-egaly	+	-	+	+	No	+	+	No	+
7	Ascites	-	-	-	+	-	-	-	-	-
8	Hemo-globin	11.6	10.7	8.4	5.0	10.4	7.1	11	12.4	11.6
9	Total Leukocyte Count	17500	4500	5200	2000	4800	4600	13700	7200	9800
10	Platelet Count	2000	80000	4000	8000	23000	12000	28000	41000	109000
11	Malaria Rapid diagnostic test	P. Vivax (+ve)	P. Vivax (+ve)	P. Vivax (+ve)	P. Vivax (+ve)	P. Vivax (+ve)	P. Vivax (+ve)	P. Vivax (+ve)	P. Vivax (+ve)	P. Vivax (+ve)
12	Blood/Blood Product trans-fusion	-	-	5BT Transfusion	3RPR + 3BT	IBT + 4RPR	No	No	No	No
13	Drug Therapy	Artemisinin Derivative		Artemisinin Derivative	Artemisinin Derivative	Artemisinin Derivative	Chloroquine	Chloroquine	Chloroquine Derivative	Artemisinin
14	Discharge (days)	8	6	6	7	5	7	3	6	6
15	Admission	Emergency	OPD	Emergency	OPD	Emergency	OPD	Emergency	Emergency	Emergency

**Table 2: Bar Diagram showing level of Thrombocytopenia**

Sr. No.		Case X	Case XI	Case XII	Case XIII	Case XIV
1	Age (in years)	4	7	90	27	60
2	Sex	M	F	M	F	F
3	Fever (days)	30	7	5	15	2
4	Symptomatology	No	Abdomen Pain	Echymosis Patches	Gum Bleeding	ARF with Jaundice
5	Hepatomegaly	-	-	-	+	+
6	Splenomegaly	-	+	-	+	+
7	Ascites	-	-	-	-	-
8	Hemoglobin	5.3	9.9	11	7	6.6
9	Total Leukocyte Count	7700	8800	4800	1700	9700
10	Platelet Count	76000	15000	26000	3000	1000

**Table 2: Bar Diagram showing level of Thrombocytopenia (Contd.)**

Sr. No.		Case X	Case XI	Case XII	Case XIII	Case XIV
11	Malaria Rapid diagnostic test	P. Vivax (+ve)	P. Vivax (+ve)	P. Vivax (+ve)	P. Vivax (+ve)	P. Vivax (+ve)
12	Blood/Blood Product transfusion	2PRBC+ 1PRP	5BT (PRBC+PRP)	2PRP	2PRP	2PRP
13	Drug Therapy	Chloroquine	Artemisinin Derivative	Artemisinin Derivative	Artemisinin Derivative	Artemisinin Derivative
14	Discharge (days)	7	8	5	8	5 ( Died)
15	Admission	Emergency	Emergency	Emergency	Emergency	Emergency



## DISCUSSION

Complicated Malaria is an entity linked with plasmodium falciparum malaria. But now trend is changing and P. Vivax malaria can also result in severe and complicated disease.

Severe thrombocytopenia is common in isolated falciparum and mixed falciparum/vivax malaria, but is very rare in isolated P.vivax infection. In Horstmann's series, the lowest count in 39 cases of vivax malaria was  $44 \times 10^9/L$ <sup>4</sup>. Pukrittayakamee et al described a case of a volunteer experimentally infected with the Chesson's strain of p. vivax with a platelet count of  $20 \times 10^9/L$ <sup>5</sup>. A case of vivax malaria associated with an initial platelet count of  $5 \times 10^9/L$  was reported from India<sup>6</sup>. Recently a study in pediatric patients in India revealed 5 cases of vivax malaria with thrombocytopenia over a period of 3 months<sup>7</sup>. Platelet count can fall below 20,000/cumm in P.vivax malaria 2.17%(2 patients) but it is more common with falciparum malaria<sup>8</sup>. In our study 7 ( 50%) cases had platelet count(<20,000/cumm). Hemoglobin levels in the subjects with thrombocytopenia with vivax malaria are affected with mean 8.87gm /dl that is significantly lower than the patients with normal platelet count(11.89gm/dl).<sup>9</sup>In the present study mean hemoglobin was 8.31 gm/dl . This clue can be helpful in distinguishing other fevers with thrombocytopenia

with unaltered hemoglobin levels and conditions like dengue fever in which Hb level paradoxically rises.

Both non immunological destruction as well as immune mechanisms involving specific platelet-associated IgG antibodies that bind directly to the malarial antigen in the platelets have been recently reported to play a role in the lysis of platelets and the development of thrombocytopenia.<sup>10</sup> In clinical trials, recombinant macrophage colony stimulating factor (M-CSF) has been known to cause a reversible dose dependent thrombocytopenia. Elevated M-CSF levels in malaria, by increasing macrophage activity may mediate platelet destruction in such cases<sup>11</sup>. Oxidative stress damage of thrombocytes has also been implicated in the etiopathogenesis based on the finding of low levels of platelet superoxide-dismutase and glutathione peroxidase activity and high platelet lipid peroxidation levels in malarial patients, when compared to those of healthy subjects<sup>12</sup>.

## CONCLUSIONS

This study stresses the association of thrombocytopenia in the diagnosis of so called benign malaria- P.vivax and the need for blood/blood product transfusions. Moreover, this study reflects the importance of differentiating vivax malaria , falciparum malaria and dengue fever keeping in mind that now a days dengue fever is a leading cause of thrombocytopenia.

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**Conflict of Interest:** None

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# Clinico-Mycolological Correlation of Dermatophytosis from Meerut City

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## ABSTRACT

Clinico- mycolological correlation was carried out in 100 cases of dermatophytosis from Meerut city. Tinea corporis was the commonest clinical type followed by tinea cruris. The overall positivity rate was 51% by culture and 58% by direct microscopy. Trichophyton was the commonest genus isolated (86.3%). Trichophyton rubrum (26%) was the predominant species isolated followed by Trichophyton tonsurans (9%) Epidermophyton floccosum (6%) and Trichophyton mentagrophytes (4%). Maximum numbers of patients were males in the third decade of life, belonging to the middle socio-economic group.

**Keywords:** Dermatophytosis, Dermatophytes, Tinea

## INTRODUCTION

Dermatophytosis is fungal infection of the keratinized tissue of the hair, nail and stratum corneum of the skin caused by a group of fungi belonging to genera *Trichophyton*, *Microsporum* and *Epidermophyton*. The fungal infections of the skin and its appendages are more common in tropical countries like India due to heat and humidity. The risk factor includes overcrowding, poverty and poor personal hygiene<sup>1</sup>. The type and frequency of dermatophytosis may change with time, due to changes in living standards and application of preventive measures like personal hygiene<sup>2</sup>. Dermatophytosis is usually diagnosed clinically but, identification of the fungal species is epidemiologically important since the source of infection can be traced and its transmission halted. Numerous studies on various aspects of dermatophytosis have been reported from different parts of India. Limited data regarding the clinico mycolological correlation of dermatophytosis from this geographical area, prompted us to undertake the present study.

## MATERIAL AND METHOD

The present study was conducted on 100 consecutive clinically diagnosed patients of

dermatophytosis attending the outpatient department of Dermatology and Venereology clinic of Subharti Medical College, Meerut over a period of one year. Clinical history regarding the age, sex, occupation and socio-economic status was taken from all the patients. History of associated risk factors such as diabetes mellitus, malignancy, immunocompromised status was also noted. The sample that is hair, nail and skin scrapping (as per the clinical presentation of the patient) was collected, transported and processed for isolation and identification of dermatophytes using standard mycolological technique<sup>3</sup>. A portion of the sample was subjected for direct microscopy using 10% KOH mount. The second portion of the sample was divided into two parts, first part was inoculated on Sabouraud Dextrose agar (SDA) with antibiotics and second part inoculated in dermatophyte test medium (DTM) (Hi-Media Pvt.Ltd, Mumbai, India). The inoculated tubes were incubated at 25°C and 37°C. Any growth appearing on the tubes were identified by colony morphology and microscopic characteristics on lactophenol cotton blue (LCB) mount. Special tests like urease production, hair perforation test and slide culture were performed when required<sup>3</sup>. Culture was considered as negative and tubes were discarded when there was no growth for maximum of 3 weeks. Eight clinical variants were considered in our setting; tinea corporis, tinea cruris, tinea unguium, tinea incognito,

tinea capitis, tinea manuum, , tinea pedis and tinea facie

## RESULTS

A total of 71 males and 29 females with clinically suspected cases of fungal infection were subjected to mycological studies. The male female ratio was 2.4:1 ( $\chi^2=2.2$  (do=7);  $p=0.948$ ). Dermatophytosis was more common in the age group of 31-40 years (29%) followed by 21-30 years (26%) ( $p<0.05$ ). Majority of our patients belonged to the middle socio-economic group (54/100) followed by lower socio-economic group (38/100) and maximum number of cases were reported between the hot and humid month of June to August.

Out of the 100 clinically suspected cases of dermatophytosis 51% cases were laboratory confirmed by culture (Table 1). Direct microscopy was positive in 58% cases. Eighteen cases which was positive for fungal elements on direct microscopy failed to grow both on conventional and selective culture media. On correlation of results of direct microscopy and culture, a high significant difference was observed at 5% level of significance. ( $\chi^2=17.836$ ;  $p<0.001$ ) ( $k=0.4180$  (Moderate agreement)).

Tinea corporis (40%) was the commonest clinical type identified followed by tinea cruris (23%) and tinea unguium (19%) (Table 2). *Trichophyton* was the predominant genus isolated in the present study followed by *Epidermophyton*. *Microsporum* however was the least common genus isolated, only from a single case of tinea capitis. Looking at the overall species isolated from our clinical types it was observed that *Trichophyton rubrum* was the predominant species isolated (26/51) followed by *T. tonsurans* (9/51), *E. floccosum* (6/51), *T. mentagrophytes* (4/51) and *T. schoenleii* (3/51) from Meerut city. On statistical analysis using the Chi square test no significant difference in proportion of laboratory confirmed isolates as compared to the clinical findings was seen at 5% level of significance. ( $\chi^2=4.54$  (df=7);  $p=0.716$ ). Further, the difference in isolation rates of various species from the clinical types was statistically significant ( $\chi^2=61.5$  (df=42);  $p=0.026$ )

## DISCUSSION

The prevalence of superficial mycoses has increased worldwide over the last decades, making these infections one category of the most commonly encountered type of infections<sup>4</sup>. Dermatophytosis

occurs commonly in tropical countries like India, often representing a public health problem.

Accurate assessment of the prevalence and etiologic agent is desirable to estimate the size of the problem and to prevent the transmission of such infections.

In the present study dermatophytosis was common in the third decade of life. Similar finding has been observed by other workers in the past. This may be due to greater physical activity in this age group leading to increased sweating. It may also be that prior to this age the infection is generally ignored and home-remedies are sought. Tinea corporis was the commonest clinical presentation in the third decade and tinea capitis in the first decade of life in our study. Tinea capitis is predominantly seen in children because of frequent shaving of scalp which makes them more susceptible to fungal infections<sup>5</sup>.

Male preponderance (2.4:1) was observed in our study. Similar finding has been reported by other worker. Lower incidence in females may be due to non reporting to the hospitals because of prevailing social stigma in rural population in India. These observations were supported by some of the earlier reports<sup>5,6</sup>.

Dermatophytosis was most common in the middle socio-economic group (54%) followed by the low socio-economic group (38%) in the present study. Similar findings have been reported by other workers from India. However, Ranganathan et al. from Chennai reported most of the cases in the low socio-economic group<sup>7</sup>.

Dermatophytosis is a common disease in tropical countries like India, due to factors such as heat and humidity which provides a fertile ground for the abundant growth of dermatophytes. We reported maximum numbers of cases between the months from June to August, a hot and humid climate in Meerut city. Few workers have also reported maximum number of cases between March to July<sup>8</sup>.

Out of the 100 clinically suspected cases of dermatophytosis 51% cases were laboratory confirmed by culture (Table1). Direct microscopy could detect 58% cases, which is comparable to that reported by other workers from India<sup>6,8</sup>. Eighteen cases which was positive for fungal elements on direct microscopy failed to grow both on conventional and selective culture media which may be due to non-viability of fungal elements in some cases.

Tinea corporis was the commonest clinical type (40%) of dermatophytosis prevalent in Meerut city and adjoining area, followed by tinea cruris (23%) and tinea unguium (19%) (Table 2). This concurs with reports from other parts of India<sup>6</sup>. However, few Indian studies have reported tinea cruris as the commonest clinical variety<sup>9</sup>. Complete unaeration due to tight clothing, maceration and high rate of sweating in groin and waist regions makes these sites more vulnerable to dermatophytosis. Tinea incognito (7%) and tinea capitis (6%) were other clinical types identified from this area. Isolation of many cases of tinea incognito was noticed in our study, it may be because ours was a hospital based study and thorough clinical history was recovered from all cases. Occurrence of tinea capitis is comparatively less common in India than in other countries, which may be attributable to the use of hair oils (particularly mustard oil) which are customarily used by Indians. It has been observed that mustard oil has an inhibitory effect on dermatophytes in vitro<sup>10</sup>.

In the present study tinea pedis (2%), tinea manuum (2%) and tinea faciei (1%) were the less common clinical type reported. However, tinea pedis has been reported as the main clinical type in the West, which may be because in Western the countries regular use of shoes and socks, predisposing to perspiration and maceration as compared to more use of slippers by Indians<sup>11</sup>. Tinea manuum has not been reported by many workers and tinea faciei is the least common clinical type seen also in other studies from India.

On clinico-mycological correlation it was observed that *Trichophyton* was the most prevalent species of dermatophyte isolated from 86.3% cases from Meerut city. *T. rubrum* was the commonest species isolated followed by *T. tonsurans*, *E. floccosum* *T. mentagrophytes* (Table 2). Similar findings has been observed by various workers<sup>5,6</sup>. *T. rubrum* was the commonest species isolated from cases of tinea corporis and tinea cruris accounting for majority of cases followed by *T. tonsurans*.

In our study *T. rubrum* & *E. floccosum* were the commonest dermatophytes causing tinea unguium which corresponds to most of the studies<sup>12</sup> We have

reported cases of tinea incognito (7%), caused by *T. rubrum* and *T. mentagrophytes* which to the best of our knowledge has not been reported from India. However, Ansari A et al. from Iran has reported tinea incognito in 0.88% cases by *T. verrucosum*<sup>13</sup>.

*Microsporum gypseum* and *T. schoelenii* were predominant isolate from cases of tinea capitis which is similar to that reported by Maruthi YA from Visakhapatnam<sup>14</sup>. A high degree of variation among different species of dermatophytes causing tinea capitis has been observed in India<sup>15</sup>.

*Trichophyton* spp. was isolated from cases of tinea manuum and tinea pedis in the present study.

To conclude, our study highlights *T. rubrum* as the commonest isolate and tinea corporis as the commonest clinical type of dermatophytosis from Meerut city. The data of the present study thus provides a valuable baseline which may be useful in the design of preventive and educational strategies for future. However, more number of samples needs to be studied from this geographical area to exactly comment on the prevalence. Although dermatophytoses does not cause mortality, it does cause significant morbidity and poses a major public health problem.

So early detection and management of dermatophytosis would be a definite challenge in the years to come.

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**Conflict of Interest:** None declared

**Ethical Approval:** This research was approved by the Research and Ethics Committee of Swami Vivekanand Subharti University, Meerut.

**Table 1: Correlation of results of direct microscopy and culture (n=100)**

	KOH +VE	KOH -VE	Total
Culture +ve	40	11	51(51%)
Culture -ve	18	31	49(49%)
Total	58 (58%)	42(42%)	100(100%)

**Table 2: Profile of clinico-mycological correlation of dermatophytosis from Meerut City (n=100)**

Clinical type	Tinea corporis	Tinea cruris	Tinea unguium	Tinea incognito	Tinea capitis	Tinea mannum	Tinea pedis	Tinea faciei	Total
Clinical cases	40	23	19	7	6	2	2	1	100
Laboratory confirmed cases	28	11	5	2	2	1	1	1	51
Species isolated									
T.rubrum	12	9	2	1	-	1	1	-	26
T.tonsurans	7	2	-	-	-	-	-	-	9
T.mentagro-phytes	2	0	-	1	-	-	-	1	4
T.schoelenii	2	-	-	-	1	-	-	-	3
T.verrucosum	1	-	1	-	-	-	-	-	2
Microsporium gypseum	-	-	-	-	1	-	-	-	1
E.floccosum	4	-	2	-	-	-	-	-	6

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# Prevalence of HIV Infection and Neonatal Outcome in Pregnant Women attending the Antenatal Clinic in ESICMC & PGIMSR, Bangalore

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## ABSTRACT

**Objectives:** The objectives were to study the prevalence of HIV infection and neonatal outcome among pregnant women attending the antenatal clinic in a teaching hospital. **Materials and Methods:** A prospective study was carried out at the antenatal clinic, Department of Obstetrics and Gynecology of ESICMC & PGIMSR, Bangalore between January 2006 and December 2011. 18207 pregnant women were tested for HIV after adequate counseling and with informed consent. Those who tested positive were followed up with antenatal care and CD4 levels. Single dose Nevirapine was given to the mother at the onset of labour and to the neonate after delivery. Children were followed up with HIV testing at 6 weeks, 6 months, 12 months and 18 months of age. **Results:** Out of the 18207 pregnant women tested for HIV, 66 were HIV positive with the prevalence being 0.36%. Among the HIV positive women, 20 (34.5%) delivered by caesarean section and 38 (65.5%) delivered vaginally. Majority 46 (79.3%) of infants had birth weight >2500 g. All the children available for follow-up tested HIV negative at various periods of follow-up. 4 HIV positive pregnant women and 14 infants were lost to follow up inspite of dedicated efforts to trace them. **Conclusion:** In our study, 18207 pregnant women were tested for HIV after counseling and the prevalence of HIV positives was 0.36%. This emphasizes the need for providing universal access to these services. Optimal antenatal and postnatal care is important to prevent transmission of HIV to the infant and also to prevent adverse birth outcomes. The fact that many HIV positives were lost to follow up reflects the fact that more concerted efforts are required to remove the stigma attached to people living with HIV.

**Keywords:** HIV, Prevalence, Pregnant Women, Neonatal Outcome

## INTRODUCTION

There are an estimated 2.4 million people living with HIV infection in India. Of these, women constitute 39% of all people living with HIV while 4.4% are children. Nearly 30% of these women are in the reproductive age group and are often diagnosed for the first time during pregnancy<sup>[1]</sup> The prevalence of HIV in the antenatal clinics in India is ever increasing and measures to prevent adverse maternal and neonatal outcome are important in this population. In the absence of any intervention, a substantial proportion of children born to women living with HIV, acquire HIV infection from their mother either during pregnancy, labour and delivery or through breastfeeding. Without any intervention, the risk of

transmission from HIV infected pregnant women to their children is estimated to be around 20-45%. Use of antiretroviral drugs has been shown to be quite effective in preventing this transmission.<sup>[1]</sup>

## OBJECTIVES

The objective of the study was to assess the prevalence of HIV infection in pregnancy and also to know the birth outcome in those pregnant women who tested positive for HIV.

## MATERIALS AND METHOD

This is a prospective study carried out in the ANC clinic of ESICMC & PGIMSR, Bangalore, a teaching



hospital, which mainly caters to patients working in the labour force.

The study period was January 2006 to December 2011 when 18207 women attended the ANC and availed its ICTC services. At the ANC Clinic, the women were counseled for HIV testing to which all agreed. A thorough history was taken and clinical examination was done. After obtaining informed consent from the pregnant women, blood was drawn for HIV screening test which was done by a rapid HIV test kit. Those women who tested positive by the 1<sup>st</sup> assay, were confirmed to be HIV positive by a 2<sup>nd</sup> assay (ELISA). Extensive post test counseling was done in women who tested positive. Early and regular attendance at the high risk Antenatal clinic was stressed in these patients. Obstetric follow-up included regular antenatal checkups along with serial ultrasound scans for foetal well being. CD4 cell counts were done at enrolment and repeated if necessary. All screen positive women received single dose of Nevirapine (200mg) at the onset of labour. Gestational age at delivery, mode of delivery, birth weight were recorded. Following delivery, all infants were provided with single dose of Nevirapine in the dose of 2mg/kg body weight. Children were followed up with HIV testing at 6 weeks, 6 months, 12 months and 18 months of age.

### RESULTS

During the study period, a total of 18207 pregnant women were tested for HIV after counseling and informed consent. Out of these pregnant women, 66 (0.36%) were HIV positive and remaining 18141 (99.64%) were HIV negative (Table 1).

**Table 1. Distribution of pregnant women according to HIV status.**

HIV test results	Number	Percentage
Negative	18141	99.64%
Positive	66	0.36
Total	18207	100%

As observed from Table 2, out of the 66 HIV positive pregnant women, 21 (36.2%) were <25 years of age, 34 (58.6%) were between 25 -29 years of age and 3 (5.2%) were ≥ 30 years of age. Majority were primigravidas ie, 42 (72.4%) and 16 (27.6%) were multigravidas. CD4 cell count at enrolment was <350 in 10 (17.2%) and ≥ 350 in 48 (82.8%) women. Out of the 66 women who tested positive, 4 patients terminated their pregnancies in the first trimester. 4 of

them were lost to follow up. Out of the remaining 58, majority 56 (96.6%) delivered at >37 weeks gestational age and also most of them had institutional deliveries 56 (96.6%). Only 2 women delivered at home. Though these 2 women did not receive Nevirapine, the neonates received Nevirapine within 72 hours of birth. 20 (34.5%) women delivered by caesarean section and 38 (65.5%) had vaginal deliveries. There were 2 still births and 1 infant death at 4 weeks of age.

**Table 2. Baseline characteristics of the mother-infant pairs**

Characteristics	Number	%age
<b>Maternal characteristics( Total – 58)</b>		
<b>Age (years)</b>		
< 25	21	36.2
25-29	34	58.6
≥/ =30	3	5.2
<b>Parity</b>		
Primigravida	42	72.4
Multigravida	16	27.6
<b>CD4 counts at enrollment</b>		
≥/ =350	48	82.8
<350	10	17.2
<b>Gestational age of delivery(weeks)</b>		
≥/ =37	56	96.6
<37	2	3.4
<b>Mode of delivery</b>		
Caesarean section	20	34.5
Vaginal delivery	38	65.5
<b>Place of delivery</b>		
Institutional	56	96.6
Home	2	3.4
<b>Infant characteristics (Total- 58)</b>		
<b>Birth weight (g)</b>		
<2500	12	20.7
≥/ =2500	46	79.3
<b>Infant follow-up (Total-55)</b>		
Upto 6 weeks	2	3.6
Upto 6 months	5	9.1
Upto 12 months	5	9.1
Upto 18 months	29	52.7
Lost for follow up	14	25.5
<b>Baby's HIV status</b>		
Positive	0	0
Negative	41	74.5
Lost for follow up	14	25.5

Regarding infant characteristics, 12 (20.7%) weighed < 2500 g and 46 (79.3%) weighed > 2500 g. Out of 55 infants, 2 (3.6%) were available for follow-up upto 6 weeks only, 5 (9.1%) were followed upto 6

months, 5 (9.1%) upto 12 months and 29 (52.7%) upto 18 months as intended. 14 (25.5%) infants were lost to follow up from the beginning itself. All infants tested HIV negative till the period they were followed up.

## DISCUSSION

In our study, the prevalence of HIV in pregnant women was found to be 0.36%. Similarly in a study done by Giri PA et al in Pune, Maharashtra, the prevalence of HIV among pregnant women was 0.41%<sup>[2]</sup> while in a study by Ashtagi et al done in Belgaum, Karnataka the prevalence was 0.7%.<sup>[3]</sup> Also in a study by Gupta et al done in North India the prevalence of HIV in pregnant women was 0.88%.<sup>[4]</sup>

Regarding birth outcome, overall it appears that HIV infected women in this study were not found to have significant negative birth outcomes and majority of neonates had birth weights >2500 g. Similarly in two studies done in Manipur and Pune respectively, there was no adverse maternal or neonatal outcome.<sup>[5,6]</sup> These results are in contrast with experience from countries in Africa, where HIV positive women with no or minimal access to antiretroviral treatment were found to have low birth weight babies.<sup>[7,8]</sup> It appears that antenatal care critically affected birth outcome in our study. It is also likely that extensive counseling, proper follow up and good CD4 cell counts in these pregnant women also contributed to favourable maternal and fetal outcome.

It is important to note that in our study 4 HIV positive pregnant women and 14 infants were completely lost for follow up inspite of dedicated efforts by counselors trying to contact them through telephone, mail and even visiting the addresses given by them. This reflects the deep stigma attached to people living with HIV. The need of the hour therefore is to involve NGO's, public and the private sector to provide education and access to better services.

## CONCLUSION

The prevalence of HIV in pregnancy is ever increasing and it is important to provide proper counseling, adequate antenatal and postnatal care to these women. This study also highlights the fact that HIV exposure per se is not associated with perinatal morbidity and good antenatal/postnatal care and

access to antiretroviral therapy for the mother and the neonate go a long way in preventing adverse neonatal outcomes.

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**Conflict of Interest:** There is no conflict of interest.

**Source of Support:** Nil

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# Comparison of Intrathecal Fentanyl and Intravenous Ondansetron for Prevention of Nausea -Vomiting during Cesarean Delivery with Spinal Anaesthesia

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## ABSTRACT

This study compares intrathecal fentanyl with IV ondansetron for preventing intraoperative nausea and vomiting during cesarean deliveries performed with spinal anaesthesia. One twenty healthy parturients posted for elective caesarean section under spinal anaesthesia using hyperbaric 0.5% bupivacaine were randomly allocated into two groups of sixty each. Group-F received 12.5µg of fentanyl intrathecally along with 2 ml of hyperbaric bupivacaine. Group-O received 4 mg of intravenous ondansetron. Intraoperatively, an anaesthesiologist blinded to the study recorded the presence or absence of nausea, retching and vomiting. The frequencies for nausea, retching and vomiting were compared using test of proportion for the two samples. The level of significance was taken as 0.05. The incidence of nausea, retching and vomiting in fentanyl group is 11.67%, 5% and 3.33% respectively where as in ondansetron group the incidence is 26.67%, 20% and 18.33%. There is significant difference between two groups with the P values 0.037, 0.013 and 0.08 for nausea, retching and vomiting respectively. Intrathecal fentanyl as part of a spinal anesthetic for cesarean delivery is superior to IV ondansetron for the prevention of intraoperative nausea and vomiting.

**Keywords:** Spinal Anaesthesia, Intrathecal Fentanyl, Nausea Vomiting, Ondansetron

## INTRODUCTION

Nausea and vomiting remains as “Big little problem” in caesarean delivery under spinal anaesthesia and poses major problem.<sup>1</sup> Intraoperative nausea and vomiting occurs in as many as 66% of the caesarean deliveries performed under regional anaesthesia.<sup>2</sup> In day today practice several drugs like metoclopramide, ondansetron, droperidol, dexamethosone, etc have been tried to reduce the incidence of nausea vomiting.<sup>3,4</sup> But none have been proved to be effective without exhibiting significant adverse side effects.

Reduced incidence of nausea and vomiting has been observed when intrathecal lipophilic opioids like fentanyl and sufentanyl were administered to enhance post operative analgesia.<sup>5</sup> Although both intravenous ondansetron and intrathecal fentanyl have been demonstrated efficacy in preventing nausea and vomiting during caesarean delivery, no direct comparative studies have been performed. Therefore we designed a randomized controlled trial comparing intrathecal fentanyl with intravenous ondansetron for the prevention of nausea and vomiting during elective caesarean delivery under spinal anaesthesia.

## MATERIALS AND METHOD

The present study was carried out at KLE Hospital and Medical Research Centre, Belgaum. The study group consisted of 120 parturients of ASA grade I and II aged between 20-35 years posted for elective caesarean section under spinal anaesthesia. Parturients with history of hyperemesis gravidarum,

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contraindications to spinal anaesthesia and those who have received antiemetics 24 hours prior to surgery were excluded. Randomized controlled trial study was carried out.

After having met all the inclusion and exclusion criteria and obtaining written informed consent, parturients were randomized into two groups of 60 using computer generated randomization table. Study drugs were prepared and dispensed in unlabelled syringes by an anaesthesiologist not involved in this study. The patients belonging to Fentanyl group (group F, n=60) received 2ml of 0.5% hyperbaric bupivacaine, 12.5mg fentanyl (0.25 ml) intrathecally and 2ml of normal Saline IV. The patients belonging to Ondansetron group (group O, n=60) received 2ml of 0.5% hyperbaric bupivacaine, 0.25ml of normal saline intrathecally and 4mg of (2ml) ondansetron IV.

Parturients were preloaded with 20ml/kg of Ringer lactate solution before spinal anaesthesia. The drug to be administered intravenously was given 15 min prior to surgery.

Dural puncture was performed at L<sub>3</sub>-L<sub>4</sub> interspace using 23G spinal needle with patient in left lateral decubitus position. Following free flow of CSF, 2ml of bupivacaine and 0.25ml of study agent was injected intrathecally. Hypotension was treated by intravenous fluids alone or by injecting 5-15mg of ephedrine intravenously. Bradycardia was treated with atropine. Oxygen administered through face mask throughout the surgery. Intra operative episodes of nausea, vomiting were recorded by direct questioning by an anesthesiologist blinded to the study drug the patient had received. Ondansetron 4mg was administered as rescue anti-emetic with the occurrence of two or more emetic episodes.

**Statistical analysis:** The quantitative variables like age, height, weight and duration of surgery were compared between two groups using students unpaired 't' test. The percentages for different indications for cesarean section were compared using the test of proportion for the two samples. The frequencies for nausea, retching and vomiting were compared using test of proportion for the two samples. The level of significance was taken as 0.05. Statistical analysis was done by using Microsoft Excel and GenStat version 9.1 Sub arachnoid block

**RESULTS**

The demographic data of both the groups were as follows.

**Table 1 : Shows demographic data in both the groups.**

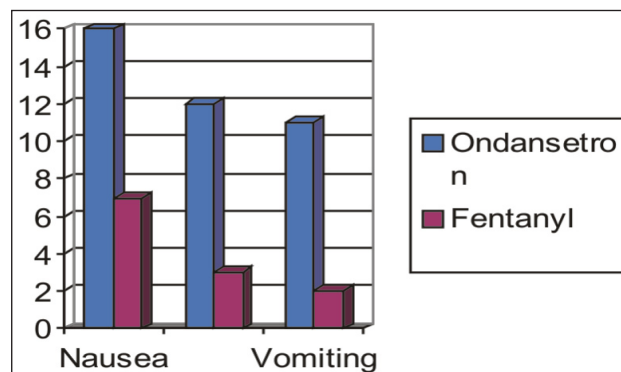
	Ondansetron		Fentanyl	
	Mean	S.D.	Mean	S.D.
Age	24.48	3.91	24.93	3.75
Height	149.38	3.69	148.73	2.66
Weight	59.45	5.67	59.50	5.62
Duration of surgery	81.17	15.63	81.25	16.76

The demographic data were compared using students unpaired 't' test and observations from table1 shows that the demographic data in both the groups are comparable and the difference is not statistically significant. The mean duration of surgery in ondansetron group was 81.17 minutes and in fentanyl group was 81.25 minutes which was not statistically significant.

**Table 2: Distribution of nausea retching and vomiting in two groups.**

	Ondansetron	Fentanyl	P value
Nausea	16(26.67%)	7(11.67%)	0.037
Retching	12(20%)	3(5%)	0.013
Vomiting	11(18.33%)	2(3.33%)	0.008

The frequency of nausea, retching and vomiting were compared using the test of proportion for the two samples. Table2 shows that the incidence of intraoperative nausea, retching and vomiting was 26.67%, 20% and 18.33% respectively in ondansetron group where as the incidence was 11.67%, 5% and 3.33% in fentanyl group. There is reduction in the incidence of nausea, retching and vomiting in the fentanyl group as compared to ondansetron group and this difference is statistically significant(p<0.05) with the P values 0.037, 0.013 and 0.008 respectively.



**Graph 1 : shows the distribution of nausea retching and vomiting in two groups.**

## DISCUSSION

In present study, we observed significant decrease in intraoperative nausea, retching and vomiting in fentanyl group when compared with ondansetron group (Table 2). The incidence of nausea in ondansetron group 26.67% and in fentanyl group is 11.67 % (P=0.037). The incidence of retching in ondansetron group is 20% and in fentanyl group is 5% (P=0.013). The incidence of vomiting in ondansetron group is 18.33% and in fentanyl is 3.33% (P=0.008) and the difference is highly significant. No side effect was observed in either of the groups.

The results observed in our study agree with similar studies. Randall et al compared four different subarachnoid solutions, 0.5% heavy bupivacaine alone, or with adrenaline, fentanyl or adrenaline and fentanyl, they observed no nausea and vomiting in bupivacaine-fentanyl group.<sup>6</sup> There was a significant association between the incidence of nausea and the groups receiving adrenaline (P=0.033). In a study conducted by Biswas BN et al the incidence of nausea and vomiting was 5% in patients receiving intrathecal fentanyl where as it is 40% in control group.<sup>7</sup>

Dan B et al conducted a study to compare the analgesic efficacy and side effects of hyperbaric bupivacaine alone or combined with clonidine or with clonidine- fentanyl group.<sup>8</sup> They observed intraoperative nausea and vomiting in 13% of the patients in bupivacaine-clonidine -fentanyl group, where as it is 41% in bupivacaine alone group.

Intraoperative nausea and vomiting during caesarean section is frequently related to peritoneal traction and exteriorisation of uterus.<sup>9</sup> This is accompanied by visceral pain despite adequate dermatomal blockade that stimulate vagal afferents. Intrathecal administration of fentanyl provides improved analgesia and thereby decreases the discomfort from intraoperative peritoneal manipulations which initiate emetic episodes could be the possible reason for reduced incidence of nausea and vomiting.

Lussos et al concluded that intraoperative nausea and vomiting is rather related to surgical manipulation of the uterus, abdominal viscera and peritoneum even in the presence of adequate sensorimotor blockade.<sup>2</sup> Therefore antiemetic treatment may be effectively administered to a group of surgical patients submitted to a certain procedure, but not for another group having different surgical procedure or anaesthetic techniques.

## CONCLUSION

Intrathecal fentanyl as part of a spinal anesthetic for cesarean delivery is superior to IV ondansetron for the prevention of intraoperative nausea and vomiting.

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**Conflict of Interest:** None declared

**Source of Support :** Nil

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# Late Onset Nevus of Ota - A Rare Presentation

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## ABSTRACT

Nevus of Ota, blue hyperpigmentation along the first and second branches of trigeminal nerve involves face, forehead, eyebrows, nose and eye (especially sclera). Late onset adulthood presentation, a rare presentation, represents stimulation by amelanotic melanocytes by potent stimuli like female sex hormones, trauma, infection. This condition in late onset, warrants detail investigations to rule out other associated autoimmune disorders and malignant change of nevus. This case highlights the importance of recognizing this entity even when the onset is late.

**Keywords:** Nevus of Ota, Late Onset, Melanosis

## INTRODUCTION

Nevus of Ota was originally described by Ota in 1939. He described it as a nevus fusco-ceruleus ophthalmo-maxillaris and melanosis bulbi. This condition affects 0.014%-0.034% of Asian population.<sup>1</sup> Male to female ratio is 1:4.8. It is associated with ocular complications like glaucoma (10.3%), cupping of optic nerve head, uveitis, cataract and rarely orbital melanoma. This case is a rare presentation of this entity where the onset of the nevus was at 24 years of age.

## CASE REPORT

26 years old woman presented with complaint of blue patch on right side of face and temporal region for last 2 years. Now she noticed that this patch increased and its colour became darker than before and more noticeable by family members and friends. Due to cosmetic reasons, patient had psychological problems also. There was no history of vision disturbance, parasthesias, numbness, photosensitivity, and any focal neurological sensory or motor involvement. Personal, family and drug history was

unremarkable. General physical examination did not reveal anything except blue patch on the face and temporal area. This patch extended up to cheek and right side of nose also (Figure 1). Patch present near the corneoscleral junction and on both sides, laterally and medially at the limbus region (Figure 2). As per history, patch started with scleral involvement. Diagnosis was confirmed by histopathology (fig 3). Systemic examination was normal. Routine investigations showed Hb of 11gm%, total leucocyte count 8000/cumm, erythrocyte sedimentation rate-60mm 1<sup>st</sup> hour. C-reactive protein was negative. Renal function tests, liver function tests, antinuclear antibody, anti ds DNA antibody were all normal. Urine examination showed traces of albumin. Detailed eye examination was done which showed normal vision, fundus and intra ocular tension. After detailed clinical examination and investigations, the diagnosis of Nevus of Ota, late onset (adult presentation) was made.

## DISCUSSION

Many conditions like Café-au-lait patch, Mongolian spot, Nevus of ito, blue Nevus, nevus spilus, bilateral nevus of ota (hori nevus), portwine stain, fixed drug eruption, etc come in the differential diagnosis of Nevus of Ota.

Age of onset (50% to 60% of all cases) is infancy, majority present at birth and 40% to 50% present around puberty. Onset between the ages of 1 and 11 years, and after 20 years is rare.

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Among 240 patients examined with nevus of ota it was found that 48% develop nevus at or soon after birth, 11% develop between 1 and 10 years of age and the remaining 36% developed it between 11 and 20 years of age<sup>2</sup>. Such finding indicates that in many cases the Nevus consist of amelanotic nevoid cell which only become pigmented after stimulation by triggering factors. Triggering factors may be female sex hormones, infection, trauma, ultraviolet light exposure.

Abnormalities of neural crest migration lead to development of these congenital dermal melanosis<sup>3</sup>. It has been proposed that changes in the concentration of glycosaminoglycans affect neural crest migration with the formation of dermal melanosis as the consequence<sup>4</sup>. The phenotype (Nevus of ota, Mongolian Spot, or Blue Nevus) and the extent of involvement depend upon the stage at which the change occurs, as well as the extent of that change.

Tanio<sup>5</sup> and Hirayama and Suzuki<sup>6</sup> give classification for extent of involvement and distribution of dermal melanocyte respectively. These classifications indicate that therapeutic outcome depends upon the depth rather than the color of nevus. Recently nevus of Ota has been reclassified according to laser response<sup>7</sup>. Treatment can be done by non laser approach like camouflage, cryotherapy, dermabrasion and surgical excision with introduction of selective photothermolysis in 1983<sup>8</sup>. The use of Q-switched (QS) laser has revolutionized the treatment. Other lasers like QS Ruby laser, QS 1064 Nd YAG, QS Alexandrite can be used<sup>9</sup>. The risk of recurrence is estimated to be between 0.6% - 1.2%<sup>10</sup>.

This is particularly important for children with nevus of Ota, as early treatment has been standard practice. Early treatment leads to complete clearance before school. In our patient, because of late presentation, the problems like psychological trauma and recurrence associated with cosmetic disfigurement of the nevus are troublesome.

### CONCLUSIONS

This case highlights the importance of recognizing Nevus of Ota even if the patient presents with late onset so that early treatment can prevent psychological trauma and recurrence.



Fig. 1. Showing extent of hyperpigmented patch on face

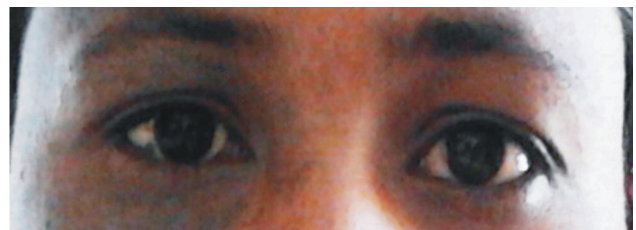


Fig. 2. Showing scleral involvement by hyperpigmented patch

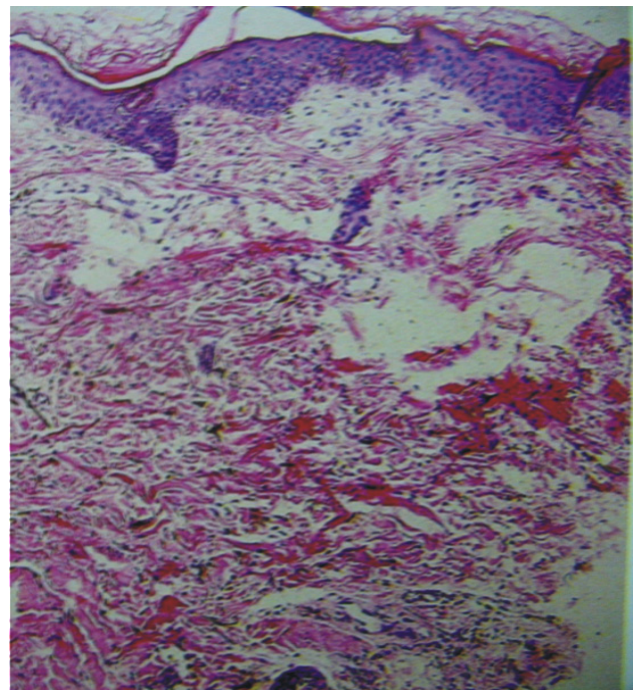


Fig. 3: Histopathology ( H & E staining) showing dendritic cells impregnated within collagen bundles in dermis.



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**Ethical Clearance:** Not Required

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# Effect of Multiple Micronutrients Supplementation of Antenatal Mothers on Birth Weight of their Babies

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## ABSTRACT

**Background:** Considerable evidence suggests a role for micronutrients in pregnancy outcomes. This study was conducted to evaluate the effect of maternal micronutrients supplementation on the birth weight of their babies.

**Method:** A randomized controlled trial was conducted between 1st Sept. 2009 to 30th Nov. 2010 at Pt. B.D. Sharma Post Graduate Institute of Medical Sciences (PGIMS), Rohtak (Haryana) in the Department of Pediatrics and Department of Obstetrics and Gynecology. Study involved 560 pregnant women of 12 to 14 weeks gestation, out of which 280 received multiple micronutrients supplement tablet and other 280 received iron and folic acid in tablet once daily after meals.

**Results:** The gestational age, birth weight and birth length were significantly higher in the multiple micronutrients supplement group as compared to the iron folic acid group. The proportion of Low Birth Weight was reduced by 22.5% and period of gestational was 0.45 weeks higher in study group as compared to iron folic acid group ( $p < 0.001$ ). Birth length was 0.62 cm higher in study group ( $p < 0.01$ ). Conclusions: Multiple micronutrients (MMN) supplementation can be beneficial for reducing the incidence of low birth weight (LBW) and preterm delivery also mortality and morbidity in neonates.

**Keywords:** Pregnant Women, Multiple Micronutrients, Births Weight, Randomized Controlled Trial

## INTRODUCTION

Maternal nutrition plays an important role in the growth and development of the fetus.<sup>1</sup> Supplementation with micronutrients can affect pregnancy outcomes. Possible mechanisms for beneficial effects include a generalized improvement in the immune function of women, with a reduced incidence of infections.<sup>2, 3</sup> Women in low income countries often consume inadequate levels of micronutrients due to limited intake of animal products, fruits, vegetables, and fortified foods leading to potentially adverse effects on the mother such as anemia, hypertension, complications of labor and even death.

About 50 million pregnant women in low income countries are anemic, primarily due to iron deficiency.<sup>4</sup> Vitamin A deficiency affects millions of women and children worldwide. A study carried out in Nepal, showed that 20% of pregnant and 27% of postpartum women were vitamin A deficient.<sup>5</sup> Globally approximately 100 million women of reproductive age suffer from iodine deficiency.<sup>6</sup> An estimated 82% of pregnant women worldwide have inadequate intakes of zinc to meet the normative needs of pregnancy.<sup>7</sup> Suboptimal vitamin B6 status has been observed in Egypt among more than one third of breastfeeding women, based on low breast milk concentrations.<sup>8</sup> Low serum vitamin B<sub>12</sub> has been observed among pregnant and lactating women in Mexico and Kenya.<sup>9</sup> Even in a developed country like the United States, a substantial proportion of women of childbearing age consume diets that provide less than the recommended amounts of micronutrients, particularly, zinc, folate, calcium and iron.<sup>10, 11</sup>

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Birth weight of an infant is the single most important determinant of its chances of survival, healthy growth and development. Globally about 15% infants and in India nearly 28% infants are born with low birth weight every year.<sup>12, 13</sup> Considerable evidences suggests a role for micronutrients in pregnancy outcomes. However, nutrition intervention studies have not provided unequivocal evidence of an association between micronutrients intakes and pregnancy outcomes such as birth weight, IUGR, preterm delivery and pregnancy-induced hypertension.<sup>14,15</sup> The present study was therefore planned to evaluate the effect of maternal micronutrients supplementation on the birth weight of their babies.

## MATERIAL AND METHOD

A randomized controlled trial was conducted between 1<sup>st</sup> Sept. 2009 to 30<sup>th</sup> Nov. 2010 at Pt. B.D. Sharma Post Graduate Institute of Medical Sciences (PGIMS), Rohtak (Haryana) in the Department of Pediatrics and Department of Obstetrics and Gynecology. Pregnant women attending antenatal clinic having singleton pregnancy, gestation of 12 to 14 weeks, body mass index of <18.5kg/m<sup>2</sup> and hemoglobin 7 to 9 gm% were included in the study while pregnant women having multiple pregnancy, gestation more than 14 weeks, fetus with evidence of congenital malformation on ultrasonography and mothers with illness of a severity that could compromise outcome of pregnancy were excluded from the study.

We calculated the sample size with a significance level of 5%, power of 80% and considering 30% loss to follow up. A total of 280 women in each group were required to detect a difference of 100gm in mean birth weight. So, a total of 560 women with singleton pregnancy who met the selection criteria were enrolled for the study. The nature and process of trial was explained to the participants and informed consent was obtained. Approval for the study was obtained from the institutional ethics committee.

The mothers who met the selection criteria were randomized to the study group (n=280) and control group (n=280) at 12 to 14 weeks gestation. Allocation was made by 2 step simple randomization. Subjects were first allocated (by computer generated random sequence) to be in one of 28 blocks of 20 subjects each. The blocks were coded as 1 to 28 in a random manner. Out of 28 blocks, 14 were assigned to receive the

multiple micronutrients supplement (study group) and the rest to receive iron and folic acid (control group). Tablets were kept in containers marked 1 to 28. A participant received drug from one of these 28 containers as per allocation. Allocation was concealed by the use of sealed envelopes. The investigators (who assessed the patient's and who estimated birth weights) were blinded to the content of the tablets being given. The code key was opened only after intervention, data collection; follow up and tabulation were finished.

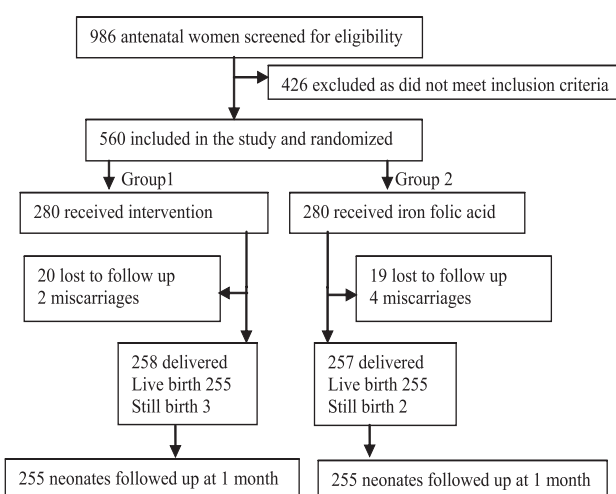


Fig. 1. Flow chart of study

The pregnant women in control group were given one tablet per day of Folifer containing 335mg ferrous sulfate (elemental iron 100mg) and folic acid 500mcg. Pregnant women in the study group were given multiple micronutrients tablet once a day containing : Vitamin A 2500 IU, Vitamin D 200 IU, Vitamin E 7.5mg, Thiamine 1mg, Riboflavin 1.5mg, Niacin 20mg, Folic acid 0.15mg, Vitamin B6 1mg, B12 1mcg, Biotin 30mcg, Vitamin C 50mg, Zinc 15mg, Iron 10mg, Selenium 30mcg, Copper 2mg, Magnesium 100mg, Calcium 162mg, Manganese 2.5mg, Phosphorus 125mg, Chromium 25mg, Molybdenum 25mg, Nickel 5mcg, Tin 10mg, Silicon 2mg, Vanadium 10mcg, Boron 150mcg, Potassium 40mg. Participants were advised for follow up visits once every 4 weeks up to 36 weeks and weekly thereafter. At each visit the participants were asked regarding the tablet intake, compliance and adverse effects and maternal weight gain was recorded. All the mothers were counseled to have their deliveries conducted at the labor room of PGIMS, Rohtak. If the mother failed to turn up within one week of the expected visit, she was contacted on phone / mail.

Baseline data were collected and socio economic status was categorized using modified Kuppuswamy scale.<sup>16</sup> Enrolment weight, height and BMI was recorded. Weight was recorded using standard scale to nearest of 0.1kg and height to the nearest of 0.1cm. All participants undergone hemoglobin estimation, blood group, rhesus status, VDRL and urine complete examination.

Data were analyzed by using statistical package for social sciences (SPSS) software version 18. The paired 't' test was utilized to compare the mean values between experiment group and controls. The result was considered significant at 5% level of significance. The univariate logistic regression analysis was also carried out to calculate the confidence intervals. Primary outcome variable was birth weight. It was recorded within 30 minutes of birth on an electronic scale accurate to 5 gms. Gestational age of newborn was calculated by using Ballard score.<sup>17</sup> Neonatal length was measured to nearest of 0.1 cm using infantometer. Mid arm circumference and occipital-frontal circumference (OFC) was measured to the nearest of 0.1 cm with a standard fiber glass tape.

## RESULTS

Mean age in study group was 26±2.14 years and in control group was 25.8±2.71 years with maximum number of cases between 26-30 years. Group I included 46.5% cases from rural and 53.5% from urban. Group II included 49.2% from rural and 50.8% cases from urban areas. Difference in proportions regarding, residence, mothers education, husband occupation, socio-economic status, maternal body mass index (BMI), parity and antenatal visits in the two groups was not statistically significant ( $p>0.05$ ). In group I, 225 cases consumed MMN supplement for 21-30 weeks duration and in group II, 221 cases consumed iron folic acid for the same duration. The average number of MMN supplement's tablets consumed by each woman in group I was 155. Average number of iron folic acid tablets consumed by each woman in group II was 147.

Table 1 represents the primary outcome variables in both groups. The mean gestational length, birth weight and mean length were higher in MMN group compared to iron folic acid group ( $p<0.05$ ). Mean OFC, chest and mid-arm circumference of the babies at birth were comparable among both groups.

**Table 1: Outcome variables at birth**

	MMN Supplement group (n=255) Mean ± SD (Group I)	Iron Folic acid Igroup (n=255) Mean ± SD (Group II)	95% confidence interval	P value
Gestation (weeks)	37.66±1.43	37.21±1.65	0.173-0.71	<0.001*
Birth weight (kg)	2.53±0.38	2.41±0.51	0.046-0.020	<0.002*
OFC (cm)	33.29±0.97	33.14±1.26	-0.051-0.343	>0.05
Length (cm)	46.97±2.10	45.35±3.73	0.09-1.15	<0.01*
Mid arm circumference (cm)	8.59±0.84	8.46±0.94	-0.03-0.28	0.117
Chest circumference (cm)	30.36±2.1	30.19±1.25	-0.13-0.475	0.266

OFC - Occipital-Frontal Circumference, \* Significant

Table 2 shows outcome variables in babies at one month of age. At one month mean weight, OFC, length, chest circumference and mid-arm circumference in MMN supplement group were significantly higher in MMN group compare to Iron folic acid group ( $p<0.05$ ).

**Table 2: Outcome variables in babies of 1month of age in both groups**

	MMN Supplement group (n=255) Mean ± SD (Group I)	Iron Folic acid Igroup (n=255) Mean ± SD (Group II)	95% confidence interval	P value
Weight (kg)	3.02±0.38	2.81±0.6	0.112-0.29	<0.001*
OFC (cm)	35.32±0.6	35.07±1.15	0.09-0.42	<0.003*
Length (cm)	50.29±1.85	49.46±2.96	0.38-1.27	<0.001*
Chest circumference (cm)	33.43±0.82	32.93±2.97	0.10-0.88	<0.013*
Mid arm circumference (cm)	9.14±0.54	8.92±0.84	0.09-0.35	<0.01*

OFC - Occipital-Frontal Circumference, \* Significant

Mean maternal haemoglobin at enrollment was significantly higher in multiple micronutrients group compared to iron folic acid group ( $8.81 \pm 0.26$  g/dl vs  $8.5 \pm 0.28$  g/dl). But the mean haemoglobin at delivery was significantly higher in iron folic acid group compared to that in the multiple micronutrients group ( $9.2 \pm 0.65$  g/dl vs.  $8.83 \pm 0.37$  g/dl,  $p < 0.001$ ). All the mothers in both the groups received one tablet each of iron and folic acid (100mg+0.5mg) and calcium (500mg) in postpartum period for 6 weeks as per protocol followed by Department of Obstetrics and Gynaecology.

## DISCUSSION

In our study, gestational age, birth weight and length were significantly higher in the multiple micronutrients supplement group as compared to the iron folic acid group. The proportion of LBW was reduced by 22.5% and period of gestational was 0.45 weeks higher in MMN group as compared to iron folic acid group ( $p < 0.001$ ). At one month follow up also the babies of multiple micronutrients supplement mothers had significantly higher weight, length, OFC, MAC and chest circumference. The iron content of the multiple micronutrients supplement was only 10 mg against a RDA of 35 mg and this resulted in significantly lower hemoglobin levels at delivery in these mothers compared to the mothers who received 100 mg iron and 0.5 mg folic acid.

Results similar to our study regarding gestational age were found by Henrik *et al.* (2004) in Harare, Zimbabwe. Study revealed that multiple micronutrients supplementation was associated with significant increase in gestational age (0.3 weeks) and non-significant increase birth weight (49 gms).<sup>18</sup> Result similar to our study regarding birth weight were also found by Osrin *et al.* (2005) at Dhanusha District, Nepal.<sup>19</sup> Findings similar to our study were also observed by Gupta *et al.* (2007) in a tertiary care hospital of East Delhi, India. They observed that infants in the micronutrients group were heavier by 98 grams and measured 0.80 cm longer and 0.20 cm larger mid arm circumference compared with iron and folic acid supplemented group. Incidence of LBW declined from 43.1% to 16.2%.<sup>20</sup> Similar findings were also revealed by Zagree *et al.* (2007) in rural Niger<sup>21</sup> and by Zeng *et al.* (2008) in rural China.<sup>22</sup>

In the year 2009 Shah *et al.* in a metaanalysis observed that the risk of low birth weight infants was significantly lower among women given MMN than

among those given iron folic acid supplementation (RR 0.83, 95% CI 0.74 to 0.93; risk difference -0.02; 95% CI 0.03 to -0.01; number needed to benefit 50, 95% CI 33 to 100).<sup>23</sup> In our study birth weight, gestation and birth length were significantly higher in MMN supplement group. In our study 12 mothers would need to be supplemented with MMN to avoid one LBW.

Difference in outcomes and effect of MMN supplementation may be due to difference in composition used in different studies. Another reason may be the duration and time of starting the supplements in different studies. In some studies compliance with taking supplement was poor. Limitation of our study was MMN supplement, which did not meet all the recommended dietary allowances for pregnant women for all the micronutrients. As the study population was the most disadvantaged and the most vulnerable, a MMN supplement that met all the RDA for all the MMN for pregnant women fully and possibly also included protein and caloric supplementation would have yielded the best results.

MMN supplementation can be beneficial for reducing the incidence of low birth weight and preterm delivery also mortality and morbidity in neonates but more studies and studies at large scale are needed to be carried out to really strengthen the statement in favor of MMN supplementation.

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**Conflict of Interest:** None declared

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# A Rare Presentation of Submandibular Gland: Pleomorphic Adenoma

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## ABSTRACT

Salivary glands are sites for a great variety of tumours. The pleomorphic adenoma is common in parotid gland followed by submandibular gland accounting for about 8%. The name pleomorphic adenoma was suggested by Willis.

The pleomorphic adenoma of the submandibular gland is rare and present in difficulty in diagnosis. They are seen in middle aged women and present as a slow growing painless swelling.

The heterogenous histology, a possible malignant transformation, an incomplete capsule are important characteristics of recurrence of pleomorphic adenoma. A complete surgical removal of the tumour is the treatment of choice.

**Keywords:** Pleomorphic Adenoma, Submandibular Gland

## INTRODUCTION

Tumours of salivary glands are uncommon and represent 2-4% of head and neck neoplasms. They may be broadly categorized into benign neoplasms, tumour like conditions, and malignant neoplasms. Pleomorphic adenoma is the most frequent benign tumour of the salivary glands. It derives its name from its architectural pleomorphism (variable appearance) seen by light microscopy. It is a slow growing tumour. It is also called as mixed tumour because histologically, they are solid, tubuloglandular structure alternate with myxoid and chondroid zones. Approximately 80% of pleomorphic adenomas occur in the parotid gland, 10-15% in submandibular gland and 5-10% in sublingual gland and minor salivary glands of palate, upper lip and buccal mucosa. Other sites involved are nose and Para nasal sinuses. It is usually seen in middle aged women<sup>[1]</sup>. The other submandibular gland neoplasms are adenoid cystic carcinoma, mucoepidermoid

carcinoma, ex pleomorphic adenoma, adenocarcinoma, squamous cell carcinoma<sup>[2]</sup>.

Fine needle aspiration cytology, operated in experienced hands, can determine whether the tumour is malignant in nature with sensitivity around 90%. It can also distinguish primary salivary tumour from metastatic disease. Eneroth et al and others reported 74-90% accuracy rate of FNAC<sup>[3]</sup>.

Cell cycle regulating protein p21 is encoded by the p21 WAF 1 gene which is located on chromosome 6p21.2. p21 plays an important role in arresting the cell cycle. Loss of function of p21 may favour tumour growth<sup>[4]</sup>.

A number of ultrasonographic features are considered typical for pleomorphic adenomas: sharp borders, lobulations in the contour, homogeneous structure, poor vascularisation and acoustic enhancement<sup>[5]</sup>.

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## CASE REPORT

A 14year old female presented with painless swelling in the left submandibular region for the last three years. Swelling was 2x1cms to begin with and was slowly progressive in nature to attain the size of 5x3x2cms. There was no pain or increase in the size of

swelling on taking lime juice. The swelling was oval in shape, firm in consistency, non-tender, freely mobile. Skin over the swelling was normal. It was bidigitally palpable.



Fig. 1: Left submandibular gland swelling.

section was glistening with mucoid appearance. The histopathological examination was suggestive of pleomorphic adenoma.

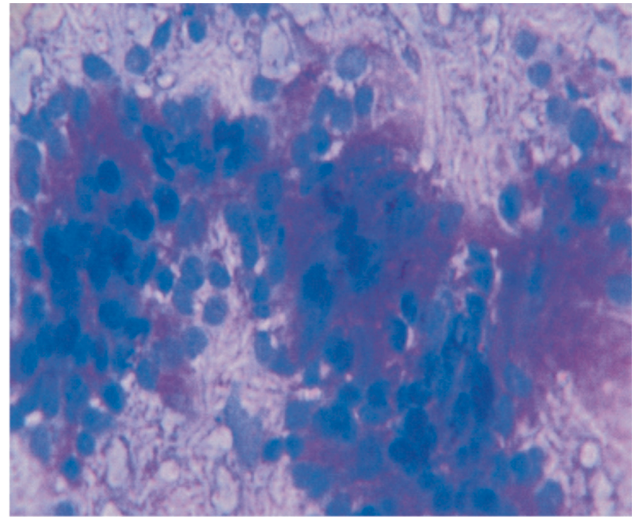


Fig.3: High power view of FNAC smears showing Epithelial cells with abundant cytoplasm in fibrillar fibromyxoid stroma. (Stain. MGG)

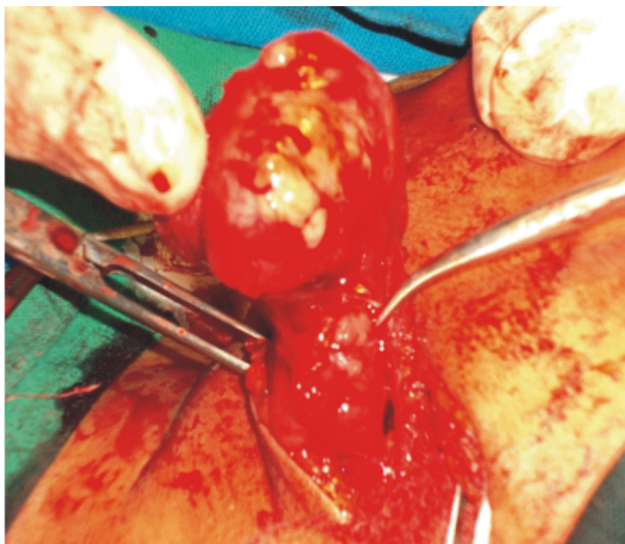


Fig. 2: Tumour in the superficial lobe with normal deep lobe of the submandibular gland

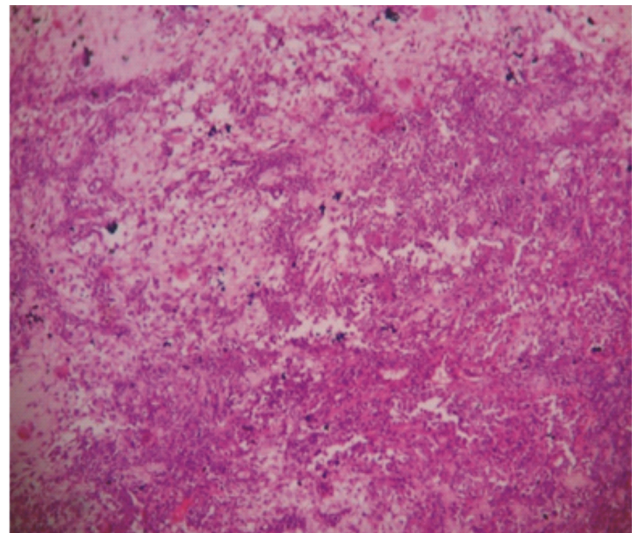


Fig.4: Microscopic picture showing Epithelial and Myoepithelial cells within myxoid stroma suggestive of Pleomorphic adenoma. (Stain. H & E)

The blood investigations were within normal limit. The fine needle aspiration cytology showed features of pleomorphic adenoma. The ultrasound neck revealed hypo echoic lesion with lobulated contour and poor vascularisation.

The swelling was surgically excised completely under general anaesthesia. The gross appearance was pinkish in colour, rubbery in consistency. The cut

## DISCUSSION

A case of submandibular gland pleomorphic adenoma is uncommon in our institution, though cases of parotid gland are frequently encountered. It is more common in females and affecting middle aged more frequently than young children. Most of the time patients present as a painless slowly growing mass.



The submandibular gland is involved in only 10-15% of the salivary gland tumours, and pleomorphic adenoma (PA) is the most common tumour affecting it [6].

Although the aetiology of submandibular gland tumour is unknown, the involvement of environmental or genetic factors has been suggested. Radiation exposure has been linked to the development of the benign Warthin tumour. Tumours of the salivary glands are classified based on their cytological, architectural and biological characteristics. The World Health Organization classification of 1992 groups both benign and malignant tumours into epithelial and non-epithelial categories. Pleomorphic adenoma comes under benign epithelial tumours [3].

The lesion is usually solitary, ovoid and well demarcated mass. It is bidigitally palpable which helps in localization of swelling. Fine needle aspiration cytology is helpful to differentiate it from other conditions like inflammation and enlarged overlying node. The resection of such tumours is usually confined to the gland, surrounding fat or lymph nodes. The benign mixed tumour involving submandibular gland is usually within the gland [7].

Ultrasound or CT-scan or MRI is useful for evaluating the local and possible extension of tumour, vascularity, invasion of the surrounding tissues, and aiding in planning the surgical resection. On ultrasound they are seen as well defined rounded hypoechoic lesions with lobulated or bosselated contour and may have posterior acoustic enhancement. They may appear heterogenous secondary to haemorrhage, calcification and necrosis [8].

Genetic alteration, such as allelic loss, monosomy and polysomy, and structural re arrangement, have all been studied as factors in the development of salivary gland tumours. According to the multicellular theory of submandibular gland tumours, pleomorphic adenomas originate from the intercalated duct cells and myoepithelial cells; oncocytic tumours originate from the striated duct cells and mucoepidermoid and squamous cell tumours originate from the excretory duct cells [3].

During surgery, care should be taken to avoid injury to rima mandibularis and hypoglossal nerve. These tumours are easy to excise hence hardly any recurrence. The recurrence rate is less as compared to parotid gland because whole of the submandibular

gland is excised. The incidence of recurrent pleomorphic adenoma of the submandibular gland accounts for 8% of all pleomorphic adenoma presenting in the head and neck region [9].

A recurrence rate in surgery for pleomorphic adenoma of > 1% is considered acceptable. Recurrences may present 15-20 years after initial surgery which needs re-surgery. The external beam and neutron radiotherapy may be an alternative treatment [10].

Surgical excision, by means of an extra capsular gland excision, is the mainstay primary treatment to be recommended for all clinically suspected neoplasm of the submandibular gland [11].

Sarcomatous transformation is seen in only 2-5% of cases and is usually associated with tumours that have been present for 10-15 years [12].

**Conclusion:** The pleomorphic adenoma of submandibular gland is common in middle aged women but can also occur in young females. The complete surgical excision is the treatment of choice. The sarcomatous changes and recurrence rate are less.

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# Impact of Biomass Fuels on Health of Women and Children in Rural Assam: A Statistical Study

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## ABSTRACT

Human health is affected by environment. Almost 3 billion people use biomass fuel and coal as their source of domestic energy in all over the world. And the percentage in rural India and Assam is 90 and 85 respectively. (NFHS2, 1998-1999). The effect of traditional biofuels viz. wood, animal dung and other biomass fuels in traditional stove on health is negative. The inefficiency of the biofuels in converting it into useful energy makes them harmful to the health of mother and their children (who stay near the mother). The women and their young children are exposed to pollutants such as carbon mono-oxide, benzene and formaldehyde due to prolonged hours of cooking in poorly ventilated indoor fires. It is a surprising fact that most rural women in India inhale every day carcinogens, equivalent to smoking about hundred cigarettes. These result in respiratory problems, lung diseases, eye infections and cancer among the vulnerable groups of people. Another health hazard for women comes from collecting fuel wood. It leads to back problem from carrying heavy loads in the head and sprains and fractures of the legs. Indoor air pollution in developing countries is ranked fifth in terms of percentage of ill health. They estimate that more than 1.6 million premature deaths occur every year due to cook stove pollution worldwide. But it does not attract much public attention. The irony is that cook stove pollution affects mostly poor women and young children. In this proposed work we sincerely study the plight of rural women and child of Assam who are exposed to dangerous levels of indoor pollution from burning biomass fuels. Subsequently statistical analysis would be drawn and some humble strategies will be suggested in handling the severe problem of cook stove pollution.

**Keywords:** Biomass Fuels, Cook Stove Pollution, Women And Children Health Etc

## INTRODUCTION

Cookstove air pollution arising from the use of biomass fuels in developing countries is now recognized as being responsible for a substantial burden of disease among the poor. Over half of the world population relies on solid fuels, such as coal/coke/lignite, firewood, dung and crop residue, which is responsible for a range of respiratory, blindness and adverse pregnancy conditions mostly effecting women and young children in developed and under developed countries (Smith and Mehta 2003)<sup>1</sup>. Nearly 72 percent of all households in India and 85 percent poorer and rural households of Assam use traditional solid fuels to meet their cooking needs. The burning of solid fuels in traditional cooking stoves results in high levels of toxic pollutants in the kitchen area and creates human health hazards especially acute respiratory, pre-mature pregnancy, problem of blindness among the women and children who spend a considerable amount of time

near the cooking stove. The hazards of kitchen continue to affect many millions of people largely in the form of smoke from improper cooking devices used in poorly ventilated areas. Wood and other biomass still dominate as domestic cooking fuels in the kitchens of the country's poor, and this is likely to remain the case for a long time. Continuous dependence on solid fuels exacerbates deforestation, which contributes to the buildup of carbon dioxide in the earth's atmosphere and thus to global climate change (WHO report 2009)<sup>2</sup>.

## OBJECTIVE OF THE STUDY

This study is an attempt to highlight the problem of rural women and children of Assam in consideration of biomass fuel and cook stove pollution in their poorly ventilated kitchen. The specific objectives of our study are

- Factors in biomass fuel selection.
- Health effects of domestic smoke pollution.
- Statistical arguments on association among combustion of biomass fuels and prevalence of blindness and pregnancy problems of rural women and ARI among children of Assam.

### DATA AND METHOD

Data considered here are secondary in nature and are taken from Reproductive and Child Health, District Level Household Survey, (DLHS – 2 and 3)<sup>3</sup>, 2002-04 and 2007-08, Assam. Statistical measures like Correlation Coefficient, t- test, Probable error etc. are used to analyze the data.

#### Role Playing Factors in Fuel Selection

Various factors will determine whether or not the household is able to move up to its preferred clean cooking fuels. The main factors documented by Gerald Leach (1987)<sup>4</sup> are household income and size, availability and cost of the required appliances, climatic factors, settlement size and culture and traditions. The irony is that biomass fuels are likely to remain the primary fuels for process heat and cooking for some times because the commercial energy option are still inaccessible and too expensive for rural poor women who will continue to rely on gathering wood and other biomass residues.

#### Health effects of domestic smoke pollution

The WHO, World Health Report [2000] estimates

that the percentage of the national burden of disease due to solid fuel uses is 3.5 percent in India. It is estimated that indoor air pollution from biomass fuel use accounts for one-third of acute respiratory infection (ARI) and this accounts for up to 20 percent of deaths among children under the age five. Most of these deaths are caused by pneumonia. Studies have shown that biomass pollution is an important risk factor of pneumonia (Panday 1989)<sup>5</sup>. An Indian study (Malik 1985)<sup>6</sup> shows that even non smoking women who have cooked on biomass stoves for many years exhibits a higher prevalence of chronic bronchitis than might be expected in similar women who have made less use of biomass stoves. The epidemiological studies have provided some evidence of an association between cataract or blindness and exposure to indoor smoke from household use of solid bio-fuels (Mishra et.al 1999)<sup>7</sup>. A study from Ahmedabad, India, showed a significant increase in still birth in those women exposed to domestic smoke during pregnancy compare to those who were not (Mavalankar et.al 1991)<sup>8</sup>. From the available evidence of the biomass fuel effects on women health, the main health effects of domestic smoke can be categorized in four groups.

- Respiratory diseases and corpulmonale.
- Adverse pregnancy outcomes (still birth, neonatal death, low birth weight).
- Cancer (usually Lung).
- Eye problems (blindness, night blind etc.)

#### Health Hazards in the Biofuel Cycle

Fuel Cycle	Activity	Possible health effects
Production	Processing/Preparing dung cakes	Faecal/Oral/Enteric infection
	Charcoal Production	CO/Smoke poisoning, Burns/ Trauma, Cataracts
Collection	Gathering fuel	Trauma, Reduced infant or child care, Bites from snakes etc. Allergic reactions, Fungus infection.
Transportation	Transportation of Biomass fuels	Backache/ Back pain, Severe Fatigue Damaged reproductive organs over time (prolapsed uterus etc)
Processing	Cutting up fuels	Trauma, Cuts, Abrasions
Combustion	Smoke	Acute respiratory infection (ARI) including pneumonia, corpulmonale, Adverse reproductive outcomes, Lung cancer, High IMR, Chronic Bronchitis, Asthma.
	Toxic Gases (CO)	Acute poisoning, Low birth weight, Higher rate of still births, Reduced bloods oxygen carrying capacity.
	Heat	Burns and Scalds, Cataracts
	Cooking position	Arthritis and related bone disease, Back pain.

## RESULTS AND DISCUSSION

The above discussion prompts us to study the relationship of type of fuel used in the household of various districts of Assam with the various socio-economic and medical factors. The data is secondary taken from Reproductive and Child Health, District Level Household Survey, (DLHS – 2 and 3), 2002-04 and 2007-08, Assam. We compute Pearson’s correlation coefficients between biomass fuel and prevalence of blindness, ARI among children and pregnancy problems for studying the ill effect of biomass fuel on health as the association between these morbidities and biomass as cooking fuel has already been established in many studies. Further the variables households having no electricity, households having Kaccha houses and female illiterates above age7 will rightly represent the socio-economic condition of the districts of Assam and hence we calculate correlation values to study its relation. We obtained Pearson’s correlation coefficient (r) to study the strength of association between the variables. But this relationship should be assessed by performing t-test for the significance of the correlation coefficient (r). The following table will portray the R and t values for the above health variables.

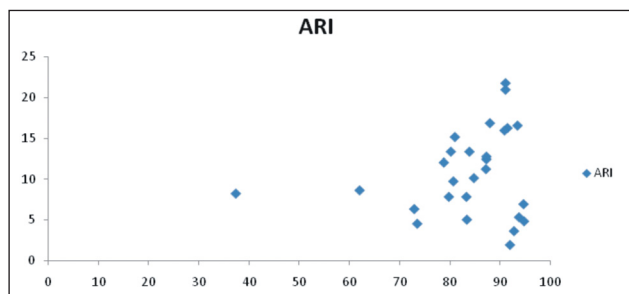
**Table.1**

Biomass fuel <sup>1</sup>	R	t
Prevalence of blindness <sup>2</sup>	0.379995(r12)	1.837201
ARI among children <sup>3</sup>	0.180367(r13)	0.916874
Pregnancy problems <sup>4</sup>	0.629851(r14)	4.054573**

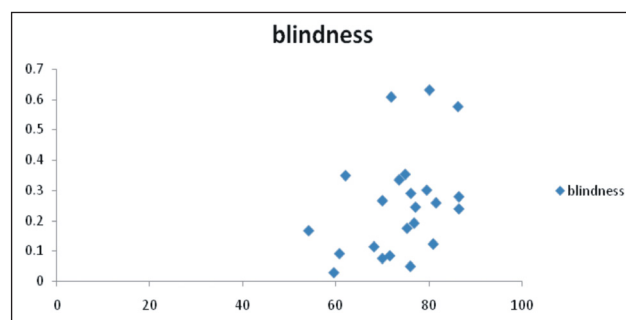
Source: 2: DLHS – 2: (2002-04)1, 3 and 4: DLHS – 3 :( 2007-08).

From Table.1 we observe that the variable pregnancy related problems is significantly related with biomass as cooking fuel. However variables blindness and ARI among children are not significantly associated with the biomass. But we get a positive correlation of the aforesaid variables. So, only possible explanation of the insignificance of the above variables is that the variables are related not in a linear way but in a non linear fashion, supported by the following scattered diagrams.

**Diagram 1**



**Diagram 2**



In order to obtain significant association between biomass, blindness and ARI we obtain probable error of correlation coefficient, used for testing the reliability of an observed correlation coefficient.

**Table. 2**

Correlation coefficient (1)	Probable error (2)
r12=0.379995	0.111064
r13=0.180367	0.125585

From table.2 we observed that all the values of column 2 are less than its corresponding correlation coefficients. Hence we may conclude significant relation between the variables.

Now we compute correlation coefficients between the aforementioned socio-economic variables and the biomass as the fuel in the cooking stove.

**Table 3**

Biomass fuel	R	t
Socio-economic variables		
no electricity <sup>5</sup>	0.821442	6.600688**
Kaccha house <sup>6</sup>	0.908162	9.941551**
Female illiterates aged 7+ <sup>7</sup>	0.532364	2.881928**

Source: 5 and 6: DLHS – 3: (2007-08), 7: DLHS – 2 :( 2002-04).

The significant association of the above variables incites us to conclude that the socio-economic condition of the people of this part of the world influences the use of biomass as their cooking fuel.

## Conclusion and Humble Suggestions

Indoor air pollution comes out to be a major environmental and public health hazard for large numbers of poorest and most disadvantaged people worldwide. The existing studies on indoor air pollution in developing countries, while providing important evidence of associations with a range of serious and common health problems, suffer from a number of methodological limitations. Some of the policies to

control the cookstove pollution in households of Assam may be implemented, which are cited below.

- Improved cook stoves supply to the poor rural habitant of Assam.
- Financial support to Improve ventilation system.
- Community awareness program regarding effects of biomass fuel use.
- Improve socio-economic status.
- Making cooking fuel available within 1km of rural habitant of Assam.

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**Ethical Clearance:** Authors are responsible for any ethical problem arises due to the study.

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# Screening for Glucose-6-Phosphate Deficiency in Newborns of a Tertiary Hospital

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## ABSTRACT

**Background:** Glucose 6 Phosphate Dehydrogenase (G6PD) deficiency is by far the most common genetic disorder in India. In India we don't have any neonatal screening programme for this disorder. The present study is planned to screen inborn neonates for G6PD deficiency.

**Method:** Present study was carried out in the Neonatal Services Division, Department of Pediatrics, Pt. B.D. Sharma PGIMS, Rohtak. The study enrolled 1660 neonates with gestation of >34 weeks and birth weight of >2 kg. Baseline data and blood sample from every neonate was collected on screening card and time resolved fluoroimmunoassay described by Beutler was used. Positive cases on screening test were confirmed by cytochemical assay test.

**Results:** Prevalence of neonatal jaundice in G6PD deficiency group was very high (45.45%) as compared to G6PD normal (3.88%) group (P <0.001). In our study, 11 newborns (7 males and 4 females) were found to have G6PD deficiency. Overall incidence was 0.66%. Female to male ratio was 1:1.75. Neonatal jaundice was present in 5 newborns, which needed phototherapy.

**Conclusions:** We concluded that G6PD deficiency in neonate is important risk factor for neonatal jaundice. It is also a risk factor for hemolysis and jaundice in later life. By screening we can intensify newborns at risk for severe hyperbilirubinemia.

**Keywords:** Newborn, Neonatal Jaundice, G6PD, Screening

## INTRODUCTION

Glucose 6 Phosphate Dehydrogenase (G6PD) deficiency is the most common human enzyme defect, being present in more than 400 million people worldwide.<sup>1</sup> African, Middle Eastern and South Asian people are most frequently affected. G6PD deficiency is by far the most common genetic disorder in India.<sup>2</sup> G6PD catalyzes nicotinamide adenine dinucleotide phosphate (NADP) to its reduced form, NADPH, in the pentose phosphate pathway. NADPH protects cells from oxidative damage. Because erythrocytes do not generate NADPH in any other way, they are more

susceptible than other cells to destruction from oxidative stress. The level of G6PD activity in affected erythrocytes generally is lower than in other cells.<sup>3</sup> Normal red blood cells generally exhibit G6PD activity at approximately 2 percent of total capacity.<sup>4</sup> There may be few or no clinical symptoms, even with enzyme activity is substantially reduced. A total deficiency of G6PD is incompatible with life.<sup>5</sup>

G6PD deficiency should be considered in neonates who develop hyperbilirubinemia within the first 24 hours of life, a history of jaundice in a sibling, bilirubin levels greater than the 95<sup>th</sup> percentile, and in Asian males.<sup>6,7</sup> G6PD deficiency can lead to an increased risk and earlier onset of hyperbilirubinemia, which may require phototherapy or exchange transfusion.<sup>8</sup> In certain populations, hyperbilirubinemia secondary to G6PD deficiency results in an increased rate of kernicterus and death,<sup>9</sup> whereas in other populations this has not been observed. This may reflect genetic mutations specific to different ethnic groups. Though

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the exact incidence in India is not known, various studies have reported an incidence ranging from 2% to 27.9% in different communities e.g. in Vataliya Prajapti community (20.15%).<sup>10</sup> Acute hemolysis is caused by infection, ingestion of fava beans, or exposure to an oxidative drug (Sulfa drugs, primaquine, nitrofurantoin, nalidixic acid, methylene blue etc.).<sup>11</sup> G6PD-deficient persons are predisposed to the development of sepsis and complications related to sepsis after a severe injury.<sup>12</sup> Children with G6PD deficiency usually present with acute hemolytic crises. The disease as such causes significant morbidity and mortality in childhood. There are no primary prevention interventions available for this disease and the only way to avoid the adverse outcomes is to recognize such children early on in life and prevent exposure to agents which can trigger hemolysis.

In general, metabolic and other inherited disorders can hinder an infant's normal physical and mental development in a variety of ways and parents can pass along the gene for a certain disorder without even knowing that they're carriers. With a simple blood test, doctors often can tell whether newborns have certain conditions that could eventually cause problems. Even though these conditions are considered rare and most babies are given a clean bill of health, early diagnosis and proper treatment can make the difference between lifelong impairment and healthy development. India is currently undergoing an epidemiological transition and congenital malformations and genetic disorders are gradually replacing sepsis as the major cause of perinatal and neonatal mortality. This is because consanguineous marriages are still fairly common in many parts of India.

The need for a mass screening program for G6PD deficiency has long been perceived by the pediatric and public health experts in the country. The newborn screening program covering a number of genetic diseases including G6PD deficiency which was piloted in Bangalore and Hyderabad has been well received by the health professionals and the public. The cost of introducing the screening program can be justified by the saving in the medical care as a whole for these patients. G6PD deficiency is important health problems for which neonatal screening can yield rich dividends. We in India have no neonatal screening programme for this disorder. The present study is planned to screen inborn neonates for G6PD deficiency.

## MATERIAL AND METHOD

The study was conducted in the neonatal services division of the Department of Pediatrics, Pt. B.D. Sharma PGIMS, Rohtak and the Genetics unit, Department Pediatrics MAMC, New Delhi. Consecutive neonates with gestation >34 weeks and birth weight >2 kg & born in the labour room of the hospital (inborn babies) from July 2010 to December 2011 were enrolled for the study. Babies with gross congenital malformation were excluded. A pre informed consent was taken from the parents of the infants. Ethical clearance for the study was obtained from institutional ethics committee.

Data were prospectively collected regarding gestational age, sex, birth weight, mother's age, education & occupation of parents, family income, consanguinity, history of antenatal steroid, history of neonatal death in siblings and regarding G6PD deficiency screening & confirmatory test. Dried blood spots were collected by heel prick on the blood samples collection cards. At least three (preferably five) blood spots were collected from each neonate within 48 hours of birth. Venous sample were collected if sampling was being done for some other test so that two pricks could be avoided.

The heel was prewarmed by rubbing gently for 3 minutes. It was wiped with 70% isopropyl alcohol/spirit, ensuring no alcohol was left on the skin as the same may dilute the sample. The heel was punctured with a lancet on the medial or lateral aspect. The first drop of blood was wiped away as it is often diluted with tissue fluid. The circle marked on the blood sample collection card was gently touched to the hanging drop so that blood soaked through to the other side. The sample was dried at room temperature in a horizontal position for 4 hours.

The filter paper containing the dried blood spot specimens were protected from moisture by packing them in zip closure bags. They were then be stored at - 20°C and transported to the Genetics lab Maulana Azad Medical College, New Delhi for analysis daily through courier service. Time resolved fluoroimmuno assay (Parkin Elmer DELFIA, Finland) using the method described by Beutler was used for analysis of Glucose 6 phosphate dehydrogenase deficiency.<sup>13</sup>

Venous blood (around 4ml) sample was collected from the neonates who showed positive result on



screening for G6PD deficiency and the same was confirmed by cytochemical assay.<sup>14</sup> The data were analyzed to obtain the incidence of G6PD deficiency and by using Chi-square statistical test.

### RESULTS

Out of the total 1660 newborns, 220 (13.27%) newborn were 34-36 weeks, 1240 (74.69%) were 37-39 weeks and 200 (12.04%) were 40-41 weeks of period of gestation. We observed that 86.74% newborns were term and mean age of gestation was 37.41±1.41 weeks. We observed that 37.46% newborns were with birth weight of <2.5 kg and mean birth weight was 2.72±0.96 kg. The total numbers of newborns with appropriate for gestational age (AGA) were 1642 (98.92%), small for gestational age (SGA) were 12 (1.02%) and one newborn (0.06%) was large for gestational age (LGA). 926 (55.78%) were males and 734 (44.21%) were females. Mean APGAR score was 6.98±0.21 at one minute and 8.43±0.767 at 5 minutes.

Most of the mothers were of age group 20-30 years. Mean age of mother was 24.2±3.15 years. 131 (7.89%) mothers were educated up to primary, 689 (41.5%) primary to matric, 727 (43.79%) matric to graduate, 33 (1.98%) postgraduate and 80 (4.8%) illiterate. Most of the mothers were primary to graduate. 54 (3.25%) fathers were educated up to primary, 471 (28.37%) primary to matric, 1000 (60.24%) matric to graduate, 83 (5%) postgraduate and 52 (3.13%) illiterate. Most of the fathers were primary to graduate. Among fathers, there were 545 (32.83%) farmers, 22 (1.32%) were salaried, 194 (11.68%) were waged labourers, 6 (0.36%) were small businessmen, 5 (0.30%) were students and 884 (53.25%) were in group of others. Most of the fathers were farmer and belongs to rural areas. Mean family income was Rs. 6371.17±2644.71.

We classified the socio economic status on the basis of Kuppuswamy's<sup>69</sup> socioeconomic status scale. Most newborns belonged to Lower middle (54.69%), 19.39 to Upper lower and 11.44% to lower class. Table 1 showing that History of antenatal steroid was present in 12 newborns. In 34 newborns, history of neonatal death in sibling was present. Out of these, 20 (58.82%) were early neonatal death (death within 7 days of life) and 14 (41.17%) were late neonatal death (death from 7 to 28 day of life). Of the total 1660 neonates, 74.33% were sampled by 48 hours of age. The mean age at time of sampling was 53.67±24.95 hours.

**Table 1: Consanguinity, antenatal steroid, neonatal death in sibling**

Variable	Total no.	Percentage
Consanguinity	7	0.42
History of antenatal steroid	12	0.72
History of neonatal death in sibling	34	2.04

Table 2 is showing that 926 males and 734 females were screened for G6PD deficiency. Twenty were found to be G6PD deficient on the screening test. Of the 20 who were found to be G6PD deficient on screening, 11 were confirmed to be G6PD deficient. 5 were loss on follow up and 4 were confirmed negative. Overall incidence of G6PD deficiency was 0.66%. Incidence in male population was 0.75% and in female was 0.54%. Female to male ratio of G6PD deficiency was 1:1.75.

**Table 2: G6PD Deficiency among male & female newborns**

Sex	Total number	G6PD deficiency	
		On screening test	On confirmatory test
Male	926	14 (1.51%)	7 (0.75%)
Female	734	6 (0.81%)	4 (0.54%)
Total	1660	20 (1.2%)	11 (0.66%)

Table 3 is showing that neonatal jaundice (NNJ) needing phototherapy was 69 newborns (4.2%). Of 11 G6PD deficient newborns and 5 (45.45%) developed pathologic jaundice which needed phototherapy. Out of 1649 G6PD normal newborns, 64 (3.88%) developed pathological jaundice which needed phototherapy.

**Table 3: G6PD deficiency and neonatal jaundice**

	Neonatal jaundice needing phototherapy	
	No.	%
G6PD deficient (n=11)	5	45.45
G6PD normal (n=1649)	64	3.88

p value <0.001 Very high significant

7.24% of cases of neonatal jaundice were due to G6PD deficiency which needed phototherapy. We observed that the frequency of NNJ was (45.45%) high in G6PD deficient group as compared to G6PD normal group (3.88%) and found to be statistically very high significant (p <0.001).

### DISCUSSION

Newborn screening aims at the earliest possible recognition of disorders to prevent the most serious

consequences by timely intervention. Apart from the United States of America, many countries of South-East Asia e.g. Malaysia, Singapore, Taiwan, Hongkong and Philippines and the Middle East Europe have been successfully running a neonatal screening program for G6PD and other metabolic disorders. Neonates are not screened in India because the health policies have typically targeted mortality and infectious morbidities but not disabilities. These policies have been successful in lowering infant mortality rates, but the net effect of these gains has been somewhat offset by an increase in disability. G6PD deficiency can cause jaundice at birth or chronic hemolytic anemia in the later life.

In our study, we screened 1660 newborns for G6PD deficiency using time resolved fluoroimmunoassay (Parkin Elderm, DELFIA) method. The incidence of G6PD deficiency was 0.66%. Out of 11 G6PD deficient newborns 5 developed neonatal jaundice and needed phototherapy.

Arif K *et. al* (2007) reported that 27.7% of the newborns developed pathological jaundice and needed intervention out of these 2% was due to G6PD deficiency.<sup>16</sup> In present study 7.24% cases of hyperbilirubinemia due to G6PD deficiency which needed phototherapy. Iranpour (2008)<sup>17</sup> reported that the incidence of G6PD deficiency was 3.2% and female to male ratio for G6PD deficiency was 1:5.5. In present study, the incidence of G6PD deficiency was 0.66% and female to male ratio was 1:1.75.

Gupte SC *et. al* in 2005 in Vataliya Prajapati community, Surat observed that out of 8 G6PD deficient, only one neonate developed jaundice.<sup>18</sup> In the present study out of 11 neonates 5 were developed neonatal jaundice and were hospitalized for phototherapy.

Abolghasemi *et. al* (2004) reported that incidence of G6PD deficiency was 2.1% (3.6% of males and 0.1% of females). Hyperbilirubinemia and jaundice were approximately 3-fold higher in G6PD deficient group than in the G6PD normal group (51% vs. 16%).<sup>19</sup> In present study incidence of G6PD deficiency was 0.66% (0.75% of males and 0.54% of females) hyperbilirubinemia and jaundice needed phototherapy was much higher (45.45%) in G6PD deficient group than in the G6PD normal group (3.88%).

Chien YH *et al* (2008) screened neonates for G6PD deficiency in Taiwan and found the male to female ratio in the screening population was 1.091

(range 1.073 – 1.098) the incidence in male and female neonates were 2.81% (2.57-3.072) and 0.7% (0.45-0.95%), respectively. The change in sex ratio of disease was unrelated to the change in incidence.<sup>20</sup> In present study incidence of G6PD deficiency was 0.66% and female to male ratio was 1:1.75.

Nadarajan *et.al* in their study in 2011 used qualitative fluorescent spot test only 2.04% of samples were false positive.<sup>21</sup> In our study we used time resolved fluoroimmunoassay and we reported that false positive cases were very high (45%).

One possible reason for the high false positivity rate in our study could be the high temperature in summer which led to enzyme inactivation by excessive heat. Limited numbers of neonates were enrolled in our study. Major reason for missing samples was early discharge of the neonate and admission to the neonatal intensive care units.

## CONCLUSION

G6PD deficiency in neonate is important risk factor for neonatal jaundice and is also a risk factor for hemolysis and jaundice in later life. By screening we can intensify newborns at risk for severe hyperbilirubinemia. More efforts need to be undertaken to create awareness and emphasis on significance of preventive testing to make screening a successful program in India.

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# Utilization of Maternal Services Provided in RCH Program by Women in Bangalore Urban District

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## ABSTRACT

**Introduction:** Utilization of health services is a complex behavioural phenomenon affected by multitude of factors including availability, distance, cost and quality of care as well as personal attitudes & socioeconomic characteristics.

**Objectives:** 1.To study the current level of utilization of selected maternal services by Mothers.  
2. To find out the reasons for current level of utilization of these services.

**Materials & method:** It is a cross sectional study done in 4 PHC areas in Bangalore Urban district. Data was collected among 80 women who had a live birth within last three years prior to the survey.

**Statistical Analysis:** Percentages and chi square tests were done.

**Results & conclusions:** Out of 80 mothers, 2 women did not avail any services at all. Out of the rest 78 mothers, 64% had minimum 3 ANC visits, 22% of them had registered their pregnancy before 12weeks, and 93.6% of the mothers received IFA tablets or syrup during pregnancy. It was seen that 97.4% of the women received at least one TT injection during pregnancy Nearly 46% and 42.7% of the mothers felt it is not necessary to register early and to have so many ANC checkups respectively. For 70% of them cost was the main reason for not taking IFA tablets.

**Conclusion:** In conclusion by improving educational status of women along with doing more and more awareness program about importance of antenatal care in the community will help in improving the utilization level of these services.

**Keywords:** Utilization, Maternal Services, Antenatal Care, RCH Service

## INTRODUCTION

Reproductive health issues have attained higher international visibility and renewed social and political commitments in recent decades<sup>1</sup>. The Government of India took steps to strengthen maternal and child

health services as early as the First and Second Five-Year Plans (1951-56 and 1956-61). The primary aim at that time was to provide at least a minimum level of public health services to pregnant women, lactating mothers, and preschool children. In 1996, safe motherhood and child health services were incorporated into the Reproductive and Child Health Programme.<sup>2</sup>

The RCH programme is envisaged to provide an integrated package of services, which will include services for mothers during pregnancy, childbirth and post-natal period, and also safe abortion services, whenever required; services for children, services for eligible couples, prevention and management of

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Reproductive Tract Infections (RTIs) and Sexually Transmitted Infections (STIs) and adolescence health services including counseling of family life and reproductive health.<sup>1</sup> Services for mother includes Antenatal care including early registration, provision of minimum 3 ANC visits, immunization with tetanus toxoid and Iron & folic acid prophylaxis and treatment. It also includes intranatal care and postnatal care<sup>2</sup>.

Utilization of health services is a complex behavioural phenomenon affected by multitude of factors including availability, distance, cost and quality of care as well as personal attitudes and socioeconomic characteristics. In the Indian context the situation is further complicated by women’s perception of illness, which is affected by their cultural conditioning to tolerate suffering. Another factor affecting women’s health seeking behaviour is that, traditionally women in India considered pregnancy as a natural state rather than a condition requiring medical attention and care, the result that women often do not avail themselves of preventive and curative medical services, intended to safeguard their own and their children’s health and well being.<sup>3</sup>

**Aims and Objectives**

1. To study the current level of utilization of selected maternal services by mothers in PHCs of Bangalore Urban District.
2. To find out the reasons for current level of utilization of these services.

**MATERIALS AND METHOD**

This study was undertaken in 4 PHC areas in Bangalore Urban District. There are 31 PHC in this district which are distributed in 4 talukas. One PHC was randomly selected from each taluk and 20 mothers in each of these PHC areas were interviewed using predesigned questionnaire by going house to house. Sample size was calculated, considering the current utilization of at least 3 ANCs during pregnancy as 71% (according NFHS 2 data for Karnataka)<sup>2</sup> and got 72 as the sample. But for convenience 80 was decided as the required size. Data was collected among 80 women who had a live birth within last three years prior to the survey. If there were more than one such woman in the households only one was taken into account and the last woman was taken as the respondent and data was collected from her. Information about registration of pregnancy, number of ANC checkups done, Iron and Folic Acid consumed and number of TT injections taken was collected from these women along with reasons if any, for not availing any of these services were also asked and noted.

**RESULTS AND DISCUSSION**

Out of 80 mothers 2 of them did not avail any Antenatal services at all. It was observed that about 39 (48.75%) of them were in the age group 21-25 yrs and 25% (20) were of the age group 25-30yrs. About 57 (71.3%) of them were Hindu by religion and 31.3% (25) of them were educated up to lower primary, 57% (46) of them were homemaker.

**Table 1: Distribution of study subjects with respect to number of antenatal visits**

Background characters	No. of visits			Total(N=78)
	One	two	three	
<b>Age</b>				
• < 20 yrs	1 (10.0)	3 (30.0)	6(60.0)	10
• 21-25yrs	1 (2.6)	13 (33.3)	25 (64.1)	39
• 26-30yrs	0	6 (30.0)	14 (70.0)	20
• >30yrs	0	4 (44.4)	5 (55.6)	9
<b>Religion</b>				
• Hindu	2 (3.6)	19 (34.5)	34 (61.8)	55
• Muslim	0	7 (30.4)	16 (69.6)	23
<b>Education status</b>				
• Illiterate	1 (7.7)	10 (76.9)	2 (15.4) *	13
• Lower primary	1 (4.0)	10 (40.0)	14 (56.0)	25
• Higher primary	0	3 (27.3)	8 (72.7)	11
• High school	0	1 (12.5)	7 (87.5)	8
• SSLC	0	1 (9.1)	10 (90.9)	11
• PUC and above	0	1 (10.0)	9 (90.0)	10

**Table 1: Distribution of study subjects with respect to number of antenatal visits (Contd.)**

Background characters	No. of visits			Total(N=78)
	One	two	three	
<b>Parity</b>				
• One	0	4 (21.1)	15 (78.9)	19
• Two	1 (3.1)	7 (21.9)	24 (75.0)	32
• Three	1 (4.0)	13 (52.0)	11 (44.0)	25
• Four and above	0	2 (100)	0	2
<b>Occupation</b>				
• Home maker	0	7 (15.6)	38 (84.4)	45
• Coolie	2 (10.5)	13 (68.4)	4 (21.1)	19
• Maid	0	2 (33.3)	4 (66.7)	6
• Others	0	4 (50.0)	4 (50.0)	8

\*X<sup>2</sup> 23.199, p value 0.010

In the present study it was observed that about 64% (50) of mothers received at least 3 antenatal check ups, which was more than that found in NFHS-2, NFHS-3 and DLHS round-2 for India, which was 44%, 50.7% and 50% respectively.<sup>4,5 & 6.</sup>

But it was less compared to that found in results of NFHS-2 and 3 for Karnataka, which was 71% and 79.3% respectively.<sup>2,7.</sup>

In the present study, it was observed that there was statistically significant association between education status and number of antenatal visits (p value <0.01)

**Table 2: Distribution of study subjects with respect to their gestational age, at first antenatal visit.**

Background characters	Timing of first visit		Total(N=78)
	Less than 12wks	More than 12wks	
<b>Age</b>			
• < 20 yrs	2 (20.0)	8 (80.0)	10
• 21-25yrs	8 (20.5)	31 (79.5)	39
• 26-30yrs	3 (15.0)	17 (85.0)	20
• >30yrs	4 (44.4)	5 (55.6)	9
<b>Religion</b>			
• Hindu	13 (23.6)**	42 (76.4)	55
• Muslim	4 (17.4)	19 (82.6)	23
<b>Education status</b>			
• Illiterate	0*	13 (100)	13
• Lower primary	2 (8.0)	23 (92.0)	25
• Higher primary	1 (9.1)	10 (90.9)	11
• High school	2 (25.0)	6 (75.0)	8
• SSLC	6 (54.5)	5 (45.5)	11
• PUC and above	6 (60.0)	4 (40.0)	10
<b>Parity</b>			
• One	8 (42.1)	11 (57.9)	19
• Two	6 (18.8)	26 (81.3)	32
• Three	3 (12.0)	22 (88.0)	25
• Four and above	0	2 (100)	2
<b>Occupation</b>			
• Home maker	14 (31.1)	31 (68.9)	45
• Coolie	0	19 (100)	19
• Maid	0	6 (100)	6
• Others	3 (37.5)	5 (62.5)	8

\*p value &lt; 0.01, \*\*p value – 0.543

In the present study it was observed that only 21.8% (17) of the mothers received their first antenatal check up before 12 weeks of gestation, which was well below that found in NFHS-2 for India and Karnataka, which was 33% and 53% respectively.<sup>4,2</sup>

It was also observed that early registration was directly proportional to the educational status of the mothers. The coverage was about 8%(2) in mothers who had studied upto lower primary, while it was 50-60% (6-12) in mothers studied upto SSLC and above. It has shown statistically significant association (p value <0.01).

**Table 3: Distribution of study population with respect to number of IFA tablets / syrup received during pregnancy.**

Background characters	Consumed IFA tablets / syrup for at least 3 months			Total(N=78)
	Yes	No	Don't know	
<b>Age</b>				
• < 20 yrs	6 (60.0)	3 (30.0)	1 (10.0)	10
• 21-25yrs	31 (79.5)	5 (12.8)	3 (7.7)	39
• 26-30yrs	13 (65.0)	6 (30.0)	1 (5.0)	20
• >30yrs	5 (55.6)	4 (44.4)	0	9
<b>Religion</b>				
• Hindu	38 (69.1)**	12 (21.8)	5 (9.1)	55
• Muslim	17 (73.9)	6 (26.1)	0	23
<b>Education status</b>				
• Illiterate	3 (23.1)*	7 (53.8)	3 (23.1)	13
• Lower primary	15 (60.0)	8 (32.0)	2 (8.0)	25
• Higher primary	10 (90.9)	1 (9.1)	0	11
• High school	7 (87.5)	1 (12.5)	0	8
• SSLC	10 (90.9)	1 (9.1)	0	11
• PUC and above	10 (100)	0	0	10
<b>Parity</b>				
• One	16 (84.2)***	3 (15.8)	0	19
• Two	25 (78.1)	6 (18.8)	1 (3.1)	32
• Three	14 (56.0)	7 (28.0)	4 (16.0)	25
• Four and above	0	2 (100)		2
<b>Occupation</b>				
• Home maker	40 (88.9)	4 (8.9)	1 (2.2)	45
• Coolie	5 (26.3)	10 (52.6)	4 (21.1)	19
• Maid	4 (66.7)	2 (33.3)	0	6
• Others	6 (75.0)	2 (25.0)	0	8

\*pvalue=0.003, \*\* p value = 0.321, \*\*\* p value = 0.025

In the present study it was found that 93.6% (73/80) of mothers received IFA tablets / syrup during pregnancy. And among those who received it was observed that 70.5% (55/73) of them received or consumed the tablets or syrup for 3 or more months.

The mothers who did not receive or who received for less than 3 months were asked for reasons for not receiving or consuming less number of IFA tablets.

Among those who did not receive, it was observed that 40% (2/5) of them considered it was not necessary to consume any tablets when they appear to be healthy. For another 40% it was costly when prescribed outside. Among the mothers who had received or consumed less number of IFA preparation about 55.6% could not buy because of the high cost, and 33.3% (6/18) of them stopped taking because of abdominal discomfort and other GI symptoms.

**Table 4: Distribution of study population with respect to number of Tetanus Toxoid doses received.**

Background characters	Taken TT injection(N=78)		Number of TT injections Taken(N=76)	
	Yes	No	One	Two
<b>Age</b>				
• < 20 yrs	10 (100)	0	1 (10.0)	9 (90.00)
• 21-25yrs	38 (97.4)	1 (2.6)	8 (20.5)	30 (76.9)
• 26-30yrs	19 (95.0)	1 (5.0)	5 (25.0)	14 (70.0)
• >30yrs	9 (100)	0	2 (22.2)	7 (77.8)
<b>Religion</b>				
• Hindu	53 (96.4)**	2 (3.6)	13 (23.6)	40 (72.7)
• Muslim	23 (100)	0	3 (13.0)	20 (87.0)
<b>Education status</b>				
• Illiterate	12 (92.3)	1 (7.7)	8 (61.5)	4 (30.8)*
• Lower primary	24 (96.0)	1 (4.0)	4 (16.0)	20 (80.0)
• Higher primary	11 (100)	0	3 (27.3)	8 (72.7)
• High school	8 (100)	0	0	8 (100)
• SSLC	11 (100)	0	1 (9.1)	10 (90.9)
• PUC and above	10 (100)	0	0	10 (100)
<b>Parity</b>				
• One	19 (100)	0	0	19 (100)***
• Two	31 (96.9)	1 (3.1)	6 (18.8)	25 (78.1)
• Three	24 (96.0)	1 (4.0)	9 (36.0)	15 (60.0)
• Four and above	2 (100)	0	1 (50.0)	1 (50.0)
<b>Occupation</b>				
• Home maker	45 (100)	0	4 (8.9)	41 (91.1)
• Coolie	17 (89.5)	2 (10.5)	10 (52.6)	7 (36.8)
• Maid	6 (100)	0	1 (16.7)	5 (83.3)
• Others	8 (100)	0	1 (12.5)	7 (87.5)

\* p value – 0.01, \*\* p value – 0.341, \*\*\* p value – 0.09.

This table showed that about 97.4% received at least one TT injection during pregnancy. Among them at least 78.94% of them received 2 TT injections, which was slightly above that found for India in NFHS-2 (67%).<sup>4</sup>

In the present study coverage with 2 doses of TT varied inversely by birth order. Two doses of tetanus toxoid injections were received by 100% (19/19) of mothers of first births, compared with 55% (16/26) of third and fourth births. The difference was not found to be statistically significant (p value 0.09). This was comparable to that found in NFHS-2 for India. It was observed to be 78% among mothers of first birth

received two TT injections compared with 56% of fourth and fifth births.<sup>4</sup>

In the present study out of 80 mothers interviewed only 2 (2.5%) of them had not availed Antenatal services at all and the reasons given by them were that they were not aware to have a check up and both were migrated families and it was their first pregnancy.

And among those who had availed services, about 50 mothers had availed three or more antenatal checkups. So among those who had availed less number of checkups, reasons for the same were asked. And the responses were:



**Table 5: Reasons for availing less number of antenatal checkups**

Reasons	Number of mothers (N=28)	Percentage
Not necessary	12	42.9
Not customary	1	3.6
Costs too much	11	39.3
Family did not allow	3	10.7
No time to go	7	25
Not aware	1	3.6
Too far to go	1	3.6
Lack of transport	1	3.6

\*Multiple responses

It was observed that 42.9% (12) considered, it was not necessary to avail so many checkups and 39.3% (11) of them mentioned it costs too much for them to avail so many checkups. About 25% (7) of them said that they have no time to go for check up. Few of them i.e. 10% (3) of them stated that their family did not allow them to have frequent checkups. This shows that many of them are still not aware of the importance of antenatal checkups.

According to NFHS-2 results for India, it was observed that for almost 3 quarters (60%) of them did not consider having a check up to be necessary, for about 15% of them cost was the main reason for not availing. And 4% felt it was not customary and in 9% of them their family did not allow to avail antenatal services.<sup>4</sup>

While NFHS-2 for Karnataka shows 63% of them felt it was not necessary, 9% said check up costs too much and 9% said their family did not allow.<sup>2</sup>

**Table 6: Reasons given by mothers for late registration**

Reasons	Frequency (N=61)	Percentage
Not sure of conception till then	14	23
Not necessary	26	42.6
Customary to go after 3 months	11	18
Family did not allow	4	6.6
Not aware	1	1.6
Others	5	8.2
Total	61	100

Nearly half i.e. 42.6% of Mothers who registered after 12 weeks of gestation, were of the opinion that it was not necessary to register early. About 23% of them mentioned that they were not sure of the conception till 3 months and 18% of them informed that, it was

not customary to consult anyone until it was 3 months of gestation.

Here again many of them were not aware of the importance of early registration in pregnancy

### CONCLUSION

In our study, majority i.e. 97.5% of the women is availing antenatal services, but many of them are not aware about importance of early registration nor about having at least 3 check ups during pregnancy. It is evident by this study wherein, only 64% of them had minimum 3 visits and less than one third, i.e. 21% of them registered early and major reason given for not availing services were; not aware, not necessary and not customary. . And in all these services educational status of mothers had shown a statistically significant association in having minimum 3 ANC visits, in registering early in pregnancy and also in consuming IFA preparation for 3 or more months. It shows that by improving educational status of women along with giving more focus on raising the awareness in the community about these issues, utilization of these services can be improved.

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# India Rising? the Academic Challenge to Democracy

Dix D E

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## ABSTRACT

To clarify the uniquely Indian problem of 800 million poor citizens (67% of India's population) in order to highlight the potential democratic solution and its worldwide implications.

**Materials and Method:** Data from the World Health Organization and the United Nations Development Programme were used to divide 144 nations into 87 normal and 57 abnormal nations. Of the abnormal nations, 39 were both poor and sick by objective criteria. These 39 nations were ranked according to need for enhanced health expenditure, and the major correlates of this need were identified.

**Result:** By wide margin, India leads the world in number of people in poverty and need for enhanced health expenditure. Among poor, sick nations, both need and number of people in poverty correlate strongly and positively ( $r > .96$ ) with the number of universities.

**Conclusion:** Among poor, sick nations, universities have been diverting resources from the people in need. India is ideally poised to break this tradition and demonstrate the power of academic commitment to achieve the Millennium Development Goals.

**Keywords:** *Democracy, Technology, Poverty, Development*

## INTRODUCTION

India ranks among the world's fastest growing economies and is commonly portrayed as the world's largest democracy. It is a world leader in aerospace and plans soon to send a probe to Mars and astronauts to the moon.<sup>1,2</sup> Yet the majority of India's citizens live in multidimensional poverty.<sup>3</sup> Democracy, defined as rule by the majority, would divert funds from aerospace to human development. How will India's leadership respond to this challenge? Will it ignore the majority in order to lead the world into space? Or will it abandon space to lead the world to human development? That answer will manifest not only India's destiny, but the world's. Will it be technology or democracy?

National Research Professor, Raghunath Mashelkar advocates for "Indian solutions to the specifically Indian problems of 800 million resource-poor people."<sup>4</sup> It is the purpose of this paper to clarify the nature of these "specifically Indian problems" in order to highlight their "Indian solutions" and worldwide implications. By abandoning space technology in order to mobilize resources for human development, India

could model the Millennium Development Goals (MDG), and, in this way, catalyze worldwide commitment to achieving these Goals. To a large extent, therefore, the destiny of our world depends on which giant India choose to become, the technological or the humanitarian.

## MATERIALS AND METHOD

The World Health Organization reported adequate health and wealth statistics for 144 nations.<sup>5</sup> I divided these nations objectively into two groups, healthy and sick, and into two different groups, rich and poor. I employed a method that is useful for distinguishing normal from abnormal clinical laboratory tests. For some such tests, it is possible to distinguish patients from normal subjects by plotting the clinical test results vs their percentile rank in the population.<sup>6</sup> I simplified and quantified this method and demonstrated its utility in distinguishing normal from abnormal clinical test values.<sup>7,8</sup> It was found to be equally useful in distinguishing normal from abnormal nations.

Values for maternal mortality ratio (MMR) were calculated at each whole percentile for the 144 nations

studied. These values were plotted vs their percentile rank. The graph is linear with a single break in slope at the 65<sup>th</sup> percentile (MMR = 120.1).<sup>9</sup> Abnormal values (the minority) exhibit a greater slope than normal values (the majority). By this method, nations are abnormal because their values for MMR differ more from each other than do the values for normal nations. Eighty-seven nations are normal by this method: Albania, Algeria, Argentina, Armenia, Australia, Austria, Azerbaijan, Belarus, Belgium, Bosnia & Herzegovina, Brazil, Bulgaria, Canada, Cape Verde, Chile, China, Columbia, Costa Rica, Croatia, Czech Republic, Denmark, Dominican Republic, Egypt, El Salvador, Estonia, Fiji, Finland, France, Georgia, Germany, Greece, Guatemala, Honduras, Hungary, Iceland, Iran, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Latvia, Lebanon, Libya, Lithuania, Luxembourg, Malaysia, Maldives, Mauritius, Mexico, Mongolia, Montenegro, Morocco, Netherlands, New Zealand, Nicaragua, Norway, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Republic of Korea, Republic of Moldova, Russia, Serbia, Singapore, Slovakia, Slovenia, Spain, Sri Lanka, Sweden, Switzerland, Syria, Thailand, Macedonia, Trinidad & Tobago, Tunisia, Turkey, Ukraine, United Kingdom, United States, Uruguay, Venezuela, and Viet Nam.

All normal nations reported values for infant mortality rate (IMR) < 33.9 deaths/1000 and under-five mortality rate (U5MR) < 43.8, which are the values at the 65<sup>th</sup> percentile. All normal nations also reported values for life-expectancy at birth (LE) greater than 67 years, which is the value at the 39<sup>th</sup> percentile (meaning 61% of nations are normal by this criterion). The MMR, IMR, U5MR, and LE are average statistics and say nothing about the distribution of health within their respective nations. To incorporate within-nation health disparity into health assessment, I utilized each nation's value for the United Nations Development Programme's new inequality-adjusted life-expectancy index expressed as percentage life-expectancy loss (LE Loss). The greater this LE Loss, the greater the within-nation inequality. All 87 of the normal nations report values for LE Loss less than 21.1%, which is the value at the 65<sup>th</sup> percentile.

Values for LE, IMR, and U5MR are for 2009 and values for MMR are for 2008, all from reference 5. Values for LE Loss are for 2011 from reference 3.

Because the 87 nations listed above are normal for all 5 per capita health criteria, I consider them to be healthy. Of the remaining 57 nations, 46 are abnormal

by all 5 criteria, and I consider them to be sick for this reason. These sick nations are: Angola, Bangladesh, Benin, Bhutan, Botswana, Burkina Faso, Burundi, Cambodia, Cameroon, Central African Republic, Comoros, Cote d'Ivoire, Democratic Republic of Congo, Djibouti, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, India, Kenya, Laos, Lesotho, Liberia, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Pakistan, Papua, Rwanda, Senegal, Sierra Leone, South Africa, Sudan, Swaziland, Togo, Uganda, Tanzania, Yemen, and Zambia.

Eleven nations are abnormal by 1 to 4 of the above criteria (Turkmenistan, Tajikistan, Kazakhstan, Kyrgyzstan, Uzbekistan, Nepal, Bolivia, Iraq, Indonesia, Ecuador, and Solomon Islands). These 11 nations are abnormal by some criteria, but not necessarily sick, and are not considered further in this paper.

Each nation's annual total per capita health expenditure in purchasing power parity of international dollars (Health \$/c) for 2008 is listed in reference 5. As described in reference 6, Health \$/c = \$186 distinguished healthy from sick nations better than any other value for Health \$/c. All but 5 (Cape Verde, Fiji, Mongolia, Philippines, and Syria) of the 87 healthy nations reported Health \$/c > \$186. All but 7 (Bhutan, Botswana, Equatorial Guinea, Gabon, Namibia, South Africa, and Swaziland) of the 46 sick nations reported Health \$/c < \$186. For 121 of the 133 healthy and sick nations, Health \$/c = \$186 seems to be a necessary condition for health. Nations with Health \$/c > \$186 were considered to be rich. Nations with Health \$/c < \$186 were considered to be poor.

India, with Health \$/c = \$122, and all 5 per capita health criteria abnormal is a member of the 39 poor, sick nations.

A nation's per capita need for health expenditure can be estimated as the difference between \$186 and that nation's per capita health expenditure. A nation's total need for health expenditure is then the product of its per capita need and its population. Total need for health expenditure was estimated by this method for all 39 poor, sick nations.

Pearson correlation coefficients were determined between need and various health and economic parameters as follows. The percentage of the population using improved drinking water sources (Water) and the percentage of the population using

improved sanitation sources (Sanitation) are for 2008 from reference 5. The number of physicians per 10,000 people (Physicians) is for 2000 – 2010 from reference 5. Deaths from malaria per 100,000 people (Malaria) is for 2008 and deaths from TB per 100,000 HIV-negative people (TB) is for 2009, both from reference 5. Each nation’s gross national income per capita (GNI/c) in purchasing power parity of international dollars (ppp int \$) for 1990, 2000, and 2009 is listed in reference 5. I define “Economic Growth” as the ratio of GNI/c at 2009 to that at 1990. The percentage of births attended by a health professional (Births Attended) is for 2000-2010 from reference 5. The Human Development Index (HDI) is for 2011 from reference 3. The percentage average annual HDI growth (HDI Growth %) is for 2000 – 2011 from reference 3. The inequality-adjusted HDI percentage overall loss (HDI Loss %) is for 2011 from reference 3. The number of people living in multidimensional poverty (Poverty) is for 2001 - 2009 from reference 3.

The number of colleges and universities in each poor nation (Universities) was obtained from the 4International Colleges & Universities, which lists the recognized, licensed or accredited, four-year and/or postgraduate, face-to-face learning, degree-granting institutions in each nation.<sup>10</sup>

**RESULTS**

Table 1 lists the poor, sick nations according to total need for health expenditure. India is most needy by a wide margin.

**Table 1: The Need of Nations (\$ million)**

Nation	Health \$ Need
India	76672
Bangladesh	23032
Pakistan	22419
Ethiopia	12337
Nigeria	11293
D. R. Congo	10758
Tanzania	5637
Kenya	4816
Mozambique	3366
Malawi	2096
Uganda	2093
Cote d’Ivoire	2068
Sudan	1650
Burkina Faso	1643
Mali	1573
Cameroon	1424

**Table 1: The Need of Nations (\$ million) (Contd.)**

Nation	Health \$ Need
Zambia	1367
Guinea	1293
Yemen	1251
Burundi	1129
Benin	1113
Senegal	1050
Cambodia	1006
Ghana	999
Rwanda	840
Papua	777
Togo	766
C. African Rep.	678
Laos	643
Liberia	546
Sierra Leone	467
Mauritania	436
Guinea Bissau	221
Gambia	189
Lesotho	141
Angola	56
Comoros	40
Djibouti	30

Health \$ Need = \$186 - (a nation’s Health \$/c ) X ( the nation’s population)

Table 2 lists all significant correlations between need and other relevant national parameters. Correlations coefficients less than .32 are insignificant (p > .05) and not listed.

**Table 2: Correlations**

**Table 2: Correlation Coefficients Among Relevant Variables**

Variables	r
Universities vs Poverty	.979
Need vs Poverty	.975
Need vs Universities	.968
HDI vs Malaria	-.694
Universities vs Physicians	.673
Economic Growth vs HDI Loss %	-.660
Need vs Physicians	.645
HDI Loss % vs Malaria	.613
HDI vs HDI Loss %	-.591
HDI vs Physicians	.524
HDI vs GNI/c	.521
Poverty vs Economic Growth	.498
Physicians vs GNI/c	.486
Universities vs Economic Growth	.482
Need vs Economic Growth	.478

**Table 2: Correlation Coefficients Among Relevant Variables (Contd.)**

Variables	r
HDI Loss % vs TB	.440
Water vs Sanitation	.433
Universities vs HDI	.415
Water vs Change in HDI	-.409
Malaria vs Physicians	-.406
HDI vs Economic Growth	.397
Physicians vs Economic Growth	.377
Sanitation vs GNI/c	.375
Sanitation vs HDI	.364
HDI vs TB	-.360
Universities vs GNI/c	.358
Sanitation vs TB	-.354
Sanitation vs Malaria	-.354
Poverty vs GNI/c	.333
Need vs GNI/c	.326
Need vs HDI	.320
HDI vs Change in HDI	-.316
Water vs Physicians	.315
All other pair-wise combinations of these variables yielded insignificant correlation	
Coefficients of $r < .32$	

Among the poor and sick nations, need correlates almost perfectly ( $r > .960$ ) with the number of people living in multidimensional poverty, which is a composite of health, education, and standard of living, and, surprisingly, also with the number of universities.

The commonly recognized per capita parameters of health and wealth, such as HDI, GNI/c, malaria, TB, water, and sanitation do not exhibit strong correlations with need or number of people living in poverty or number of universities.

The moderately negative correlation between economic growth and inequality-adjusted HDI indicates that among the poor, sick nations, economic growth tends to be egalitarian. This is supported by the moderately negative correlation between HDI and inequality-adjusted HDI.

The weak or insignificant correlation coefficients between parameters that, intuitively, seem to be closely related, e.g., water, sanitation, malaria, and TB, make the unexpectedly strong correlation coefficients among need and number of universities, and number of people in poverty all the more dramatic.

## DISCUSSION

By per capita statistics, India ranks as the healthiest

and wealthiest of the world's poor, sick nations. It has the highest HDI at .547 (Reference 3), the highest GNI/c at \$3250 (Reference 5), and the greatest growth in GNI/c between 1990 and 2009 at 3.7 fold (data from Reference 5). The nations with the second and third fastest growing economies between 1990 and 2009, Mozambique and Bangladesh, grew at 3.3 and 3.1 fold, respectively, and both these nations had GNI/c less than half the Indian value in 2009. But per capita statistics are deceptive. Because of its enormous population, India is in fact the world's most needy nation by a wide margin (Table 1).

Although India's economy grew faster than any other poor, sick nation's, its growth in HDI was less than average at 1.56% between 2000 and 2011 (Reference 3). The average of the 33 poor, sick nations reporting change in HDI between those years was 1.59%. Fourteen of the 33 poor sick nations reporting change in HDI showed better growth in HDI than India.

The number of people living in multidimensional poverty is listed according to nation in reference 3. According to this data, 150 million more poor people reside in India than on the entire continent of Africa. According to this same data, 140 million more poor people reside in India than in the entire collection of other Asian nations including China, Bangladesh, Pakistan, Indonesia and Philippines.

No nation is more needy of progress toward the MDG than India, and no nation is more capable of making that progress. India has 508 universities. The nation in second place, Pakistan, has only 128. The average number of universities among poor, sick nations other than India is 16, and five such nations have no universities. But India's universities have focused on technology for the purpose of making the rich minority even richer, rather than on shrinking the gap between rich and poor. Not one of the MDG involves aerospace research. If India truly wants democracy, it must focus its universities on identifying solutions to poverty and meeting the needs of the majority of its people.

India is in position to catalyze worldwide collaboration on sustainable development.<sup>11</sup> Through economic evaluation it could articulate the means to maximum cost-effectiveness.<sup>12</sup> By health education, it could rescue the next generation of impoverished Indian children.<sup>13</sup>

By MMR, India, at 230/100,000, ranks with Yemen as the best of the poor, sick nations. But only 47% of Indian births are attended by a health care professional. The average for all 39 poor, sick nations is 49%. India's population of 1.2 billion exceeds by 82,000 the combined populations of all 38 other poor, sick nations. As a result, India has at least 27,000 more maternal deaths per year than any other poor, sick nation. India could divert funds from aerospace to improve maternal and primary health care for the poor.<sup>14-16</sup> It must divert those funds to be democratic.

Democracy is government of, by, and for the people. When the majority of the people are poor, democracy requires government to act to end poverty. India could lead the world in this direction by fostering research that translates into achieving the MDG.<sup>17</sup>

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**Conflict of Interest:** None

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# Common Musculoskeletal Injuries in Rock Climbers

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## ABSTRACT

**Introduction:** In India, rock climbing comparatively is a new sport. An increase in indoor climbing facilities and the availability of natural rock formations has increased participation rates in India. It has also led to the development of sport climbing competitions. In this, competitors attempt to climb routes as quickly as possible. Traditional rock climbing is usually associated with injuries resulting from falls. In sport climbing, because maximal power and endurance is required of the upper extremities, they are the major site of injuries and overuse syndromes. Since this is a relatively new sport in India and because there has been a paucity of research the purpose of this study is to identify the injuries unique to this sport.

**Objective:** Identify the common musculoskeletal injuries, the common sites of injury; identify risk factors and the surface on which the injuries occurred.

**Study Design:** Cross sectional survey.

**Methodology:** 40 climbers were interviewed using a validated questionnaire. The data obtained was analysed using simple percentage.

**Results:** The commonest injury to occur was an ankle sprain (20%). The ankle (21.7%) and the middle finger (20%) were most commonly injured. The use of climbing shoes that are several times smaller and the use of a crimp grip (hyperextension at the DIP joint and hyperflexion at the PIP joint) were risk factors that predisposed the climbers to injury. 70% of the injuries occurred on a natural wall.

**Conclusion:** The results indicate that an ankle sprain was the commonest injury. The ankle was most commonly injured. Majority of the injuries occurred on a natural climbing surface.

**Keywords:** Rock Climbers, Injuries, Risk Factors

## INTRODUCTION

Rock climbing is an exciting and challenging sport that has grown rapidly in recent years. An estimated five million people climb either indoors or outdoors at least three times a year.<sup>1,2</sup> An increase in indoor climbing facilities and the availability of natural rock formations has increased participation rates in India.

Free climbers use only natural rock formations. Artificial aids such as ladders or pegs are not acceptable except to put up belays and runners. Free climbing does not imply climbing without a rope: free climbers do protect themselves from falls. Climbers who do not use a rope are considered to be free soloing.

Bouldering is the term given to free soloing small rock formations without climbing above a height from which the climber can still jump without injury.<sup>3,6</sup>

Climbs may also be made on smaller rock formations (climbing gardens) or on artificial climbing walls with specifically designed handholds and footholds. The handholds and footholds may be as thin as a tiny lip or protrusion of the rock and only wide enough to take 1 or 2 fingers.<sup>3,5</sup>

Sport climbing can be considered the latest evolution of free climbing. Short, often single-pitch routes of high difficulty typify sport climbing. In sport climbing, climbers attempt increasingly difficult routes



that have smaller footholds and handholds and are often overhanging. Moves are both static and dynamic, and jumping is necessary to reach the next hold. In contrast to traditional climbing, in which the lower extremities support most of the body weight, in sport climbing the upper extremities do most of the work on difficult routes. Great upper body strength, which can be obtained only through specific training of the forearms and hands, is required.<sup>3-9</sup>

Injuries in traditional rock climbing result mostly from falls or falling objects.<sup>3</sup> In sport climbing, because maximal power and endurance is required of the upper extremities, they are the major site of injuries and overuse syndromes.<sup>6</sup> Many reports have described the leading role of hand and finger injuries among the medical problems of the upper extremity. Those injuries primarily involve the slowly adapting tissues—ligaments, tendons, and joint capsules rather than more rapidly adapting muscle tissue.<sup>7-9</sup>

With the introduction of artificial climbing walls, it is now possible to climb through all seasons and to climb in regions that previously did not have appropriate landscape. Climbing walls are designed to maintain a high standard of safety, which permits climbers to consistently test their abilities at the highest levels of their physical capacity. Artificial climbing areas have also led to the development of sport climbing competitions. Although they are well protected from falls by a rope from above, adding a competitive aspect may lead to increased intensity of training and higher levels of difficulty.<sup>2</sup> Since this is a relatively new sport in India and because there has been very little research done the purpose of this study is to identify the injuries unique to this sport.

**MATERIAL AND METHODOLOGY**

**Research design:** Cross sectional survey

The data has been collected by the direct method with the help of a validated questionnaire and the data thus obtained was statistically analyzed using SPSS version 15 w.r.t. objectives.

**Study setting:** Poddar College, Nandadeep High School, International rock climbing competition (Girivihar, CBD Belapur).

**Sample size:** 40

**Material and tools used:** Validated Questionnaire

**Duration of study:** 3 months

**Inclusion criteria:** Climbing for more than one year.

**Exclusion criteria:** Climbing for less than a year.

**FINDINGS**

**Table 1:**

	Mean	Standard deviation
Age	26.14	9.32
No. of years	6.5	4.80
BMI	19.70	3.68
Climbing per week:		
Artificial wall	3	1.63
Natural rock	2	1.04

Demographic Data

**Table 2:**

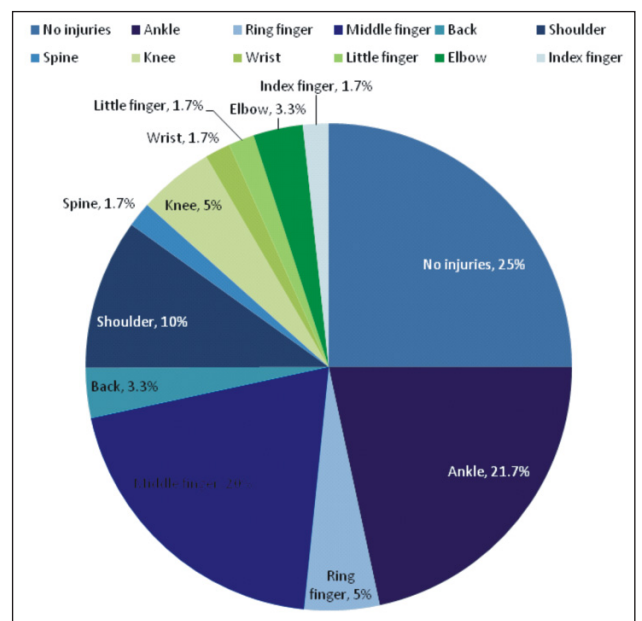
	Percentage
<b>Injuries occurring on:</b>	
Natural rock	63%
Artificial wall	37%

Percentage of injuries occurring on different surfaces

**Table 3:**

	Percentage
Use of protective aids	95%
Use of climbing shoes	100%

Percentage of subjects using protective gear while climbing



**Fig. 1. Common sites of injury**

## DISCUSSION

Sport climbing is associated with unique upper and lower-limb injuries involving predominantly the hand, elbow, and shoulder, and to a lesser extent the foot. Many pathologic conditions are limited to sport climbing. As per the data collected from this study 62% of climbers reported having suffered from an injury while 38% did not. It is seen that the upper limb (60%) was slightly more prone to injuries.

The commonest injury to occur was an ankle sprain (20%) followed by an injury to the middle finger (25%).

### Ankle

Ankle injuries accounted for 21.7% of the total injuries of which 20% were ankle sprains. Climbers often buy climbing shoes several sizes smaller than street shoes. The smaller shoe holds the foot in a supinated, stable position while the thinness of the shoe increases proprioceptive sensitivity. Climbing shoes are supposed to fit like a second skin. To obtain this fit, nearly 90% of climbers accept pain during and after climbing. The small shoes also induce specific foot deformities as well as musculoskeletal, neurologic, and dermatologic problems.<sup>10</sup>

In climbing, climbers ascend unroped to a height of 10 to 15 feet, and if they fall, they usually land on their feet, which absorb much of the impact. As the foot is already in a forced supinated position because of the small climbing shoe, the likelihood of an ankle sprain is increased. Both dorsiflexion and plantarflexion-inversion sprains may occur. The origin of ankle sprains in sport climbing is different. This injury can occur when climbers fall into the rope in overhanging walls. A falling roped climber on vertical walls swings into the face, usually extending the legs to brace the body for impact. Both dorsiflexion and plantar flexion-inversion sprains may occur.

One ankle fracture was reported and it may be fractured when a climber reflexively tries to stop his body from colliding with a rock face or climbing wall.<sup>6, 10-12</sup>

### Fingers

Injuries to the middle (20%), index (1.7%), ring (5%) and little (1.7%) fingers.

Rock climbing employs 4 basic grips: the open-handed grip, the pinch grip, the pocket grip, and the crimp grip.<sup>16</sup> In both the open-handed grip and the

pinch grip, the fingers and thumb are wrapped around a hold at varying degrees of flexion. When a climber uses a pocket grip, only one, two, or three fingers are used to support the climber's weight. Both the proximal interphalangeal (PIP) joint and the distal interphalangeal (DIP) joint are held at varying degrees of flexion. A crimp grip, on the other hand, requires a climber to hyperextend the DIP joint while flexing the PIP joint.<sup>17</sup>

The pocket grip involves inserting one or two finger tips into a small pocket in the rock. These holds place an extremely large stress on one or two flexor tendons, which may be supporting the entire weight of the body. This grip is commonly associated with flexor digitorum profundus (FDP) avulsions; particularly when the climber falls and the finger or fingers remain trapped within the pocket.<sup>16</sup>

The crimp grip is used to maximize force against a small ledge or hand hold. In the crimp grip, the proximal interphalangeal (PIP) joints are flexed to 90° and the distal interphalangeal (DIP) is fully extended or hyperextended. This is the grip commonly associated with pulley ruptures. Pulley ruptures occur most commonly following falls with the hand in the crimp grip position. The crimp grip maximizes contact between the finger tip and shallow ledges or holds. This position places the FDP and flexor digitorum sublimis (FDS) tendons at or near maximal contraction to resist body weight. The presenting history and physical exam findings are relatively consistent in patients after pulley rupture. Typically, patients will hear a loud pop with a feeling of giving way of the PIP joint. Generally, there is severe pain at the base of the proximal phalanx, followed several hours later by swelling and pain. Patients usually complain of pain on finger flexion. Bowstringing is best demonstrated when the finger is flexed against resistance. Clinically apparent bowstringing requires the rupture of the A2 through A4 pulleys.<sup>16</sup>

A2 pulley rupture is the most common climber's injury and has been given the name climber's finger. The injury is most frequent in the ring and middle fingers because those fingers are used most often for small holds—separately for 1-finger holds and together for 2-finger holds.<sup>10, 18</sup>

### Shoulder

Shoulder injuries accounted for 10% of the total injuries. Shoulder problems in sport climbers are quite common because most climbing is done with the arms

above the head. Pain can be caused by impingement as well biceps tendonitis.<sup>6,10</sup>

It is important to differentiate between and primary and secondary impingement. Primary impingement can be caused by a structural narrowing of the subacromial space which causes pain and dysfunction, acromioclavicular arthropathy, type I acromion, or swelling of the soft tissue in the subacromial space.<sup>10, 19-20</sup> Secondary impingement can result from disorders such as a SLAP lesion (superior labrum lesion from anterior to posterior) with superior instability. Arm positions above the head can lead to maximal shear and pull forces on the biceps tendon.<sup>10, 21-22</sup>

### Elbow

Elbow injuries amounted for 3.3% of the total injuries. Basic positioning of the upper extremity in sport climbing: forearm pronated, wrist extended in slight ulnar deviation, fingers flexed to gain maximal hold on the rock protrusion. When pulling on to the next handhold, the elbow is flexed by the brachialis and the biceps brachii muscles while the forearm is held in pronated position. 2 soft tissue injuries of the elbow caused by slow regeneration of tendon tissue after repeated microtrauma were reported: anterior elbow pain, and triceps tendonitis. Very high stress in climbing leads to insertion tendonitis from such microtrauma. Anterior elbow pain also called climber's elbow is tendonitis of the brachialis muscle. It is caused by overuse of this muscle in a position where the biceps muscle is not or is only insufficiently functioning, which occurs with flexion and pronation of the elbow, particularly during long traverses on climbing walls. Triceps tendonitis occurs after mantle-shelf movements, during which arms flexed at the elbow and pushing downward initially support the body's weight. Injuries occur when the arms and elbows are extended to push the body higher.<sup>8, 10, 21-23</sup>

### Knee

Knee injuries accounted for 5% of the total injuries. The injuries reported were an ACL sprain and meniscal tears. They occur mostly when a climber is moving up from a position in which the knee is hyperflexed and the whole leg is turned outward—the frog position. Injury occurs when the meniscus is put under load and rotational stress.<sup>10, 24</sup>

### Back

3.3% of climbers reported injuries in the back.

Specific overuse syndromes of the cervical spine as well as of the lumbar spine have been described. The cervical spine is often hyperextended while belaying a partner up vertical or overhanging rock faces, resulting in typical muscle pains and disorders such as arthritis of the facets of the cervical vertebra.<sup>10</sup>

### Fractures

Fractures accounted for 7% of the total injuries. Accidents producing multiple traumatic injuries are exceptional. Nevertheless, if a fall is not adequately controlled a fracture of the spine can occur. Bones of the forearm (distal radius), hand (scaphoid) and ankle were probably fractured when a climber reflexively tries to stop his body from colliding with a rock face or climbing wall.

70% of the injuries occurred on a natural wall, while the remaining 30% occurred on an artificial wall. Overall indoor rock climbing is much safer because it allows the climber to climb with a heightened sense of security. Also the climbers rarely overexert themselves since they do not have to scale a particular surface or reach the summit.

## RECOMMENDATIONS

### A specific warm up that includes

1. A 10 minute warm up hike/ stroll / session of bouldering.
2. This is followed by a climbing specific stretching program described by Eric J. Horst an accomplished climber, climbing instructor and author of several books on climbing.<sup>25</sup>

A specific cool down that includes:

1. Stretching
2. Yoga; shavasana.
3. Meditation

Strength training that concentrates on

1. Fingers and Forearm training.
2. Shoulder muscles (Large push muscles).
3. Training the core muscles.
4. Training the antagonist muscles.<sup>25</sup>

### Use of protective aids

1. Harnesses.
2. Helmets.
3. Ropes.
4. Carabiners.
5. Crash pads/ Protective mats.

### Rules to prevent overuse injuries

1. Focus on technique training over strength training.
2. Regularly vary the type of climbing.
3. Use prophylactic finger taping in the most stressful situations and after injury.
4. Proceed cautiously through dangerous moves.
5. Don't climb to exhaustion.
6. Don't climb or train more than four days per week.
7. Always warm up and cool down.
8. Maintain muscle balance by training antagonist muscle groups.
9. Use periodization to vary your training schedule.
10. Make getting proper rest and nutrition a top priority.<sup>25</sup>

### CONCLUSIONS

The commonest injury to occur was an ankle sprain. The commonest site of injury was the ankle. 70% of injuries occurred on a natural wall.

**Conflict of Interest:** None

**Ethics Committee Approval:** Taken

**Source of Support:** None

**Acknowledgement:** None

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# A Case Report on Benign Cyst Transformed to Malignant Invasive Squamous Cell Carcinoma

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## ABSTRACT

**Back ground:** Cysts are mostly benign swellings over the skin surfaces in mid line and other various sites. Sizes differ from simple acne, sebaceous cysts, dermoid cyst and embryogenic cysts. Cysts are usually painless for longer years and can be presented visualized prominently and distorting out look of the individuals and always containing some thick or semi liquid material.

**Clinical Presentation:** A 60 years old female admitted with mild history of pain and irritation over the skin. Two year old benign cyst situated over midline sacro coccygeal region. Clinically skin is mobile over the swelling except a small nodule 1.1 mm size over the central part. Patient was subjected to routine investigations and specific investigations like Fine Need Aspiration Cytology (FNAC) procedure done from the periphery of the cyst and report revealed as epitheloid cyst. After initial aspiration, some non haemorrhagic pultaceous material was observed in the cyst. Confirmation of diagnosis was made by post operative specimen biopsy report as epidermoid cyst with invasive squamous cell carcinoma.

**Keywords:** Age, Sex, Diagnosis, FNAC, Invasive Squamous Cell Carcinoma

## INTRODUCTION

Benign cysts are usually presents over the surface of skin in the subcutaneous plane having a sac filled with liquid or semi liquid fluid or pultaceous material. In case of sebaceous cyst it consists of sebum. Usually lining of the cyst is epithelial. Cutaneous Squamous Cell Carcinoma has been shown to develop more frequently in chronically injured or diseased skin, including long-standing ulcers, sinus tracts, burns, osteomyelitis and skin affected by chronic inflammatory disorders<sup>1</sup>. Squamous cell carcinoma is a kind of epithelial cells which is part of epidermis of the skin of lips, gastro intestinal lining, ovarian cyst, sacro coccygeal dermoid, bladder, prostate and other tissues. Repeated uncontrolled divisions of cancer stem cells of epithelial lineage are characteristic. The lesions usually present as a nodule, but they can appear as a raised, indurated, and erythematous area with crusting, and possibly ulceration. The average size is approximately 1.2 cm but may be as large as 5.0 cm<sup>2</sup>.

Once the lesion has grown and progress to the point and it has breach and penetrated, infiltrated to adjacent structures it is called invasive carcinoma.

Squamous cell carcinoma of the skin starts as a small nodule and enlarges and finally it becomes necrotic. Lesion caused by squamous cell carcinoma often asymptomatic and it is second most common cancer of the skin. Sun light exposure and immune suppression are the risk factors. 20 % are non melanotic skin cancers, generally treated by surgical excision. Generally squamous cell carcinomas treated by radiation and chemotherapy and it was used for treatment of Metastatic diseases.

**Operative Procedure:** Cyst size of 5.5X5X4 cms, under local anaesthesia was excised without disturbing subcutaneous tissue planes. Elliptical incision over the cyst leaving a part of skin around the 3 cm away the nodule. Cyst shelled of totally very easily in planes sub cutaneously with finger dissection raising the skin

from all sites. Total specimen sent for histopathology. Histo pathology report shows epidermoid cyst with invasive squamous cell carcinoma. Post operative period was uneventful and wound healed normally. Patient was discharged on 7th day of operation. Patient is under follow-up.

## DISCUSSION

Management and surgical considerations of Benign cyst have recently undergone considerable change. Although surgical resection remains the standard form of treatment of Benign cyst transformed into rare invasive malignant squamous cell carcinoma. Squamous cell carcinoma (SCC) presented a logical and comprehensive clinic pathologic classification system of cutaneous SCC based upon histologic subtypes and biological potential. It is recommended that the histologic subtype, degree of differentiation, depth of invasion, and perineural invasion be routinely reported in cases of cutaneous Squamous cell carcinoma. General Surgeons, Dermatologists and pathologists alike should be aware of the importance of these features in determining prognosis and treatment<sup>5,6,8</sup>.

The lesions usually present as a nodule, but they can appear as a raised, indurated, and erythematous area with crusting, and possibly ulceration. Centrally, the lesion may be atrophic to ulcerated. Invading strands and columns of malignant squamous cells within the dermis arise from the epidermis or ulcer edge. Squamous cell carcinoma arising from benign sweat gland cysts. However, there is no evidence of a precursor lesion. Where as, Squamous Cell Carcinomas arising from actinic keratoses, demonstrate a 12–13% incidence of an associated solar lentigo. The importance of separating this variant from other types of SCC lies in the fact that there is an approximately 8–14% incidence of regional or distant metastases with de novo Squamous cell carcinomas. Both SCCs arose in the cyst walls and invaded the surrounding dermis and more cases need to be reported to confirm this. This report demonstrated that Squamous cell carcinoma can arise from benign adnexal structures and might also explain the existence of some cases of primary dermal Squamous cell carcinoma with no epidermal connections<sup>15,18</sup>.

Benign cysts are usually presents over the surface of skin in the subcutaneous plane, less than 5 cm in diameter and in some high risk patients are those with tumours are more than 5 cm in diameter<sup>5</sup>. In our case

also tumour size was 5.5X5X4 cms in diameter. In our hospital, patient was undergone surgery by giving elliptical incision over the primary lesion, cyst shelled off totally very easily in planes sub cutaneously with finger dissection raising the skin from all sites. Post operative period was uneventful and patient is under follow up for further evaluation of any recurrences of the tumour development. However, most of these studies are still at the early follow up stage, hence longer follow up and many studies correlation is required<sup>16</sup>.

## CONCLUSIONS

In midline sacro coccygeal region most common cysts are sacro coccygeal teratomas and dermoid cysts. Some times pilonoidal sinus with all its features are present. But, here it is reported and transforming into invasive squamous cell carcinoma which is rare. No other lymphadenopathy and no infiltration of adjacent field. Further studies of these rare entities will be required in order to establish their biological behavior.

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# Evaluation of Physical and Mental Fitness of an Infectious Disease Laboratory Workers' in Urban Set Up

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## ABSTRACT

**Background:** Majority of people who work in laboratory on infectious agents are prone to various work related disorders. This affects the overall output coming from an individual in their workplace. Musculoskeletal pains may arise due to the posture attained at work place for long period of time or wearing heavy outfit required to work in negative atmospheric pressure. Stress could be due to increase in the work or issues with the staff. Reduced physical fitness due to lack of physical activity along with various co-morbid factors such as obesity, hypertension and sedentary lifestyle, can cause lifelong disease.

**Methodology:** Thirty laboratory workers were selected for cross sectional survey. Study design was assessment and questionnaire based. Subjects filled Nordic and Perceived stress questionnaire. Following assessments were done on the subjects like Harvard step test, Partial curl-up test, Push-up test, Squat test, Peak Expiratory Flow rate measurement. Statistical analysis was done using SPSS Version 13.

**Results:** About 33% of the subjects were suffering from hypertension. None of the subjects had diabetes and 56.7% of the subjects had abnormal B.M.I ( $p < 0.05$ ). Significantly higher proportion of the subjects had normal perceived stress score ( $p < 0.05$ ). Majority of the group had poor Harvard score ( $p < 0.001$ ) and abnormal PEFr readings ( $p < 0.001$ ). Upper extremity strength was also less ( $p > 0.05$ ), where as abdominal ( $p < 0.05$ ) and lower extremity strength ( $p < 0.001$ ) was good. No back or knee pain was reported in Nordic Questionnaire ( $p < 0.05$ ) in last one year. Even though lab-workers were healthy for their age, on doing physical tests, lot of them were found to have decreased cardiovascular endurance, reduced lung capacity, and muscular endurance. Their B.M.I was also on higher side. All this could be attributed to their sedentary lifestyle at place of work.

**Conclusion:** Lab workers need to improve their cardiovascular endurance, lung volumes, B.M.I and upper extremity strength.

**Keywords:** Lab-Workers, Physical Fitness, Harvard Step Test, Peak Expiratory Flow Rate Measurement, And Perceived Stress Score

## INTRODUCTION

Risk assessment involves assessing the risks that matter in the workplace. It is done to prevent occupation related disorder.<sup>1</sup>

Occupational health as defined by W.H.O. is the promotion, maintenance of the highest degree of physical, mental, social well being of the workers, in

all occupation; by preventing the departure of health, controlling the rising factor and adaptation of work to job, people to job<sup>2</sup>.

The Department Of Health And Human Services, Centres for Disease Control and Prevention, Atlanta, USA published recommendations on evidence-based interventions to promote physical activity.<sup>3</sup> A state of

reduced physical fitness in employees due to lack of physical activity along with various co-morbid factors such as obesity, hypertension and sedentary lifestyle can cause lifelong disease. One of the many benefits of regular exercise is increased and sustained energy throughout the day. Musculoskeletal pains may arise due to the posture attained at work place for long period of time or wearing heavy outfit required to work in negative atmospheric pressure. Stress could be due to increase in the work or issues with the staff. Cardiovascular endurance may be reduced due to the sedentary lifestyle at workplace and at home.<sup>4</sup> Reduced physical fitness due to lack of physical activity along with various co-morbid factors such as obesity, hypertension and sedentary lifestyle, which can cause lifelong disease and mortality.<sup>5</sup>

Working for long-standing hours in laboratories along with wearing positive pressure suits affects the body in many ways. If a person is not physically fit, then he cannot carry out this work efficiently.

### METHODOLOGY

Thirty Lab workers were included in this cross sectional survey. All workers of this one facility were included. Their working hours were eight hours per day. Their job demanded working in forward bent posture at lumbar spine for handling various equipments to do virological studies. They took adequate rest periods in between their work schedule. Study design was questionnaire and assessment based.

After the permission of the ethical committee of our college, study was carried at a laboratory in Pune. Individuals suffering from any recent injury of the lower limb or upper limb, injury due to trauma or any soft tissue injury, fracture, severe distress, and high blood pressure were excluded from the study.

A peak flow meter was used to measure the Peak Expiratory Flow rate (PEFR). A stool and metronome were used for performing the Harvard step test.

Subjects signed the consent form and filled up the details. The subjects received information about the procedure, along with a practical demonstration.

The study participants were asked to fill a Nordic Musculoskeletal Questionnaire<sup>6</sup> for pain in lower back, neck, shoulder, knee, wrist and ankle. The participants were also asked to fill up a Perceived stress

questionnaire<sup>7</sup> that helped to evaluate the stress level of the individual.

Then following tests were performed on the subjects.

### The Harvard Step Test

It is a type of cardiac stress test for detecting and/or diagnosing cardiovascular disease. It is also a good measure of fitness, and an ability to recover after a strenuous exercise. Practical demonstrations of the test was given to the participants by the investigator Before starting the Harvard Step test for any participant, the blood pressure and pulse rate was assessed using the sphygmomanometer and stethoscope.

The participants were asked to take steps up and down on a platform /stool at a height of about 46 cm at a rate of 30 steps per minute set at metronome for 3 minutes or until exhaustion. Exhaustion is the point at which the subject cannot maintain the stepping rate for 15 seconds. The subject immediately sits down on completion of the test, and then post-test the heart rate was measured at the interval for 30 sec, for three consecutive minutes. Harvard score was calculated and grades were assigned to the subject.<sup>8</sup> After five minutes rest, subject was asked to do partial curl up test.

### Partial Curl up test

This test was used to assess the abdominal muscle endurance of the study participants. Before testing, each subject was first explained about the procedure, followed by a demonstration.

The participants assumed supine position with knees bent at 90 degrees and feet flat on floor. The arms were extended to the sides with the middle finger touching the first piece of tape. Second piece of tape was placed 10cm away from the first piece. A metronome was set at 50 beats per minute. On the start, the subject lifted the shoulder blades off the mat making an angle of 30° with the floor on the first beep, sliding his fingers to the second piece of tape.. The subject was instructed to continue curling up until either the cadence was broken or the subject has become fatigued. Using American college of Sports Medicine Grading (ACSM), fitness category was assigned to the subjects.<sup>9</sup> After five minutes rest, next test was done.

### Push-Up test

This test was used to evaluate the upper body muscular endurance of the study participants. Before testing, each subject was first explained about the procedure, followed by a demonstration.

Males started in the standard push-up position. Hands should be shoulder width apart, arms extended straight out under the shoulders, back and legs in a straight line, and toes curled under. Females did a modified push-up with knees bent and touching the floor. The subject must raise the upper body, straightening the elbow. They reached the down position until the chin touched the mat. The stomach should not touch the mat. The subjects were asked to keep the back straight. Maximum number of push-up without rest was counted. ACSM grading was used.<sup>9</sup> After five minutes rest, next test was done.

### Squat Test

The Squat test was done to evaluate the development of the participant's leg strength. Before testing, each subject was explained about the procedure, followed by a demonstration. The subject stood in front of a chair, facing away from it, with their feet shoulder width apart. The subject was asked to squat down lightly touching the chair with their backside of body. The subject was asked to perform the repetitions without any rest.<sup>10</sup> After five minutes rest, next test was done.

### Peak Expiratory Flow rate measurement (PEFR test)

The Peak Expiration Flow rate (PEFR) is a simple and reliable way of judging the degree of airway obstruction in various obstructive lung diseases, especially asthma. Before testing, each subject was first explained the procedure, followed by a demonstration.

The subject was asked to sit on a chair with back erect, with feet flat on the floor and asked to look forward. Subjects were told how to hold the Wright's Peak flow meter, keeping the fingers away from the scale and the slot and that the holes should not be covered at the end of the peak flow meter. The mouthpiece of the peak flow meter being placed in the mouth with the lips closed firmly around it, each

subject was told to breathe in deeply and blow out just once as hard and as fast as you can without putting his/her tongue inside the mouthpiece, while blowing into the peak flow meter. If the subject happened to cough or spit into the mouthpiece, another reading was to be considered. Repeating the above procedure, two more readings were taken. Out of three readings, the highest of the three readings was documented. Normal values of PEFR score ranges between 400-600 ml/l.<sup>11</sup>

### Nordic Questionnaire

Subjects were given instructions to fill-up Nordic questionnaire.<sup>6</sup> The procedure was explained to them. They were asked to put a tick mark against the component, which gives them pain. Nordic Questionnaire is a reliable and valid outcome measure.<sup>12</sup>

### Perceived Stress Score

Subjects were given instructions to fill-up the questionnaire. Stress score was calculated for the same.<sup>7</sup>

Surrounding environment and timing of the day was kept same for all subjects performing the tests.

## DATA ANALYSIS

Statistical analysis was done using SPSS Version 13.

'P' values were obtained using Chi-Square test with reference to equal distribution of categories. P value of less than 0.05 was considered significant with 95% confidence interval.

## RESULTS

**Table 1: The distribution of subjects according to their demographic characteristics.**

Parameters	Number of subjects (n)	% of subjects
<b>Age (years)</b>		
≤30	14	46.7
31 – 39	7	23.3
≥40	9	30.0
<b>Sex</b>		
Male	22	73.3
Female	8	26.7

The above table shows the demographic distribution of the subjects.

**Table 2: The distribution of subjects according to BMI category.**

BMI category	Number of subjects (n)	% of subjects	Chi-Square Value	P-value
Underweight	1	3.3		0.027 (Significant)
Normal	12	40.0	-9.20	
Overweight	10	33.3		
Obese Grade I	7	23.4		
Total	30	100.0		

P-values are obtained by using Chi-square test, with reference to the equal distribution of categories.

Significant proportion of the subjects i.e. 56% had abnormal BMI ( $p < 0.05$ )

**Table 3: The distribution of subjects according to Perceived Stress Scale (PSS) category.**

PSS category	Number of subjects (n)	% of subjects	Chi-Square Value	P-value
Very Low	7	23.3		0.008 (Significant)
Low	7	23.3	9.6	
Average	14	46.7		
Slightly High	2	6.7		
Total	30	100.0		

Significant numbers of subjects had average Perceived stress score ( $p < 0.05$ )

**Table 4: The distribution of subjects according to Peak Expiratory Flow Rate (PEFR) category.**

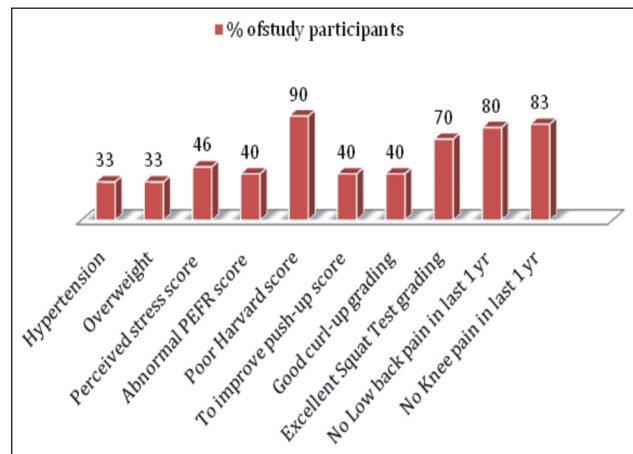
PEFR category	Number of subjects (n)	% of subjects	Chi-Square Value	P-value
Reduced	24	80.0	10.8	0.001 (Significant)
Normal	6	20.0		
Total	30	100.0		

Significantly higher proportion of the subjects i.e. 80% had Reduced Peak Expiratory Flow Rate ( $p < 0.001$ )

**Table 5: The distribution of subjects according to Harvard step test grading.**

Harvard grading	Number of subjects (n)	% of subjects	Chi-Square Value	P-value
Poor	27	90.0	19.2	0.001 (Significant)
Low Average	3	10.0		
Total	30	100.0		

Higher proportion of subjects had poor Harvard score which was statistically significant ( $p < 0.001$ )



**Fig. 1. Performance in different physical tests**

40% of subjects did not have good upper strength ( $p > 0.05$ ). 40% of subjects had significant Partial curl up grading ( $p < 0.05$ ) and 70% had excellent Squat test grading ( $p < 0.001$ ). In the Nordic Questionnaire, significant numbers of subjects had no back or knee pain in last 7 days or 1 year

## DISCUSSION

This study was done to assess physical fitness assessment of lab workers. 33.3% of the subjects had hypertension. This is more than the national prevalence of 25% in urban population. Increasing age, body mass index, sedentary lifestyle increases risk of diseases such as hypertension, diabetes. Hypertension reduces the physical fitness of the individuals and their capacity to work efficiently.<sup>13</sup>

Significant proportion of the subjects had abnormal BMI. The BMI in late adolescence is an important predictor of coronary heart disease and stroke among men before age of 55 years independent of smoking, hypertension and early cardiovascular mortality.<sup>14</sup>

Higher proportion of people had average Perceived Stress score. Their scores were ranging from 12-15. The low or average stress score was probably due to less workload, friendly working environment, residence close to place of work, comfortable working hours etc. Low job stress is good because people do not get fatigued.<sup>15</sup>

Maximum subjects had reduced PEFR. This could be because since subjects had to deal with infectious pathogen, they had to wear protective pressure suits and work for three to four hours. There is continuous supply of oxygen but there is accumulation of carbon dioxide along with which the chest is under continuous positive pressure. Along with this, overall Indians have less PEFR compared to Western population due to lesser height. Even when Indian standards were used, PEFR was much less. Sedentary life style and no participation in physical activity in the form of sports, gymnasium and occupation could be responsible for reduced PEFR in otherwise healthy individuals.

Reduced Harvard Step test score indicates reduced cardiovascular endurance. Lab workers stand at a particular place while working in the lab. Their work does not involve walking or moving from one place to another. Modern Technology further makes the person sedentary. For cardiac endurance to increase or to be maintained with increasing age, physical activity is important. Availability and use of physical activity facilities, building walking trails, and exercise rooms, developing number of partnerships with community resources for physical activity such as YMCAs or health clubs, corporate discounts with gymnasiums, maintenance of on-site fitness equipment or facilities, developing incentive-based physical activity programs would be immensely helpful in encouraging routine exercise and physical fitness in workplace culture.

Higher proportion of people had reduced endurance of upper limb. This is also due to daily lifestyle, which does not require lifting heavy weights. They had good abdominal strength and lower limb endurance. In Nordic questionnaire, significant number of subjects did not complain of knee or back pain in last 7 days or last 1 year. This co-relates well with their higher score in lower limb endurance and abdominal strength. Good endurance of muscles helps in maintaining proper posture and sustaining a particular activity like standing for long hours without fatigue. Abdominal strength gives adequate stability to the back, helps in performing various daily tasks so the subjects did not complain of backache.

## CONCLUSION

The study showed that the lab-workers working in laboratory had abnormal body mass index probably due to sedentary lifestyle, which needs to be corrected immediately. They had average perceived stress score,

reduced cardiovascular endurance and reduced peak expiratory flow rate. Although the staff has good lower limb endurance but they have reduced upper limb endurance. Good abdominal endurance is seen in the staff. Interestingly the staffs have no complaints of significant back pain and knee pain in the last one year.

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**Conflict of Interest:** None

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# A Study on Distribution of Blood Pressure among School Children (10 to 14 Years) in Urban Field Practice Area of a Medical College, E.G. District

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## ABSTRACT

Hypertension is known to be a direct or indirect cause of death globally. The prevalence is expected to increase to 1.56 Billion by 2025. The risk factors for hypertension include Obesity, Family history of Hypertension, and change in dietary habits, decreased physical activity and increase in stress. Early detection of hypertension and its precipitating factors is important if one is to evolve measures so that complications of hypertension can be prevented. Due to the paucity of studies the present study was undertaken with the following objectives.

1. To study socio demographic profile of schoolchildren.
2. To study prevalence of hypertension among school children
3. To correlate Blood Pressure with anthropometric indices.

**Methodology:** It is a School based cross-sectional study conducted in two private Schools to get a sample size of 225 study subjects in the age group of 10 to 14 years. A pre-designed Questionnaire was administered to collect information regarding socio demographic profile, personal food habits; exercises and general examination of the student were done. Blood Pressure, anthropometric measurements were recorded. Analysis was done by spss16.0, coefficient of correlation analysis was applied.

**Results:** The overall prevalence of hypertension among school children (10-14yrs) was 4.88% with systolic hypertension of 3.12 % (n=7) and diastolic hypertension 1.78 % (n=4). In each age group from percentiles 3th to 95th there is a raise in systolic blood pressure was observed. As the age increases there is raise in diastolic blood pressure was observed except at 12yrs age group. There was a positive correlation between height, weight, body mass index, age with systolic blood pressure and diastolic blood pressure.

**Conclusion:** Prevalence of hypertension was more among girls than boys. Age, height, weight and BMI were positively correlated with systolic and diastolic blood pressure. It is therefore necessary to check the hypertension in children regularly.

**Keywords:** Blood Pressure, Systolic, Diastolic, School Children, Obes

## INTRODUCTION

Hypertension is known to be a direct or indirect cause of death globally <sup>1,2</sup>, around one billion adult world population was found to have hypertension in the year 2000 and this is expected to increase to 1.56

Billion by 2025 <sup>3,4</sup>. Findings from previous longitudinal studies of Blood pressure suggests that essential hypertension in adults can be detected in early life. In the developing countries like India the estimated population prevalence of systemic hypertension is 5 to 10% <sup>5</sup>. The risk factors for hypertension include

Obesity, Family history of Hypertension, and change in dietary habits, decreased physical activity and increase in stress<sup>7</sup>. Children with higher BP tend to maintain those levels of BP in adult hood.

Hypertension is a risk factor for ischemic heart disease, thus it is necessary to detect and effectively treat hypertension during child hood and adolescence. The incorporation of blood pressure (BP) measurement into routine Pediatrics examination has lead to the discovery of significant number of children with asymptomatic HT. This tracking phenomenon appears strongest for systolic blood pressure but is also noted in diastolic blood pressure. High blood pressure is a potential risk factor for cardiovascular disease. Thus, one key to cardiovascular disease prevention may be detection of blood pressure pattern during childhood and adolescent. It is, therefore, necessary to study the normal range of blood pressure among children. Thus, early detection of hypertension and its precipitating or aggravating factors is important if one is to evolve measures so that complications of hypertension can be prevented<sup>6</sup>. A considerable work has been done to establish the normal blood pressure variation for 10-14yrs age groups. As per our knowledge, in Rajahmundry, no such study had been reported yet, especially in the age group of 10-14 years. Hence, we conducted a study with the following objectives.

### OBJECTIVES

1. To study socio demographic profile of schoolchildren.
2. To study prevalence of hypertension among school children
3. To correlate Blood Pressure with anthropometric indices.

### METHODOLOGY

**Study Design:** School based cross – sectional study

**Study Setting:** Two private Schools in Urban field practice area of GSL Medical college, Rajahmundry.

### STUDY SAMPLE

Urban field practice area of our college consists of 6 private schools of which 2 schools were selected randomly, and the selection of subjects in the age group of 10-14yrs of these schools was also done randomly study sample i.e. 250 subjects were present

in 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup> and 9<sup>th</sup> standards. Considering 10% exclusion criteria, study sample is 225 subjects.

**Study Period:** 1<sup>st</sup> July to 30<sup>th</sup> Sep 2012(3 months)

**STUDY SUBJECTS:** 225 Subjects between age group of 10 to 14 years who were present during the period of the study.

### Inclusion criteria

All Children between 10 to 14yrs age group who were present during study period.

**Exclusion criteria:** Non-Responsive Children (Physically challenged Children, Absentees, not willing to give consent, chronic illness).

### DATA COLLECTION

After taking consent from the School authorities and from Children the importance of the study was explained to the school management, staff, and teachers. Total of 225 school children in the age range of 10–14 years were examined. The Non-responsive children were not examined. A pre-designed Questionnaire was administered to collect information regarding socio demographic profile, personal food habits, exercises and general examination of the student were done. Blood Pressure, anthropometric measurements were recorded

### STUDY TOOLS

The BP measurement and clinical examination of the children was done during the school hours. BP was measured by standardized sphygmomanometers with appropriate size cuff, covering 2/3rd of the arm. The BP was measured with the child in a sitting position, with the arm at the level of the heart, after a five-minute rest. The cuff inflated to a level at which the distal arterial pulse was palpable. It was then deflated at a rate of 2–3 mm Hg per second. SBP was recorded on hearing the first sound (phase I), while DBP was taken on complete disappearance of Korotkoff sounds (phase V).

Pre hypertension is defined as SBP or DBP between the 90<sup>th</sup> and 95<sup>th</sup> percentile. Adolescents having blood pressure >120/80 mm Hg, but below the 95<sup>th</sup> percentile are also included in this category. HTN is defined as SBP or DBP exceeding the 95<sup>th</sup> percentile for age, gender, and height on at least three separate occasions, 1-3 week apart<sup>5</sup>. If the SBP was higher than



120 mm Hg and the DBP higher than 80 mm Hg, two additional readings were obtained and it was crosschecked by another consultant. The lowest of the three readings were recorded<sup>6</sup>. All the readings were made by the same observer to avoid inter-observer variation.

Anthropometric indices were recorded as per the recommendations. The weight was recorded to the nearest 0.1 kg by weighing scale and the height was noted to the nearest 0.5 cm using a measuring scale. BMI was calculated by the formula: BMI = weight (kg)/ height (m)<sup>2</sup>.

**Ethical Issues**

The Research team won't exert any pressure of any kind on the study group to participate in the study. Written consent was obtained from study subjects. Confidentiality was guaranteed by not writing names on the study tools. Completed sheets were kept securely.

**Study Variables**

Age, sex, occupation of father, socioeconomic status, education, income of father, food habits, exercises, blood pressure, and history of hypertension, diabetes in the family, height and weight.

**Study Analysis**

Analysis was done by spss16.0; coefficient of correlation analysis was applied. Associations between

factors was considered statistically significant at  $p < 0.05$ .

**OBSERVATIONS AND RESULTS**

In the present study out of 225 subjects ,boys were 49.78%(n=112),girls were 50.22%(n=113) with almost 1:1 ratio,22.23%(n=50) were from 5<sup>th</sup> standard,22.23%(n=50) were from 6<sup>th</sup> standard , 21.33%(n=48) from 7<sup>th</sup> standard,17.33%(n=39) from 8<sup>th</sup> standard and 16.88%(n=38) from 9<sup>th</sup> standard. Majority of the study subjects were from business family 35.11% (n=79), followed by agriculture 28% (n=63), employers 18.66% (n=42), others 11.55% (n=26), and professionals were 6.66% (n=15). Regarding education of parents, 33.77% (n=76) were high school graduates followed by intermediate 20.44% (n=46), graduation by 19.11% (n=43), illiterate 8.88% (n=20), post graduation 8.88% (n=20) and primary education by 8.88% (n=20). According to B.G.PRASADS percapita income classification, 67.55 % (n=152) were above RS. 3056 /- income group, followed by 23.11 % (n=52) were between RS.3055 to RS.1528/-, 6.66 % (n=15) were between RS. 1529 to RS.917/- and 2.66% (n=6) were between RS 916 to RS.458/- income group. Regarding family history of diseases, 60% (n=135) parents had hypertension and on treatment, 16.44 % (n=37) with diabetes,3.11% (n=7) with both diabetes and hypertension. Regarding food groups of study subjects, 83.55 % (n=188) were non vegetarians,12%(n=27) vegetarians and 4.44% (n=10) vegetarians + egg consuming subjects

**Table1: Age& Sex Wise Distribution of Hypertension**

Age(yrs)	Boys	Htn	Prevalence(%)	Girls	Htn	Prevalence (%)
10	28	1	3.57	27	2	7.40
11	21	0	0	16	1	6.25
12	12	1	8.33	26	1	3.84
13	21	1	4.76	17	1	5.88
14	30	2	6.66	27	1	3.70
Total	112	5	4.46	113	6	5.30

Among 225 subjects 49.78%(n=112) were boys and 50.22%(n=113)were girls.

Among boys highest prevalence of hypertension was observed in 12yrs(8.33%) and 14yrs age group(6.66%)fallowed by 13yrs(4.76%) and 10yrs(3.57%).overall prevalence of hypertension among boys was 4.46%. Among girls highest prevalence of hypertension was observed in 10yrs

(7.40%), fallowed by 11yrs (6.25%), 13yrs (5.88%) and 12yrs (3.84%) age group. overall prevalence of hypertension among girls was 5.30%. The overall prevalence of hypertension among school children (10-14yrs) was 4.88%with systolic hypertension of 3.12 % (n=7) and diastolic hypertension 1.78 % (n=4).

**Table2: Age & Sex Wise Mean,Standard Deviation and Increments in SBP and DBP in Ascending Order**

AGE	SEX	SBP(MEAN $\pm$ SD)	DBP (MEAN $\pm$ S.D)
10	MALE	96.18 $\pm$ 12.23	69.43 $\pm$ 7.21
	FEMALE	93.04 $\pm$ 14.42	63.19 $\pm$ 7.00
11	MALE	97.90 $\pm$ 8.86	66.43 $\pm$ 7.76
	FEMALE	101.50 $\pm$ 9.13	69.38 $\pm$ 5.50
12	MALE	116.67 $\pm$ 21.74	67.50 $\pm$ 5.12
	FEMALE	106.77 $\pm$ 8.48	68.08 $\pm$ 5.78
13	MALE	109.71 $\pm$ 8.58	69.05 $\pm$ 7.41
	FEMALE	108.24 $\pm$ 7.96	68.12 $\pm$ 3.42
14	MALE	110.47 $\pm$ 11.32	70.07 $\pm$ 5.47
	FEMALE	109.04 $\pm$ 11.25	66.33 $\pm$ 7.93

Table 2: Depicts means, standard deviations and increments in systolic and diastolic blood pressure among boys and girls in ascending order.

Among boys systolic and diastolic blood pressure increased with age, except at 13yrs, where in there was a decline in systolic blood pressure (-6.96).

In girls ,systolic blood pressure and diastolic blood pressure increased with age ,except at 12yrs and 14yrs where in there was a slight decline of diastolic blood pressure(-1.3) at 12yrs and (-1.79) diastolic blood pressure at 14yrs age group.

Among boys systolic blood pressure showed a significant increase at 12yrs age group, in girls at 11yrs spurt was seen.

**Table 3: Age &Sex Wise Distribution Of Anthropometric Indices**

Age In Years	Sex	Height In Meters Mean $\pm$ S.d	Weight In Kgs Mean $\pm$ S.d Bmimean $\pm$ S.d
10	MALE	1.43 $\pm$ 0.09	40.29 $\pm$ 11.74
	FEMALE	1.43 $\pm$ 0.08	37.33 $\pm$ 7.40
11	MALE	1.39 $\pm$ 0.056	38.10 $\pm$ 7.94
	FEMALE	1.45 $\pm$ 0.007	45.44 $\pm$ 13.11
12	MALE	1.47 $\pm$ 0.07	47.00 $\pm$ 9.71
	FEMALE	1.47 $\pm$ 0.06	41.54 $\pm$ 9.08
13	MALE	1.55 $\pm$ 0.07	46.05 $\pm$ 9.79
	FEMALE	1.53 $\pm$ 0.05	49.82 $\pm$ 10.92
14	MALE	1.61 $\pm$ 0.07	48.30 $\pm$ 10.14
	FEMALE	1.56 $\pm$ 0.07	49.48 $\pm$ 8.29

Table 3: Depicts age and sex wise distribution of anthropometric indices, of which as the age increases the mean heights tend to increase in both boys and girls except in boys at 11yrs there is a slight decline in height.

As age increases mean weights tend to increase in

boys and girls except in boys at 13yrs, 14yrs and in girls at 12yrs there is a slight decline in weight.

As age increase mean BMI tend to increase in boys and girls except in boys at 13yrs, 14yrs and in girls 12yrs and 14yrs there is a slight decline in body mass index was observed.

**Table4; Distribution of SBP & DBP by Age in Percentiles of Study Subjects**

Age In Years	No	Mean±S.d(sbp &Dbp)	3	5	10	25	50	75	90	95
10	55	94.64±13.32	75	77	82	86	92	100	108	131
		66.36±7.71	54	56	58	60	68	72	78	78
11	37	99.46±9.03	80	83	87	96	98	103	112	118
		67.70±6.94	50	51	58	63	68	73	76	78
12	38	109.89±14.52	92	93	96	100	109	116	120	128
		67.89±5.52	53	59	60	62	70	72	74	76
13	38	109.05±8.23	88	91	97	106	110	114	122	124
		68.63±5.92	58	59	60	64	68	72	78	80
14	57	109.79±11.21	96	97	100	102	108	115	121	140
		68.30±7.16	53	57	58	64	70	73	78	80

Table 4; depicts percentiles of systolic blood pressure and diastolic blood pressure of study subjects. In each age group from percentiles 3<sup>th</sup> to 95<sup>th</sup> there is a raise in systolic blood pressure and diastolic blood pressure. As the age increases there is raise in diastolic blood pressure except at 10 yrs age group.

**Table 5: Correlation Between Blood Pressure And Anthropometric Indices**

Variables	SBP	DBP
Height	.389*	.123*
Weight	.452*	.225*
Bmi	.305*	.175*
Age	.450*	.107*

\*Correlation Is Significant At The 0.01 Level. (2-tailed).

TABLE 5 ; Depicts that there was a positive correlation between height, weight, body mass index ,age with systolic blood pressure and diastolic blood pressure.

**DISCUSSION**

In the present study prevalence of hypertension was found to be 4.88% with systolic hypertension of 3.12%,diastolic hypertension of 1.78%.prevalence of hypertension among boys was4.46%and in girls 5.30%. Studies conducted by Amar taskande<sup>7</sup> , Chaturvedi et.al reported almost similar prevalence of 5.75%,with 3.25% systolic hypertension and 2.49% diastolic hypertension. But the study conducted by Sarin<sup>8</sup>, Chaturvedi et.al reported only 0.98% prevalence. The reason for low prevalence in this study may be because of use of means and standard deviations for the assessment of hypertension rather than using more acceptable criterion of 95<sup>th</sup> percentiles of blood pressure values. According to Anisam.M. Durrani <sup>9</sup>prevalence of hypertension was 9.37%.the reason for high prevalence may be due to the author studied among

12-16yrs age group in which hypertension contribution by 15<sup>th</sup> and 16<sup>th</sup> yrs age group was 17% and 15% respectively and author taken mean of the three readings for assessing hypertension and then calculated percentiles. In the present study, the systolic blood pressure and diastolic blood pressure showed a positive correlation with age, height, weight and body mass index which is consistent with the studies conducted by AnisanM.Durrani etal, NaimNur<sup>10</sup> etal and Amar taskande etal.

**CONCLUSIONS**

The pattern of increase in systolic blood pressure and diastolic blood pressure values were different between males and females and among different age groups. Prevalence of hypertension was more among girls than boys. Age, height, weight and body mass index were positively correlated with systolic and diastolic blood pressure. It is therefore necessary to check the hypertension in children regularly.

**SUMMARY**

A study was conducted on hypertension among school children in urban field practice area of E.G. district.225 subjects were selected from 5<sup>th</sup>, 6<sup>th</sup>, 7<sup>th</sup>,8<sup>th</sup> and 9<sup>th</sup> standards, out of which 49.78% were boys and 50.22% were girls with almost boys to girls ratio of 1:1.Majority of study subjects were from business family and were above RS.3056/- per capita income group and 60% of study subjects parents were having hypertension,88.55% of study subjects were non-vegetarians. The prevalence of hypertension was 4.48%, with 3.12% systolic hypertension and 1.78% diastolic hypertension. Girls were having highest prevalence of hypertension than boys.Age, height, weight and body mass index were positively correlated with systolic and diastolic hypertension.

### RECOMMENDATIONS

1. Hypertension checking must be made compulsory in schools.
2. Teachers must be trained for recording blood pressure and reporting to medical authority.
3. School health services must be improved.
4. Sports hour in schools must be initiated.

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**Conflict of Interest:** We declare that there is no conflict of interest

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# To Compare the Intra Ocular Pressure Reduction between SICS and Trabeculectomy with and without the use of Intra Operative Mitomycin-C

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## ABSTRACT

**Background:** To compare the Intra ocular pressure reduction between Small Incision Cataract Surgery and Trabeculectomy with and without the use of intra operative Mitomycin-C.

**Material and Method:** A Prospective Randomized study was performed on patients attending Ophthalmology OPD at Navodaya Medical College Hospital, Raichur between August 2009 to September 2011. A total of 42 eyes of 38 patients which included 20 males and 18 females in the age group of 40-65 years were divided into two groups. Group 1 included 21 eyes (with intra-operative MMC), Group 2 included 21 eyes (without intra-operative MMC). Patients with primary open angle glaucoma and senile cataract were included in the study. All patients were on anti-glaucoma medication of more than 2 months duration. Pre-operatively all patients underwent detailed ocular examination which included Visual Acuity, Perkins tonometry, Gonioscopy, Perimetry and Biometry. And post-operatively they were followed up on 1st day, 1st week, 1, 3, 6 months and last follow up was done at 1 year. Successful control of Intraocular pressure (IOP) was defined as achieving IOP less than 21 mmHg without medication.

**Results:** No significant difference in age, sex, laterality, pre-operative IOP were noted between the two groups. Mean pre-operative Intra ocular pressure in group 1 ( $22.285 \pm 2.028$ ) mmHg and in group 2 ( $21.8095 \pm 2.442$ ) mmHg. Post-operatively mean Intra ocular pressure decreased to  $14.095 \pm 2.406$  mmHg in group 1 and in group 2 showed mean reduction of Intra ocular pressure of  $17.333 \pm 3.367$  mmHg after a period of 12 months follow up. Significant reduction in IOP was noted in both the groups ( $p < 0.0001$ ). Group 1 showed greater reduction in IOP ( $p = 0.0009$ ) and better stability as compared to Group 2. 18 eyes (85.71%) of group 1 showed best corrected visual acuity  $\geq 6/12$ . 19 eyes (90.4%) in group 2 showed best corrected visual acuity  $\geq 6/12$ . No significant difference in post-operative complication was noted expect for the Encapsulated Bleb.

**Conclusion:** Use of intra-operative Mitomycin-C in combined small incision cataract surgery and trabeculectomy showed a greater reduction of intra ocular pressure and better stability after 1 year of follow up.

**Keywords:** Small Incision Cataract Surgery (SICS), Trabeculectomy, Mitomycin-C (MMC)

## INTRODUCTION

Cataract and Glaucoma are the most common causes of Visual impairment worldwide.

Co-existing cataract and Glaucoma is a common problem in elderly population.<sup>1</sup> Ever since Spaeth and

Sivalingam first described combined surgery for Glaucoma and Cataract,<sup>2</sup> the surgical management of these co existing diseases has remained a subject of debate.<sup>3,4</sup> Combining cataract extraction with a filtering procedure is accepted as a suitable surgical procedure for co-existing Glaucoma and Cataract.<sup>5,6</sup>

The introduction of Mitomycin-C for Glaucoma surgery in the early 1990s increase the success rate of Trabeculectomy, although more frequent complications have been reported.<sup>7</sup> Trabeculectomy with adjunctive Mitomycin-C is the most widely accepted filtering surgery for surgical treatment of Glaucoma.<sup>8</sup>

## METHODOLOGY

A prospective randomized study was performed on patients attending ophthalmology OPD at Navodaya Medical college Hospital, Raichur between AUG 2009 to SEPT 2011. A total of 42 eyes of 38 patients which included 20 males and 18 females in the age group of 40-65 years were included in the study. All cases having primary open angle glaucoma and cataract were included in the study. All patients were on anti-glaucoma medication for more than 2 months.

### STUDY DESIGN:

All patients underwent detailed ocular examination which included Visual Acuity, Slit lamp biomicroscopy, Perkins tonometry, Gonioscopy, Perimetry, Keratometry and Biometry.

All patients were divided into 2 groups

Group 1 (n=21): Patients who underwent SICS with Trabeculectomy with intra-operative Mitomycin-C.

Group 2 (n=21): Patients who underwent SICS with Trabeculectomy.

### Operative Procedure

All surgeries were performed by single surgeon. Fornix based conjunctival flap was made at limbus 10 '0' clock to 2 '0' clock. Tenon capsule was cleared from the sclera. Wet field cautery was done to maintain hemostasis. All patients in Group 1 received Mitomycin-C in the dose of 0.2mg/ml was applied under the conjunctival flap over the scleral bed for the duration of 2mins with a sponge. This was followed by copious irrigation of the site with ringer lactate for 5mins. A frown shaped scleral incision was taken 2mm behind the superior limbus. Sclerocorneal tunnel was made with extension of 1mm into clear cornea. A continuous curvilinear capsulorhexis about 6mm in size was made. Hydrodissection was performed and nucleus was delivered. Cortical matter was aspirated and PCIOL was implanted in the capsular bag. Sclerotomy was performed by excising a block of

trabecular tissue from the posterior lip of the scleral tunnel using a Kelly's descemet's membrane punch. Peripheral iridectomy was performed. Conjunctival flap was closed with 8-0 silk suture in water tight manner. The patency of trabeculectomy was tested by injecting ringer lactate through side port. Same procedure was followed in patients of Group 2 expect the intra-operative use of adjuvant Mitomycin-C. Subconjunctival Gentamycin 0.5ml and Dexamethasone 0.4% in 0.5ml was injected into the inferior fornix.

### Statistical Analysis

Post-operatively all eyes underwent detailed examination which included Uncorrected Visual Acuity (UCVA), Best Corrected Visual Acuity (BCVA), Intra ocular pressure measurement, optic disc changes, perimetry, and complication. IOP measurements were performed 1 day before surgeries were considered as baseline IOP. The surgical success of glaucoma was defined as IOP less than 21mmHg without anti-glaucoma medication. The surgical success of cataract surgery was based on achieving Visual Acuity 6/12 or better. Post-operative follow up was done on immediate 1<sup>st</sup> day, 1<sup>st</sup> week, 1, 3, 6 months and last follow up was done at 1 year. Data was analyzed using Paired student 't' test and unpaired student 't' test. P value < 0.001 was considered significant.

## RESULTS

42 eyes of 38 patients which included 20 males and 18 females who underwent the surgical procedure between August 2009 to September 2011. No significant difference in age, sex, laterality, pre-operative IOP were noted between the 2 groups. All patients in both the groups were on anti-glaucoma medication pre-operatively. Below table shows the mean, SD and P value of IOP in both the groups Pre-operatively and Post-operatively.

Table 1

Groups	IOP (Mean + SD)		P value
	Pre-operative	Post-operative	
Group1	22.285±2.028	14.095±2.406	P<0.0001
Group2	21.809±2.442	17.333±3.367	P<0.0001

Reduction of IOP in Group 1 were intra-operative Mitomycin-C was used showed better reduction of IOP with greater stability after 1 year as compared to Group 2.

**Table 2**

Groups	Post-operative IOP (mean SD)	P Value
Group 1	14.095±2.406	0.0009
Group 2	17.333±	

2 patients in Group 1 showed IOP more than 21mmHg (9.52%). 4 patients in Group 2 showed IOP more than 21mmHG (19.04%). IOP was brought under control with anti-glaucoma medication.

UCVA and BCVA improved significantly for both groups following surgery and there were no statistical significant difference in the visual function in both the groups.

18 eyes (85.71%) of group 1 patients showed best corrected visual acuity ≥ 6/12.

19 eyes (90.4%) of group 2 patients showed best corrected visual acuity ≥ 6/12.

Below table shows post-operative complication in both the groups after surgery.

**Table 3**

Complication	Group 1	Group 2
Encapsulated Bleb	2	4
Shallow AC	4	3
Hyphaema	2	1
Bleb Infiltrate	1	0
Early Hypotony	1	1
Choroidal Detachment	0	0
Posterior capsular opacity	3	3
Cystoid macular oedema	1	0

**DISCUSSION**

Numerous modification of combined cataract and glaucoma surgery reported.<sup>5</sup> The results of our study can be compared to the study conducted by Saurabh Mittal, Apoorva Mittal, Rengeppa, RamaKrishnan,<sup>9</sup> which shows

**Table 4**

Category	No. of eyes	IOP(mean SD) at 1 year	Visual Acuity BCVA > 6/12	P value
Pre-operative	55	19.89(7.47)	-	0.420
Post-operative	55	13.08(3.8)	42 eyes(76.4%)	<0.001

In this study the anti-glaucoma medication used increased from 0.07 (SD 0.26) after 6 months to 0.56 (SD 0.65) at the end of 5 year follow up.

Post-operative complication.<sup>9</sup>

**Table 5**

Complication	SICS with Trabeculectomy with MMC(%)
Fibrinous membrane	3(5.5)
Tight bleb	3 (5.5)
Failed bleb	2 (3.6)
Bleb infiltrate	1(1.8)
Choroidal detachment	1(1.8)
Cystoid macular oedema	1(1.8)

In another study conducted by Neumann R, Zalish M, Olive M,<sup>10</sup> were IOP was measured after SICS and Trabeculectomy. Which shows mean reduction in IOP mmHg was 6.27±0.97 and mean improvement in visual acuity (units) was 3.13±0.49 with a mean follow up of 10 months. Most common post-operative complication observed in this study was shallow AC and fibrin formation.

**CONCLUSION**

Though both the groups showed significant reduction in IOP. Use of intra-operative Mitomycin-C in combined small incision cataract surgery and trabeculectomy showed a greater reduction of intra ocular pressure and better stability as show by lesser use of anti-glaucoma medication after 1 year of follow up. And both the groups achieved good visual acuity.

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**Conflict of Interest:** None

**Sources of Support:** None

**Ethical Clearance** Obtained

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# Pre-diabetes among Medical students in a Medical College, Andhra Pradesh

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## ABSTRACT

**Introduction:** Diabetes affects quality of life and has major public health impact. It was observed that Indians have a younger age of onset of diabetes compared to other ethnic groups. The children with Type-2 Diabetes are at risk of mortality and morbidity. An increase in the prevalence of Type-2 diabetes in the younger age group has been noted from the epidemiological studies. Early identification of children with Pre-diabetes aid in appropriate management there by reducing incidence and related cardiovascular and micro-vascular complications. Due to the paucity of studies on the prevalence of Pre-diabetes and Diabetes among Medical students, the present study was planned to assess the overall prevalence of Pre diabetes and Diabetes among Medical students aged >20 years, to assess the prevalence of pre-diabetes among obese students and to know the association of risk factors and pre diabetes.

**Methodology:** This is a cross sectional study done among Medical students aged >20years. Out of 300 randomly selected students 224 have given consent to participate in the study .They were tested for Impaired Fasting Glucose (IGT) and Impaired Glucose Tolerance (IGT) along with their anthropometric measurements. The data for study variables like family history of diabetes, fast food consumption, and physical activity were collected by using pre-tested schedule.

**Results:** Overall Prevalence of Pre diabetes among study group was 8.9%. Among them about 14.3% are males and 5.7% are females. As per Body mass index, Prevalence of pre diabetes among normal individuals was 1.6%, 13.3% among pre obese and 28% among obese individuals. Average fasting blood sugar level was 89.6 mg/ deal with a standard deviation of 7mg/ deal and average post-prandial blood sugar level was 102.71mg/ deal with a standard deviation of 16.58mg/ dl. Prevalence of overweight among participants was 23.2% and obesity was 6.3%. A Statistically significant association was observed between Body mass index and pre diabetes and pre-diabetes was associated with a family history of diabetes and waist circumference.

**Conclusions & Recommendations:** Screening for diabetes should be done routinely for students at high risk of obesity, positive family history of diabetes, fast food consumption and physical inactivity. We also recommend incorporation of known risk factors for non-communicable diseases like diabetes, hypertension etc. into the medical examination schedule for all the students being admitted into the medical colleges and there should be regular monitoring of the high risk students at least for once in a year.

**Keywords:** Pre- Diabetes, Young Age, Medical Students, Risk Factors.

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## INTRODUCTION

Diseases such as Diabetes, Cancers, Depression and Heart diseases are replacing infectious diseases and malnutrition as the leading causes of disability and premature death<sup>1</sup>. World Health Organization

classifies Diabetes as the third leading cause of premature mortality globally. Diabetes affects quality of life and has major public health impact. In this open economy era there is a dramatic transition in society, families, eating habits and lifestyles. Govt of India introduced a National Program for prevention and control of Cancer, Diabetes, Cardiovascular diseases, and Stroke (2008) with the objective of health promotion, health education and early detection of persons with high risk of developing diseases through opportunistic screening<sup>2</sup>.

A variety of factors, including diet, genetic predisposition, physical activities, physiological and behavioral factors, are implicated as contributing factors to obesity<sup>3,4</sup>. Previously a disease of the middle-aged and elderly, Type-2 diabetes has recently escalated in all age groups and is now being identified in younger age groups, including adolescents and children, especially in high-risk populations. It is one of the leading chronic diseases of childhood and adolescence<sup>5, 6</sup>. It has been documented that Indians have a younger age of onset of diabetes compared to other ethnic groups. The children with Type-2 Diabetes are at risk of mortality and morbidity. An increase in the prevalence of Type 2 diabetes in the younger age group has been noted from the epidemiological studies<sup>7</sup>. In the last 20 years, the incidence of diabetes has markedly increased. Among the newly diagnosed cases, 1/3 were diagnosed among the adolescent age group. The signs and symptoms of diabetes appear late in the disease process. The clinical manifestations of Type-2 are preceded by an asymptomatic stage called preclinical or pre diabetes<sup>8</sup>.

The Glucose tolerance test can help uncover glucose intolerance. Impaired fasting glucose and Impaired glucose tolerance are associated with increased risk of conversion to overt diabetes as compared to the general population. Ramachandran et al (1989) reported a high prevalence of Impaired glucose tolerance in urban (8.7%) and rural (7.8%) areas<sup>9</sup>. National Urban Diabetes Survey (NUDS-2001) reported 14% prevalence of pre diabetes in six metropolitan areas<sup>10</sup>. ICMR-INDIAB study (2011) reported a prevalence of 4.4%-10.9% of pre-diabetes in four different states<sup>11</sup>. Early identification of children with Pre diabetes aid in appropriate management there by reducing incidence and related cardiovascular and micro-vascular complications. Medical students of today will be the health care providers of tomorrow. Their perceptions regarding prevention of diseases will

strongly motivate the future clinical practice<sup>12</sup>. Due to the paucity of studies on the prevalence of Pre diabetes and Diabetes among Medical students, the present study was planned with the following objectives.

### OBJECTIVES

- To assess the overall prevalence of Pre diabetes and Diabetes among Medical students (>20 years).
- To assess the prevalence of pre diabetes among obese students
- To know the association of risk factors with pre diabetes.

### METHODOLOGY

This is a cross-sectional study involving Medical students aged  $\geq 20$  years and was conducted at the GSL Medical College, Andhra Pradesh. An institutional ethics committee of this college has given the approval for the study. A Schedule to collect appropriate data was devised and pre-tested. A team comprising of Medical students and PGs of Community Medicine Dept were given training to collect uniform data from the subjects. Screening camp was conducted. About 300 students attended, in them 224 students gave their consent to participate in the study. Known Diabetics were excluded from the study. Informed Consent was taken from the study participants after explaining the aims and objectives of the study. American Diabetic Association (ADA) criteria have been taken for diagnosis of Diabetes and Pre diabetes. Blood samples were collected after overnight, fasting capillary glucose was estimated using one touch ultra glucometer (Johnson & Johnson). Oral glucose 82.5 gms equivalent to 75 gms of anhydrous glucose was given to estimate 2 hours Capillary blood glucose. Pre diabetes was considered if the fasting blood sugar level was between 100mg/dl-125mg/dl and 2-hour blood glucose is between 140-199mg/dl. Fasting blood sugar  $>126$ mg/dl was taken as Diabetes and  $<100$ mg/dl was considered as normal. 2 hour blood glucose  $>200$ mg/dl was taken as diabetic and less than 140 was taken as normal<sup>13</sup>. Information regarding age was obtained from college records and was recorded in completing years. History of consumption of fast food and soft drink at least once in a week was taken as fast food consumption. A history of playing outdoor games for one hour per day thrice a week was considered as sports<sup>14</sup>. History of Diabetes in any one of the parents was as positive

family history. Waist circumference of > 90 cms for males and > 80 cms for females as a risk factor was included in the study<sup>22</sup>. The waist circumference was measured as per the WHO STEPS protocol, which instructs that the measurement be made at the approximate midpoint between the lower margin of the last palpable rib and the top of the iliac crest parallel to the floor using stretch resistant tape<sup>23</sup>.

Heights were measured with a calibrated speedometer to the nearest cm. Weights were measured using calibrated Digital weighing machine to the nearest 0.5kg. Waist circumference was

measured with non-stretchable measuring tape to the nearest cm. Efforts were taken to minimize the intra observers and inter observer variation. Body mass index was calculated by using the formula weight in kg divided by height in meter<sup>2</sup>. Body mass index < 18.4 kg/m<sup>2</sup> was treated as underweight, 18.5-23.4 kg/m<sup>2</sup> as normal, 23.5-24.9 kg/m<sup>2</sup> as overweight and >25 kg/m<sup>2</sup> treated as obese<sup>15</sup>. Results were analyzed by using SPSS version 16, Chi square test was utilized to study the association between the variables and p value <0.05 was considered as significant for all statistical comparisons.

## RESULTS

Table 1 Distribution of Risk Factors

Risk factor	Classification	(%)
Sex	Male (84)	(37.5)
	Female (140)	(62.5)
Body mass index	Under Weight (20)	(8.9)
	Normal (124)	(55.5)
	Pre obese (30)	(13.5)
	Obesity (50)	(22.5)
Waist circumference at risk of pre diabetes	Male (24)	(10.5)
	Female (94)	(42)
	Nil (106)	(47.5)
Family history of Diabetes	Yes (94)	(42)
	No (130)	(58)
Fast food consumption	Yes (154)	(68.8)
	No (70)	(31.2)

Table-1 depicts that out of total 224 medical students participated in the study 84 (37.5%) were males and 140 (62.5%) were females. About 8.9% were underweight, 55.5% were in normal range, 13.5% were Pre-obese and 22.5% were obese. High waist circumference was observed among 24 male and 94

female students. About 42% of participants were having a family history of diabetes and about 69% participants were having a history of fast food consumption. Only 76 (33.9%) students were having an active physical life.

Table 2: Prevalence of Pre-diabetes Among Risk Groups

Risk factor	Classification	Pre diabetes	Prevalence (%)
SEX	Male (84)	12	14.28
	Female (140)	8	5.71
Body mass index	Under Weight (20)	Nil	Nil
	Normal (124)	2	1.61
	Pre-obese (30)	4	13.33
	Obesity (50)	14	28
Waist Circumference at risk	>90 cms Male (24)	6	25
	<90cms Male (60)	6	10
	>80cms Female (94)	6	6.38
	<80 cms Female (46)	2	4.34

**Table 2: Prevalence of Pre-diabetes Among Risk Groups(Contd.)**

Risk factor	Classification	Pre diabetes	Prevalence (%)
Family History of Diabetes	Yes (94)	10	10.63
	No (130)	10	7.69
Sports	Yes (76)	8	10.52
	No (148)	12	8.10
Fast food consumption	Yes (158)	16	10.38
	No (70)	4	5.71

Table-2 depicts that Prevalence of pre diabetes among students was 8.92% with a Prevalence of 14.28% among males and 5.71% among females. Prevalence of pre diabetes among normal students was 1.61%, 13.33% among pre obese and 28% among obese. Prevalence of overweight among participants was 23.21% and obesity was 6.25%. Pre diabetes among male students with waist circumference >90cms was 25% and <90cms was 10%. Pre-diabetes among female students with waist circumference>80cms was 6.38% and with<80cms was 4.34%. Pre diabetes among students with a family history of diabetes was 10.63% and without family history was 7.69%. Pre diabetes with habit of fast food consumption was 10.39% and without that is only 5.71%

**Table 3: Association between Prediabetes and Risk Factors**

Risk factors	p value	Interpretation
SEX vs IFG	p>0.05	Not significant
IGT	p<0.05	Significant
BMI vs IFG	p<0.01	Highly significant
IGT	p<0.05	Significant
HOD vs IFG	p>0.05	Not significant
IGT	p<0.05	Not significant
FFC vs IFG	p<0.05	Not significant
IGT	p>0.05	Not significant
WC vs HOD of Males	p>0.05	Not significant
HOD of Females	p<0.05	Significant

Table-3 depicts that the statistically significant association was observed between Body mass index and pre-diabetes. Family histories of diabetes and waist circumference were not shown a significant association with pre-diabetes. No significant association was observed with fast food consumption, sports and pre-diabetes. Average fasting blood sugar levels are 89.6 mg/dl with a standard deviation of 7mg/dl and average postprandial blood sugar levels are 102.71mg/dl with a standard deviation of 16.58mg/dl.

## DISCUSSION

Increasing age increases the risk. Most cases are detected during middle age. In India 10 years age specific prevalence of diabetes was higher than Japan and china shown by decode study<sup>16</sup>. These medical students are future doctors and are expected to treat patients. They also serve as promoters and good role models for healthy lifestyles in their community. It is therefore important to identify the gaps in knowledge

and practice in the curriculum of this medical college to address this issue. Physical activity of doctors and medical students is not only important from a personal point of view but it also affects their counseling of patients. It has been shown that doctors who act on the advice they give themselves provide better counseling and motivation of their patients to adopt such health advice<sup>17</sup>. The attitude and behavior of medical students influence their manner and approach to the practice of medicine in the future<sup>18</sup>. Physical exercise did seem to play a discriminatory role between normal students and the pre-diabetic students in the present study. The level of involvement of students in physical exercise is low (33.92%) as like reported in other universities<sup>19</sup>.

Prevalence of pre-diabetes among Medical students in this study was 8.92% and is coinciding with a prevalence of Impaired glucose tolerance 10.7% among young physicians of India as per the study done by Ramachandran et al<sup>20</sup>. Prevalence of obesity was 22%, which was very less as compared to 55% among young

physicians as per a study done by Ramachandran et al, which might be because our study was done among too young group<sup>20</sup>. Absence of physical activity was very high 66% as compared to 38% as per a similar study done among medical students in Pakistan<sup>21</sup>. More females were covered in the study as compared to males because of the availability of more female students in the medical college. There is more risk of pre-diabetes among subjects consuming fast foods and soft drinks. Pre-diabetes was also more prevalent among subjects with adverse anthropometric measurements. Limitation of the study was that capillary blood glucose was tested for estimating blood sugar levels in the place of venous plasma glucose.

### CONCLUSIONS & RECOMMENDATIONS

Since Indians are a high risk ethnic group we recommend that screening for diabetes should be routinely done for students at high risk such as obesity, positive family history of diabetes, who frequently consume fast foods and with physical inactivity. It is recommended that students have to increase their physical exercise to at least three times a week and to reduce consumption of soft drinks. There is a need to improve the curriculum regarding nutritional intake and its impact on body weight and health. We recommend incorporation of known risk factors like Diabetes, Hypertension etc. into the medical examination schedule for all the students being admitted into the medical colleges. There should be regular monitoring of high risk students at least once in a year

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# A Study on Morbidity Pattern, Treatment Seeking Behavior and Healthcare Expenditure among Urban Poor of Danapur Slums of Patna, India

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## ABSTRACT

**Objective:** To determine the morbidity pattern, treatment seeking behavior and health care expenditure among urban poor.

**Method:** A cross-sectional household survey was carried out in four selected slums in Danapur, Patna Bihar India. The analysis was based on self-reported illness episodes, place of treatment and their costs.

**Results:** The morbidity pattern showed cough, cold, diarrhea and diabetes as the most prevalent illnesses. The burden of acute illnesses was higher (48%) as compared to chronic illnesses (42%). Sixty-eight percent household seeks treatment from the private health care providers as they were major healthcare providers in all types of illnesses. The share of household income spent on health care in the last three month was 23.28%.

**Conclusion:** Health care expenditure will inevitably increase in the next decade in India. This conclusion is based on the observation that the chronic illnesses, prevalent, mainly among the adults and elderly, were much costlier, coupled with demographic transition.

**Keywords:** Morbidity, Health Expenditures, Slums; Danapur-Patna, India

## INTRODUCTION

Urbanization is rapidly spreading across the developing countries. The existence of slums is an indication of poverty and urbanization. Approximately, 25% of Indian poor population currently lives in slums, which often lack even the most basic health infrastructure amenities<sup>1</sup>. A significant population of Patna resides in slums and squatters where health care delivery is not in place.

In India approximately 70% of the healthcare expenditure is borne by households<sup>2</sup> and is mainly delivered by private providers<sup>3</sup> and largely funded through out of pocket spending<sup>4</sup>. Out-of-pocket medical costs alone push 2.2% of the population below the poverty line in one-year<sup>5</sup>. There is very little literature on the cost of other components of healthcare, and on the financial exposure related to

them. It was observed that there was no comprehensive study to understand the health need of slums<sup>6</sup>. The present study attempts to estimate morbidity pattern, treatment seeking behavior and the health care expenses with reference to demographic and socio-economic perspectives of the slum population in Danapur, Patna India.

## MATERIAL AND METHOD

This study was a cross-sectional population-based survey conducted in the slums listed by Danapur Nizamat Nagar Parishad (DNNP) in Patna, Bihar. A list of 42 slum area was obtained from the DNNP. By simple random sampling, four slums were selected and every household in each of the four selected slums were included in the study. The study was conducted between December 2009 and January 2010.

A structured pre-tested schedule was used to collect the data through the in-person interviews with the head of the household. The respondents were asked to describe, in their own words, what kind of illness occurred in the last three months, where they seek treatment and how much, they spend for each illness. The illnesses are not necessarily diagnosed sometimes they are reported symptoms only.

The expenses were categorized into direct formal cost, informal cost, and indirect cost<sup>7</sup>. The direct formal costs included cost on allopathic consultations, expenditure on prescribed allopathic drugs, diagnostic test, dietary change, physiotherapy, rehabilitation, and hospitalizations. Informal costs included expenditure on traditional medicine consultations and drugs and over the counter (OTC) drugs whereas indirect costs include wage loss of the ill and of the care-giver, time spent and transportation costs.

The replies were analyzed and sorted by a researcher into four types: acute illnesses, chronic illnesses, injuries and undetermined. Injuries included self reported intentional and unintentional injuries whereas undetermined are any cases, which could not

be classified with certainty were included in this category; physiological conditions like pregnancy come under this category.

The data was analyzed using Microsoft Excel and SPSS.

## RESULTS

A total of 132 households comprising of 1121 individual's information were included in the study. The average family size was 8.49 persons per household. The proportion of males was 52.0%, and female was 48.0%. The sex ratio of the study population was 936 females per 1000 males. Significant proportion (43%) of the population was of the age group 15-39 years. The mean age of the population was 22.5 years (SD=15.8 years; median=20 years). The share of elderly population was 3.0 percent.

The proportion of illiterate was 34.5 and 45.3 for males and females respectively. Table 1 shows the socio-demographic characteristics of the sample population.

**Table 1. Socio demographic characteristics (n=1121)**

Variable	Male(n=579)	Female(n=542)	Total (%)
<b>Marital status</b>			
Married	254(43.8)	301(55.5)	555(49.5)
Single	87(15.0)	34(6.2)	121(10.7)
Widowed	21(3.6)	28(5.1)	49(4.3)
Not applicable	217(37.4)	180(33.2)	397(35.4)
<b>Educational qualification</b>			
Illiterate	200(34.5)	246(45.3)	446(39.7)
Primary (1-4)	123(21.2)	74(13.6)	197(17.5)
Middle (5-9)	109(18.8)	96(17.7)	205(18.2)
SSC, HSC	60(10.3)	37(6.8)	97(8.6)
Higher	16(2.7)	14(2.5)	30(2.6)
Not Applicable	71(12.2)	75(13.8)	146(13.0)
<b>Occupation</b>			
Daily wages	190(32.8)	17(3.1)	207(18.4)
Paid employee	16(2.7)	6(1.1)	22(1.9)
Business	85(14.6)	4(0.7)	89(7.9)
Student	131(22.6)	89(16.4)	220(19.6)
Housewife	-	265(48.8)	265(23.6)
Not working	49(8.4)	44(8.8)	93(8.2)
Not applicable	109(18.8)	117(21.5)	226(20.1)

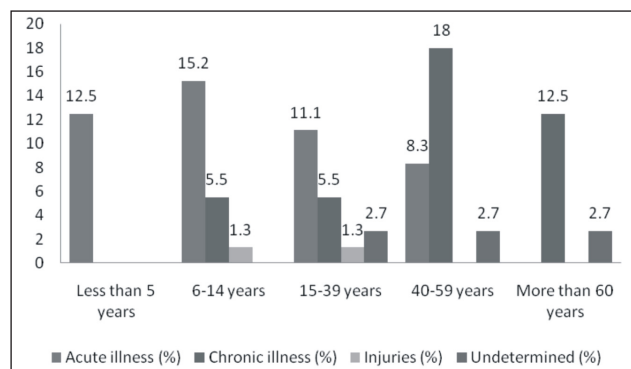
### Morbidity Pattern

People from 52 households (39%) reported at least one illness episode in the last three months recall

period, and six individuals reported more than one illness. The total number of illness episodes was 73.



It was seen that the proportion of acute illness (cough cold and fever 16.6% and diarrhea 12.5%) was higher than chronic illness (diabetes 11.1%).



**Graph 1 Distribution of illness categories by age.**

Graph 1, shows the distribution of illness categorized by age. Majorities of the ill person were of the middle age group category 40-59 years (29.8%) followed by the adolescents (22.3%) and younger age group (22.3%). It was also found that the proportion of sickness was more in female (53.7%) than male (46.2%).

**Treatment seeking behavior**

Private healthcare providers were approached by 68% of the households for treatment. Only 18% utilized

the government health care facility, remaining 11% used self-medication or the advice of pharmacist and 3% used charitable institutions for treatment. Those with acute illness (n=35), 28(80%) approached the private healthcare provider, 2(6%) government facilities and 5(14%) used self-medication for treatment. Similar trend was seen among those suffering from chronic illness (n=31), 20(65%) approached private healthcare providers and 11(35%) went to government facility. All injury cases (n=2) were taken to the private health care providers.

**Healthcare expenditure (Monetary)**

In the present study, the average household income per month was Rs 3,390.00. The average per capita income was Rs 370.00 and share of household income spent on health care in the last three months was approximately one-fourth of the total household expenses (23%). Table 2, shows the distribution of the total expenditure on health by socio-demographic variables. The median expenditure on health care amounted to INR 750 over the last three months in the household. It was found that there was no difference between the total expenditure and the selected variable, but it was noted that expenditure on female was less than the males; expenditure was more on acute illness, and most of the expenditure was at private healthcare providers.

**Table 2: Distribution of total expenditure on health by socio-demographic variables**

Variables	Expenses Less than INR 750(%)	Expenses More than INR 750(%)	Total (%)
<b>Sex(n=73)</b>			
Male	18(45.0)	17(51.5)	35(47.9)
Female	22(55.0)	16(48.4)	38(52.1)
<b>Type of illness(n=73)</b>			
Acute	21(52.5)	14(42.4)	35(47.9)
Chronic	19(47.5)	12(36.3)	31(42.4)
Injuries	—	02(6.06)	02(2.7)
Undetermined	—	05(15.1)	05(6.8)
<b>Place of treatment(n=73)</b>			
Private	22(55.0)	31(93.3)	53(72.6)
Government	13(32.5)	—	13(17.8)
Charitable	—	2(6.6)	02(2.7)
Self medication	5(12.5)	—	05(6.8)
Total	40	33	73

\*Rs 750 is median of total healthcare expenditure

The direct formal cost accounted for 97 percent of the total cost followed by indirect costs (1.5%) and lastly informal costs (1.2%). Table 3 shows the

distribution of direct formal cost distributed by illness categories.

**Table 3: Distribution of direct formal cost by illness categories**

Variable	Acute	Chronic	Injuries	Undetermined	Total
<b>Consultation(n=64)</b>					
Less than 50	3(11.5)	15(50.0)	—	2(33.3)	20(31%)
51-150	21(80.7)	13(43.0)	2(100.0)	3(50.0)	39(61%)
More than 150	2(7.6)	2(6.6)	—	1 (16.6)	5(8%)
Total	26	30	2	6	64
<b>Prescribed drugs(n=62)</b>					
Less than 500	12(48.0)	18(62.0)	1(50.0)	3(50.0)	34(55)
501-1000	6(24.0)	5(17.2)	1(50.0)	2(33.3)	14(22)
1001-1500	7(28)	6(20.5)	—	1(16.6)	14(22)
Total	25	29	2	6	62
<b>Diagnostic test(n=52)</b>					
Less than 200	13(68.4)	18(69.2)	1(50.0)	2(40.0)	34
201-500	4(21.05)	7(26.9)	1(50.0)	2(40.0)	14
More than 500	2(10.52)	1(3.8)	—	1(20.0)	4
Total	19	26	2	5	52

All values are calculated in INR

It is evident that 39(61%) medical consultations (n=64) were between Rs 51 to Rs 150 and 21(33%) of total medical consultations were for acute illness only. For the expenditure on prescribed drugs (n=62), 34(55%) spent less than Rs 500 and 18(29%) of the total expenditure on prescription drug was on chronic illness only. In the category of diagnostic test (n=52), 34(65%) spent less than Rs 200 and 18(35%) of the total expenditure on the diagnostic test was for chronic illnesses alone.

#### Distribution of informal cost

The median for informal cost was INR 150. Total number of individuals who spent on informal cost was 9 (4-males; 5-females). The expenditure was divided into two classes viz expenses more than Rs 150 and

expenses less than Rs 150. It was found that among those who spent more than Rs 150 (n=4), there was no gender difference, all 4(100%) spent it for acute illnesses. Those who spent less than Rs150 (n=5), 3(60%) were females, and 4(80%) spent on acute illnesses.

#### Distribution of Indirect cost

In the present study, the median transportation cost was Rs 25. Table 4, shows the distribution of cost by selected variables. It was found among those who spent less than Rs25 (n=21) majority were males, with chronic illness and who went to private healthcare providers. Similarly, among those who spent more than Rs25 (n=19), majorities were females, with acute illness, who went to the private healthcare provider.

**Table 4: Distribution of Indirect Expenses by Sex, Type of illness and place of treatment**

Variable	Expenses Less than INR 25	Expenses More than INR 25	Total
<b>Sex(n=40)</b>			
Male	11(52.3)	09(47.3)	20(50.0)
Female	10(47.6)	10(52.6)	20(50.0)
<b>Type of illness(n=40)</b>			
Acute	7(33.3)	10(52.6)	17(42.5)
Chronic	11(52.3)	8(42.1)	19(47.5)
Injuries & others	3(14.2)	1(5.2)	04(10)
<b>Place of treatment(n=40)</b>			
Private	12(57.1)	17(89.4)	29(72.5)
Government	8(38.09)	1(5.2)	09(22.5)
Charitable	1(4.7)	1(5.2)	02(5.0)
Total	21	19	40

### Healthcare Expenditure (Time spent)

It is seen in the present study, time spent including in treatment of chronic illnesses was 3 to 4 hours by 91% of patients. Time spent for undetermined illnesses was more than 4 hours, as most of these cases underwent hospitalization. The meantime spent by males was 1.51, and the meantime spent by females was 0.68 hrs.

### DISCUSSION

The major proportions of the study population in the selected slums were of younger age group constituting the productive work force. The literacy status of sample population was low, which reflected lack of education as a barrier to better occupation opportunity. The reported higher morbidity prevalence and the illiteracy status were significant. In the present study, there was not much difference between the proportion of acute and chronic diseases. The explanation for this difference could be due to the morbidity afflicting the two age groups. Whereas the young were more exposed to acute illnesses, the adults were more prone to chronic diseases and the costs associated with these illness types were markedly different. The study shows that acute communicable upper respiratory tract diseases were prevalent. This result is concurrent to Marimuthu 2009 study in Delhi slums<sup>8</sup>. Poverty is a determining factor in people affected by Tuberculosis<sup>9</sup>.

Among the individual features, it was observed that total cost of illness was significantly less among females, perhaps due to discrimination in allocating of monetary resources for illness-related travel and treatment per se. In a study P Larson et al found unqualified healthcare providers (allopath, drug sellers, and homeopaths) were visited in over 90% of rural and over 75% of inner-city slum cases when care was sought<sup>10</sup>.

The cost of chronic illnesses recorded in this study needs to be seen in the context of a growing prevalence of obesity, diabetes mellitus, cardiovascular diseases<sup>11</sup>, and other chronic conditions. There was clear evidence of a demographic, epidemiological and nutritional transition in India as a cause of the increase in chronic diseases and obesity<sup>12</sup>, particularly in urban areas. Increase in the prevalence of chronic diseases leads to an increase in the cost of illness due to higher cost of

chronic diseases due to an expected increase in the number of years that subjects may suffer from chronic morbidity and disability.

When hospitalization was required it was the most costly component of expenditure. It was also observed that severe illnesses that required hospitalizations were also associated with higher costs for other expenses (e.g., diagnostic tests, drugs, etc.).

Drugs were the second most expensive item in all types of morbidity. It was also observed, drugs were used much more frequently than hospitalizations. The procurement price of drugs in public pharmacy is lower than in private pharmacies, but often the essential drugs are unavailable.<sup>13</sup>

In the present study, it was found that informal costs accounted for only 1.2 percent of total. The similar kinds of findings were observed with other reports on the low utilization of indigenous systems of medicine in India<sup>14</sup>. Study shows preference for private sector as the place of treatment for acute episodes of illnesses for slum communities also. General Hospitals were the main source of treatment for chronic illnesses. For maternity care also private sector hospitals were preferred by the community<sup>15</sup>.

The pattern of expenses in INR as per the type of illnesses during the last three months further shows that 40.8% acute illness and 32.3% of chronic illness spend less than INR 2000 whereas 8.4% chronic illnesses spend in between INR 2001 to 4000. Dalal *et al* estimated that out-of-pocket spending on hospital care might have raised the proportion of the population in poverty by 2 percent<sup>16</sup>.

### CONCLUSION

Health care expenditure will inevitably increase in the next decade in India. This conclusion is based on the observation that the chronic illnesses, prevalent, mainly among the adults and elderly, were much costlier, coupled with demographic transition and an increase in life expectancy. Dense populations may not only pose a risk, but also an opportunity to efficiently reach a large, vulnerable proportion of the population. This study sought to consider the broad patterns of slum dwellers morbidity, treatment seeking behavior and spending on health care. Further studies are required to understand the in-depth healthcare behavior of the slum population.

**Ethical Clearance:** The institutional review board of the School of Health Sciences, University of Pune, approved all subject recruitment and data collection procedures. Verbal informed consent was taken from the participants.

**Conflict of Interest:** Nil

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# Role of IEC in Improvement of Knowledge and Attitude about HIV/AIDS among College Students

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## ABSTRACT

**Background:** The epidemic of HIV/AIDS is now progressing at a rapid pace among young people (15 - 24 years) accounting for 40% of new infections in 2006. Education has been described as social vaccine and it can serve as a powerful preventive tool.

### Objective:

1. To assess the knowledge and attitude about HIV/AIDS among college students
2. To study the role of Information Education Communication (IEC) in improvement of their knowledge and attitude

**Materials and Method:** A prospective study was carried out among 270 college students aged between 16 - 18 years, where knowledge and attitude towards HIV/AIDS was assessed at baseline using pre tested questionnaires. Health education sessions were conducted on HIV/AIDS. Post Health education questionnaires were later distributed to assess the change in knowledge and attitude towards HIV/AIDS among study participants.

**Results:** The overall general knowledge regarding HIV/AIDS, knowledge regarding its mode of transmission, prevention and treatment was poor among the study participants. Following educational sessions a significant improvement was observed in knowledge and attitude of the students towards patients living with HIV/AIDS. Some misconceptions about HIV/AIDS were corrected through the health education intervention, as detected by improved correct response rates.

**Conclusion:** A planned HIV/AIDS education program has significantly improved the HIV/AIDS knowledge and attitude towards patients living with HIV/AIDS. However, a small proportion still exists and needs to be addressed by other health education programmes.

**Keywords:** AIDS, Health Education, Students, HIV

## INTRODUCTION

Since emergence of human immunodeficiency virus (HIV) infection in 1981, the HIV pandemic has become one of the most serious infectious disease challenge to public health.<sup>1</sup> According to the acquired

immunodeficiency syndrome (AIDS) epidemic update, December 2007, released by World Health Organization (WHO), approximately 33.2 million people are living with HIV/AIDS worldwide. 90% of the HIV infected persons live in developing countries with the estimated number of Indians being 2.7 million.<sup>2</sup> The total annual economic loss due to HIV/AIDS in India is estimated to be Rs.3447 billion. These figures emphasize the societal burden posed by HIV infection in India.<sup>3</sup> Many diseases have carried considerable stigma, now HIV/AIDS is the topmost in the list of diseases to be stigmatized.<sup>4</sup> The epidemic is now progressing at a rapid pace among young people (15-24 years). Lack of a vaccine or cure for HIV/

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AIDS makes IEC programmes the only available approach for combating the pandemic.<sup>1</sup>

Research related to HIV/AIDS among university students has focused primarily on the assessment of knowledge, attitude and behaviors and to a lesser extent, on the effectiveness of educational interventions.<sup>5</sup>

In view of above the present study was undertaken to assess knowledge and attitude among college students and to study the role of IEC in improvement of Knowledge and attitude towards HIV/AIDS among them.

## MATERIALS AND METHOD

### Study participants and settings

The study was carried out in government PU College in Kadagudi Bangalore over a period of 2 months between August - October 2010. Permission of college Principal was taken before starting the study. All the college students aged between 16-18 years who were present at the time of study were included. 270 students (123 boys and 147 girls) were present at the time of study.

### STUDY DESIGN

The study used a prospective study design. After reviewing previous studies related to this field, questionnaires were prepared both in English and in local language (Kannada). Brief introduction was given to the students regarding importance and purpose of the study. Questionnaire was distributed among the students and their Knowledge and attitude towards HIV/AIDS was assessed at baseline. Then a health education intervention was implemented followed by a post-intervention assessment.

### Intervention and assessment of intervention

The health education was in the form of a series of lectures over a period of 2 days (2 hours/day). Education materials used were PowerPoint presentations and videos. Their baseline knowledge and attitude was assessed using pre-test questionnaire. After 1 month of intervention a post-test was

undertaken by using same interview questions that was used in pre-test to assess the improvement of their knowledge and attitude about HIV/AIDS..

### Statistical analysis

Z test for proportions was used to compare the knowledge and attitude towards HIV/AIDS between boys and girls and also to assess the improvement in their knowledge and attitude towards patients living with HIV/AIDS. The statistical significance was evaluated at 5% level of significance. Microsoft Word and Microsoft Excel was used to generate the tables.

## RESULTS

A total of 270 respondents were included in the study of which 123 were boys and 147 were girls (**Table 1**). During post-test assessment 9 students lost the follow-up. For the purpose of analysis the questions were divided into following broad categories: 1. General knowledge towards HIV/AIDS, 2. Knowledge regarding modes of transmission, 3. Knowledge about prevention and treatment of HIV/AIDS, 4. Attitude towards patients with HIV/AIDS.

**Table 1: Distribution of study subjects according to sex**

Gender	Number	Percentage
Male	123	45.5
Female	147	54.5
Total	270	100

### General knowledge about HIV/AIDS

The overall general knowledge of HIV/AIDS was low among girls compare to boys. 40.6% of boys and 28.6% of girls knew correct abbreviation of AIDS, and this difference was statistically significant. Among all respondents only 13% knew that HIV/AIDS is caused by a virus. Some misconceptions were identified, around 55% of them thought that HIV infected person always looks tired and ill. This figure was reduced to 20% after intervention. 40.6% boys and 27.2% girls thought AIDS affects only gay people, this difference was also statistically significant. Only 35.5% of respondents knew that it is most devastating disease of century, slight doubling percentage was detected after intervention (Table 2).

**Table 2: Pre and Post assessment of study participants, regarding general knowledge about HIV/AIDS**

Knowledge questions	Percentage of correct response					
	Males (%)		Females (%)		Total (%)	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
AIDS stands for Anti Infectious Disease Situation	24.4	78.3	22.4	70	23.3	73
	P<0.01					
AIDS stands for Acquired Immune Deficiency Syndrome	40.6	83.3	28.6	99	34.0	91
	P<0.01					
AIDS is caused by virus	16.3	81.6	10.2	88.8	12.9	85.4
	P<0.01					
An HIV infected individual always looks ill	48.8	75	42.8	70.9	45.5	79
	P<0.01					
AIDS only affects gay people	40.6	81.6	27.2	78	33.3	75
	P<0.01					
AIDS is the most devastating disease in the country	40.6	77.5	31.2	73	35.5	72
	P<0.01					
AIDS is not curable but treatment exists to improve quality of life	24.4	77.5	17.1	70	20.3	73
	P<0.01					

**Knowledge about modes of transmission**

25% of boys and 29% girls did not know about sexual mode of transmission. Intervention decreased this percentage to 5% and 8% respectively. Among all respondents 20% incorrectly thought that HIV cannot spread after receiving infected blood and 31.5% respondents did not know that women with HIV can

transmit infection to her baby; this percentage was reduced to 0% and 0.4% respectively after intervention. 33.8% respondents incorrectly thought that it can be transmitted through mosquito bite and 22% believed that sharing utensils with HIV infected person can transmit the disease. Education intervention succeeded to improve their knowledge about mode of transmission of HIV/AIDS (Table 3).

**Table 3: Pre and Post test assessment of study participants, regarding mode of transmission.**

Mode of transmission questions	Percentage of correct response					
	Males (%)		Females (%)		Total (%)	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Unprotected sex (sex without condom)	75.6	95	71.4	92	73.3	93.8
	P<0.01					
Receiving a HIV infected blood	83	100	79	100	80.7	100
	P<0.01					
From mother to baby	74	99	64	100	68.5	99.6
	P<0.01					
Bitten by a mosquito	72.2	100	61.2	98	66.2	99
	P<0.01					
Sharing utensils with person living with HIV	82.1	96	74.8	97	78.1	97.7
	P<0.01					
Touching person living with HIV	96	100	91	97	93.3	98.8
	P<0.01					

**Table 3: Pre and Post test assessment of study participants, regarding mode of transmission. (Contd.)**

Mode of transmission questions	Percentage of correct response					
	Males (%)		Females (%)		Total (%)	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Reusing someone else's syringe	63.4	100	57.8	97	60.3	98.8
	P<0.01					
From a toilet seat	80.5	95	74.8	99	77.4	97.3
	P<0.01					
Sharing razor with an infected person	52	90	47.7	90	49.6	90
	P<0.01					
Tattooing/body piercing	45.5	92.5	40.8	92	42.9	92
	P<0.01					

### Knowledge about prevention and treatment

75% of respondents knew that using new syringes at the time of injections can prevent HIV transmission. This percentage was improved to 98% after intervention. 90% of all respondents believed that HIV transmission is preventable by having sex only with faithful partner. 67.4% respondents knew that HIV transmission can be preventable from mother to child,

this percentage improved to 93% after intervention. 88% of respondents correctly said that all pregnant women should be routinely tested for HIV. Only 26.6% respondents knew about centers for HIV screening and this percentage improved to 98% after intervention. Among all only 20% knew the availability of treatment and this percentage improved to 86% after intervention (Table 4).

**Table 4: Pre and Post assessment of study participants, regarding prevention and treatment of HIV/AIDS**

Methods of prevention and treatment questions	Percentage of correct response					
	Males (%)		Females (%)		Total (%)	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Using new syringe	81.3	98	70.7	97	75.5	98
	P<0.01					
Having sex only with your faithful partner	93.4	100	88.4	98	90.7	99
	P<0.01					
HIV transmission from mother to child is preventable	73.1	91	62.5	95	67.4	93
	P<0.01					
All pregnant women should be routinely tested for HIV	90.2	98	87.7	95	88.8	96
	P<0.01					
Do you know any centers for HIV screening	30	100	23.8	97	26.6	98
	P<0.01					
Do you know any treatment available to improve HIV infected patients life	21	91	20.4	81	20.7	86
	P<0.01					

### Attitude

Overall 82% students felt that HIV infected person should not be allowed to school or work, 75% believed

they should be separated legally, 70% said their names should be made public so that others avoid them. After intervention favorable attitude improved to 78%, 78% and 82% respectively (Table 5).



**Table 5: Pre and Post-test attitudes of study participants, towards people living with HIV/AIDS**

Attitude questions	Percentage of correct response					
	Males (%)		Females (%)		Total (%)	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
HIV infected persons are allowed to school or work	24.3	83	13.6	74	18.5	78
					P<0.01	
Should be legally separated	26.8	81	23.8	75	25.1	78
					P<0.01	
Make names public so others avoid them	32.5	85	30.6	79	31.4	82
					P<0.01	

## DISCUSSION

The present study aimed to assess knowledge and attitude towards HIV/AIDS among college students and also to provide lacking information and correct misconceptions about different aspects of HIV/AIDS among this group.

With respect to the general knowledge regarding HIV/AIDS, in present study it was observed that all college students who participated had heard about HIV/AIDS. However, a need for improvement was detected at baseline, as a considerable percentage did not know the correct abbreviation of AIDS, more than half of respondents thought that AIDS affects only gay people. Other studies from India and abroad among college students have reported good knowledge of HIV/AIDS.<sup>6,7</sup>

In our study more than 70% of respondents gave correct response about transmission of HIV through infected blood and unprotected sex which agree with the findings of other studies (Wong et al.,<sup>8</sup> Hayyawi et al.,<sup>9</sup>). However, study revealed some misconceptions, 33% of respondents thought that HIV can be transmitted through mosquito bite. A study done by Bhosale et al.,<sup>10</sup> also found a prevalence of this misconception. 22% respondents believed that HIV can be transmitted by sharing utensils and 23% respondents believed that HIV can spread from toilet seat. Health education intervention succeeded to reduce these misconceptions significantly.

As regards to prevention and treatment, most of our respondents knew the possible methods of prevention. However some misconceptions were identified which were improved after intervention.

Negative attitudes towards HIV positive people at school and at work were observed in our study. Even after intervention more than 20% of respondents would avoid HIV positive individuals at work. This result is similar to study done by Ayranci et al.,<sup>11</sup>.

Taken as a whole, findings of our study indicate that the health education intervention was effective in enhancing knowledge and perception among college students towards HIV/AIDS.

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**Conflict of Interest:** None

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**Ethical Clearance:** Permission was taken from institutional head, government PU College Kadugodi Bangalore.

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# Prevalence of HIV, Hepatitis B, Hepatitis C and Associated Risk Factors in Patients Undergoing Elective Surgery - A Prospective Study

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## ABSTRACT

**Objective:** To study the prevalence of HIV, Hepatitis B, Hepatitis C and associated risk factors in patients undergoing elective surgery.

**Materials and method:** This is a prospective observational study. A total of 225 patients above 16 years of age undergoing elective surgery in JNMC, Aligarh from October 2006 to October 2008 were selected for the study and screened for HIV, Hepatitis B and C, and detailed history was taken to find out the risk factors.

**Result:** A total 225 patients were screened including 175 (77.7%) were male and 50 (22.3%) female patients. Out of 225, 19 (8.4%) patients were positive either for HIV, HBV or HCV. 15(6.6%) were positive for HBV, 3(1.3%) were positive for HCV and 1(0.4%) was positive for HIV. The most common agent turned out to be HBV occurring in 79 % followed by HCV in 16 % and HIV in 5 % of all seropositive patients. Blood transfusion in 11(57.8%), frequent injections either intravenous or intramuscular in 10(52.5%) followed by previous surgery in 9(47.2%) were the most common risk factors among seropositives. About 7(36.7%) gave history of sexual exposure, 6(31.5%) had history of tooth extraction or dental procedures. Visit to barber for shaving and haircut was found in 5(36.2%) patients.

**Conclusion:** Prevalence of Hepatitis B is more common than Hepatitis C and HIV in elective surgical patients with unknown seropositive state in our country. Pre operative screening for HIV, HBV and HCV in elective surgical cases should be done for higher risk group. Public awareness on modes of transmission has to be increased through Health Education and mass media.

**Keywords:** HIV, Hepatitis B, Hepatitis C, Prevalence, Risk Factors, Elective Surgery

## INTRODUCTION

Approximately 3 million health care workers (HCWs) experience percutaneous exposure to blood borne viruses each year. Exposure to blood-borne pathogens is an occupational risk for health care workers, with surgeons having a highest risk of percutaneous exposure than other specialists.<sup>1</sup> This results in an estimated 16,000 hepatitis C, 66,000 hepatitis B, and 200 to 5000 human immunodeficiency virus (HIV) infections occurring annually and more than 90% of these infections are occurring in low-income countries, and most are preventable.<sup>2</sup>

The World Health Report 2002 estimates that 2.5% of HIV, 40% of hepatitis B (HBV) and hepatitis C (HCV) cases among health care providers worldwide are the result of occupational exposure.<sup>3</sup>

Studies done abroad in patients undergoing surgery reveals prevalence rates for HIV ranging from 0.2 to 32.8%.<sup>4</sup> HBV has range from 2.11% to 36%<sup>5</sup> among surgical patients in studies done while HCV has range of 1% to 37.4%.<sup>6</sup>

HIV, Hepatitis B and C viruses are blood borne and largely transmitted by transfusion, use of infected

needles, surgical and dental instruments, and barber shaving equipments.<sup>7</sup>

These blood borne infections are relevant to surgeons with respect to the surgical management of these patients in general, the treatment of the increasingly long list of surgical complications specific to these patients in particular, and the risks of patient-to-surgeon and surgeon-to-patient transmission.

Physiologic and social factors of HIV and hepatitis are associated with an increased risk for developing a surgical problem; the prevalence of these infections may be higher in surgical patients than in the general population. A significant number of operations are associated either with the manifestations or sequelae of a blood-borne pathogen infection.<sup>8,9</sup>

Thus, there are higher chances that an infected individual will require surgery. It may be inaccurate to base estimates of blood-borne pathogen incidence during surgery on the known estimates in the general population or other disease-specific groups.

Little is known about the current prevalence of these viruses among patients presenting for Surgery in India. HIV seroprevalence rates vary widely by geographic area and patients' demographic characteristics. Hence, the present study was selected to know the prevalence of HIV, Hepatitis B and Hepatitis C among patients undergoing elective surgery.

## MATERIALS AND METHOD

This prospective, observational study was carried out in the Surgical Patients of Jawaharlal Nehru Medical College and Hospital, AMU Aligarh, U.P. from October, 2006 to October, 2008.

All patients undergoing elective surgery were included in the study. Patients with prior diagnosis of chronic liver disease or evidence of Hepatitis B & C and HIV, paediatric and less than 16 years of age and emergency patients were excluded from the study.

After taking due consent from the eligible patients, 5 ml of blood was withdrawn using aseptic precautions in vial and immediately sent to department of Microbiology. Samples were subjected to initial

screening test by the ELISA for detection of HIV antibodies in the serum by Microlisa HIV and for second test immunocomb II was used. The second test was done for confirmation after the first test positivity. Analysis of report was done according to strategy II of NACO recommendations. Estimation of HBsAg and Anti-HCV Antibodies was done by Enzyme linked immunosorbent assay (ELISA) based HEPALISA kits and HCV Microlisa kits respectively. The specificity of this test is more than 99% and sensitivity of 100%.<sup>10</sup> A detailed questionnaire was designed for all positive patients which included age, sex, history of previous surgical procedure, blood transfusion, visit to dentists, general practitioner and barber, user of frequent I.V and I.M medication. Computerized record of all patients was maintained and all findings were analyzed statistically at the end of study.

## OBSERVATIONS AND RESULTS

Out of 225 patients, males were 175 comprising 77.7% of study population while females were 50 comprising 22.3% of study population. 19 patients were seropositive either for HIV, HBV or HCV constituting about 8.44% of study population. Among seropositives 15 were positive for HBV (6.66%), 3 were positive for HCV (1.33%) and 1 was positive for HIV (0.44%). Thus, the most common agent turned out to be HBV occurring in 79 % of seropositive patients followed by HCV in 16 % and HIV in 5 % of patients. (Table 1)

**Table 1: Seropositives among elective surgical patients**

Total patients	Number (n)	Total Prevalence (%)
Total elective patients	225	
Total Seropositives	19	18.44
HBV	15	6.66
HCV	3	1.33
HIV	1	0.44

The mean age of presentation of seropositives for HIV, HBV and HCV was 70, 67.3 and 54.6 years, respectively (Table 2). As compared to females, males had a higher prevalence of these infections with 14 males positive for HBV, 3 males positive for HCV and 1 male positive for HIV whereas only 1 female was found positive for HBV. One patient was seropositive for both HBV and HCV.

**Table 2: Prevalence of seropositivity for HBV, HCV and HIV along with mean age**

Seropositivity	HBV	HCV	HIV
% prevalence	79%	16%	5%
Mean age in years	67	70	54

**Table 3: Risk Factors among Seropositives**

Risk Factors	HBsAg	HCV	HIV	Total patients(n)	Percentage %
Blood transfusion	9	2	0	11	57.8
Injection Use	8	1	1	10	52.5
Previous surgery	7	1	1	9	47.2
Sexual exposure	6	0	1	7	36.7
Tooth extraction	5	1	0	6	31.5
Barber visit	4	1	0	5	26.2

Blood transfusion appeared to be the single most common risk factor especially those who tested positive for HBV and HCV. About 11 seropositive patients comprising 57.8% gave history of previous blood transfusions. Frequent use of intravenous or intramuscular drugs were seen in 10 (52.5%) patients, majority of whom 8(42.1%) were HBV positive followed by 1(5.2%) each of HCV and HIV positive. 9(47.2%) seropositive patients gave history of previous surgery of which 7(36.2%) turned out to be HBV, 1(5.2%) HCV and 1(5.2%) HIV positive. Almost all the patients had multiple risk factors that included unprotected sexual exposure (36.7%), and tooth extraction (31.5%) and visit to barber for shaving and hair cut (26.2%). Visit to barber and tooth extraction was again more common in HBV positive patients followed by HCV positive.

### DISCUSSION

In this study, overall prevalence of seropositive patients taken together for HIV, HBV or HCV was found to be 8.4%. The prevalence for HIV was 0.4%, for HBV it was 6.6% and for HCV it was 1.3%.

The HIV prevalence rate was 0.4% in our study as compared to national adult prevalence of 0.3%.<sup>2</sup> This could be explained as only surgical patients were included in our study. This prevalence was greater than that observed by Mullins et al<sup>11</sup> of 0.15%, but lower than the observations of Shiao et al.<sup>12</sup>

A greater prevalence was observed in surgical population as HIV infection poses increased risk for developing surgical illnesses. However, our results were similar to that reported by Charache et al.<sup>13</sup> HIV

seroprevalence was found at a higher age of 54 years and more common in males similar to the findings by Montecalvo et al<sup>14</sup> and Martin et al.<sup>15</sup>

In our study the prevalence of HBV showed male predominance which was greater than that reported by Martin et al<sup>15</sup>, who observed a prevalence of 2.7%. In our study HCV prevalence was found to be 1.33%, similar to National HCV prevalence of below 2% .<sup>16</sup> Our results are close to the studies by Thorburn et al<sup>17</sup> who estimated 2% prevalence of HCV infection. A higher incidence of hepatitis B & C were in the age group of 50-70 years which is equivalent to the study by Talpur et al<sup>18</sup> and Zahid et al.<sup>19</sup>

Blood transfusion appeared to be the common risk factor with 78.5% of HBV seropositives clearly giving history of previous blood transfusions. Risk of transmission after needle stick injury and by blood transfusion is highlighted in many studies<sup>20,21</sup>. However Redd et al<sup>22</sup> proposed atleast 30% of reported HBV among adults cannot be associated with an identifiable risk factor.

About 66.6 % ( n=1) of seropositives of HCV had previous blood transfusions which is similar to the observations by Thompson et al.<sup>23</sup> Several studies on voluntary or mixed donors have noted a prevalence of hepatitis C below 2%.<sup>24,25</sup>

Procedures during tooth extraction are also suspected of transmitting Hepatitis B and C, and to lower extent of HIV if there is blood spillage. As such 33.3% seropositives for HBV and HCV had undergone tooth extraction.

In our study 52.5% patients gave history of intravenous or intramuscular injections, while studies by Faridullah<sup>26</sup> and Aslam<sup>27</sup> showed higher percentage.

Thus, in our study the predisposing factors of hepatitis B and C were previous history of blood transfusion in almost 58 % patients, previous surgery 47 %, sexual exposure 32%, tooth extraction or dental procedures 31% and visit to barbers shop 26.2%. Ashraf et al reported 91.6% patients with history of injections, blood transfusion in 47.38% patients, history of previous surgery in 37.0% patients, history of dental procedure in 44.29% and shaving by barber in 84% patients.<sup>28</sup> Though frequent use of injectables remained the major factor in Ashraf et al study which is similar to our study but percentage of patients is higher in each risk group than our study population.

### CONCLUSION

The triad of HIV, Hepatitis B and C remains a significant public health problem in India and will continue to be same until proper measures are taken to contain them. Though HIV has already been established as an epidemic, Hepatitis B and C are emerging and their implications will be felt in the years to come. Since blood transfusion and unsafe therapeutic interventions by infected needles are modalities for spread of these infections which pose risk for transmission from patient to health care staff especially surgeons. These can be prevented by following Universal precautions which are vital part of occupational safety and should not be understated. Compliance with universal precautions is clearly an important first step toward a safer work environment for surgeons performing operations without the use of sharp instruments whenever possible is better option. Surgeons should be vaccinated against HBV. Preoperative screening for HIV, HBV, and HCV in elective surgical cases should be restricted to high risk groups as incidence of seropositive is low. Stringent blood banking laws need to be introduced and sterilization and reuse of needles discouraged. Furthermore, the awareness in the general public has to be increased regarding the modes of spread and the implication of these infections.

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# Awareness and Perception of First Year Medical College Students on Rabies and its Prevention

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## ABSTRACT

**Background:** Rabies continues to be major public health problem in India in spite of the wide availability of anti rabies vaccine. In India 20,000 dies of rabies annually. The large number of deaths due to rabies can be attributed to people not aware of the various aspects of the disease and its prevention. This study was therefore carried out to assess the knowledge and perception among first year medical college students.

**Method:** This study was a descriptive study conducted at Hassan Institute of Medical Sciences, Hassan using a pretested questionnaire.

**Results:** A total of 90 first year medical college students participated in this study. 80 (88.8%) knew that rabies is caused by virus. 38 (42.2%) knew annual mortality due to rabies in India. 88 (97.7%) knew that rabies is transmitted through bites of an animal. 54 (60%) students knew that rabies is 100% fatal. 44 (48%) students knew the symptoms of rabies. 60 (66.6%) felt that the bites wounds should be washed. 55 (61.1%) knew that an antiseptic to be applied to the wound. 40 (44.4%) students told animal bite wound should not be sutured or bandaged. 15 (16.6%) students knew that 5 doses of vaccine should be taken when bitten by animal. Only 2 (2.2%) were aware of RIGs.

**Keywords:** Rabies, Rabies Immunoglobulin, Anti Rabies Vaccine

## INTRODUCTION

Rabies is an important public health problem in India. Maximum number of deaths due to human rabies is reported from our country. It is estimated that in India 17.4 million animal bites and 20,000 deaths due to rabies occurs annually. 955 of global rabies deaths are because of dog bite <sup>(1, 2)</sup>. Rabies is a 100% fatal disease which can be prevented by timely and appropriate use of Post Exposure Prophylaxis (PEP) using wound care, Anti Rabies Vaccines and Rabies Immunoglobulin (RIG). Lack of knowledge among health providers on basic principles of animal bite management can have detrimental effect on rabies prevention. The use of RIG is only 2% <sup>(3)</sup>. Health

personnel in our country have an important role in preventing mortality due to rabies. The present study was undertaken with an objective to assess knowledge regarding rabies and its prevention among first year medical college students.

## MATERIALS & METHOD

This study was conducted at Hassan Institute of Medical Sciences (HIMS), Hassan. This was a descriptive study in which all the first year medical students of 2011-12 batch were approached with a pre-designed and pre-tested questionnaire reading various aspects of rabies and its prevention. Data was collected from 90 first year medical students who consented to participate in the present study. The data was analyzed using SPSS Ver 13.0 software.

## RESULTS

Out of 99 first year medical students of HIMS, Hassan, 90 participated in the study. Of the 90 students 80 ( 88.8%) knew that rabies is caused by virus, the

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rest were of the opinion that rabies is caused by a bacteria. 38 (42.2%) knew that 20,000 people die annually due to rabies in India. 88 (97.7%) knew that rabies is transmitted through the bite of an animal and only 3 (3.33%) knew that it could be transmitted by scratch but only one knew that it could be transmitted by licks also (Table 1). All the students knew that rabies is transmitted by dogs. Some of the students knew that rabies is transmitted by other animals like cat, monkey, pig, horse and wild animals (Table 2). 54 (60%) students that once a person gets rabies it is 100% fatal. 44 (48%) students knew that hydrophobia and aerophobia are the symptoms of rabies in the human beings, 20 (22.2%) students thought that person with

rabies will behave like animal. 15 (16.6%) students felt that the person with rabies becomes mad (Table 3). 60(66.66%) felt that animal bite wound should be washed with soap and water. 55 (61.1%) knew that an antiseptic has to be applied to the animal bite wound. 77 (77.77%) students are of opinion that animal bite victim should consult doctor immediately. 40(44.4%) students felt that animal bite wound should not be bandaged or sutured. 15 (16.6%) students knew that 5 doses of vaccine should be taken when bitten by animal (Table 4). Only 2 (2.2%) were aware of RIG. 40 (44.4%) students felt that animal should be vaccinated to prevent rabies occurring in the community.

**Table 1: Sex wise distribution of knowledge regarding causative agent, annual mortality and modes of transmission.**

Details	Male(N = 50)	Female(N = 40)	Total(N = 90)
Correct knowledge of the causative agent	44 (88)	36 (90)	80 (88.8)
Knowledge of annual mortality	22 (44)	16 (40)	38 (42.2)
<b>Knowledge of Modes of Transmission</b>			
Bite	50 (100)	38 (95)	88 (97.7)
Scratch	02 (4)	01 (2.5)	03 (3.33)
Licks	01 (2)	00 (0)	01 (1.11)

Note: Figure in the parenthesis indicates percentage.

**Table 2: Sex wise distribution of knowledge regarding reservoir of rabies infection**

Reservoir of Infection	Male(N = 50)	Female(N = 40)	Total(N = 90)
Dog	50 (100)	40 (100)	90 (100)
Cat	20 (40)	10 (25)	30 (33.3)
Monkey	08 (16)	04 (10)	12 (13.3)
Wild animals	10 (20)	05 (12.5)	15 (16.6)
Rodents	04 (8)	02 (5)	06 (6.6)

Note: Figure in the parenthesis indicates percentage.

**Table 3: Sex wise distribution of knowledge regarding Symptoms of rabies in human beings**

Symptoms of Rabies in human beings	Male(N = 50)	Female(N = 40)	Total(N = 90)
Hydrophobia	24 (48)	20 (50)	44 (48.8)
Aerophobia	28 (56)	16 (40)	44 (48.8)
Behave like animal	08 (16)	12 (30)	20 (22.2)
Mad	10 (20)	05 (12.5)	15 (16.6)

Note: Figure in the parenthesis indicates percentage.

**Table 4: Sex wise distribution of knowledge of Post Exposure Measures**

Knowledge of Post Exposure Measures	Male(N = 50)	Female(N = 40)	Total(N = 90)
Wash with soap and water	35 (70)	25 (62.5)	60 (66.66)
Apply antiseptics	28 (56)	27 (67.5)	55 (61.1)
Should not bandaged or sutured	22 (44)	18 (45)	40 (44.4)
Consult doctor immediately	40 (80)	30 (75)	70 (77.7)
Number of Vaccine doses	11 (22)	04 (10)	15 (16.6)

Note: Figure in the parenthesis indicates percentage.

## DISCUSSION

Correct knowledge of the causative agent was in 80 (88%) of the students, 44 (88%) of 50 boys and 36 (90%) out 40 girls and there was no statistical significant difference between male and female students which is comparable with the Vinay M and et al<sup>(4)</sup>. Regarding the annual mortality in India due to rabies 38 (42.2%) had correct knowledge and there was no statistical significant difference between male and female students<sup>(5)</sup>. All boys and 38 (95%) of girls knew that rabies is transmitted by bite of an animal and 2 (4%) of 50 boys and 1 (2.5%) of 40 girls knew that it could be transmitted by scratches and 1 (2%) of boys and none of the girls knew that it is transmitted by animal licks also.

All the respondents knew that rabies is transmitted by dogs and it is comparable with other studies<sup>(5,6)</sup>. 4 (8%) of 50 boys and 2 (5%) of 40 girls are of opinion that rabies is transmitted by rodents, which is not true in our country. There was no statistical significant difference between male and female students. 24 (48%) of 50 boys and 20 (50%) of 40 girls knew that symptoms of rabies is hydrophobia and aerophobia.

Regarding the immediate measures that should be done to the bite wound, 35 (70%) of boys and 25 (62.5%) of girls felt that it should be washed with soap and water. Regarding post exposure measures there was no statistical significant difference between knowledge of male and female students which is similar to other studies<sup>(5,6,7)</sup>.

## CONCLUSION

Majority of the MBBS students of the first year knew that rabies is caused by virus which is transmitted through dog bite. More than 50% of the students knew about symptoms and post exposure measures correctly. Students had poor knowledge about the other modes of transmission, animal that can transmit rabies, Rabies immunoglobulin and number of vaccine doses. The knowledge regarding rabies prevention among male and female students is same.

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**Conflict of Interest:** Nil

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# Assessing Outcome of a Model CME Programme on "Laws Applicable to Hospitals: Issues, Challenges and Possible Solutions

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## ABSTRACT

**Objective:** There is increasing public awareness about medical science and practicing it within the legal and ethical ambit today, needs continuous updation about the laws applicable to hospitals. Realising the need, a workshop focussing on the more commonly practiced laws applicable to hospitals was organized. This study was conducted to assess the satisfaction and knowledge gain of the delegates and to improve future training programs.

**Materials and method:** Participant satisfaction survey and prepost knowledge assessment surveys were conducted. Data analysis was done by using Likert scale and SPSS, by comparing differences in mean scores between before and after.

**Results:** The study revealed that amongst 65 delegates, 38.5% were in the age group of 50- 60 years with 76.9% males. The delegates comprised of senior functionaries including Medical Superintendents (15.5%) Joint, Assistant and Deputy Directors, (7.6%), Chief Medical Officers(13.8%) etc. The overall Experience was rated as very good by 66% delegates. The pre post tests depicted the overall gain in the post test knowledge score as 78.3% with highly significant p values.

**Conclusion:** The public is very aware and knowledgeable about health related matters. It is thus essential for health and hospital administrators to keep themselves updated. This CME was organized with this objective and resulted in 78% improved knowledge score of the participants.

**Keywords:** *Laws and Hospitals, Workshop, Case Studies, Pre Post Knowledge Score, Knowledge Gain*

## INTRODUCTION

Health care practitioners are aware that in order to provide medical care within the legal and ethical ambit, they need to regularly update themselves. Understanding health policy and the legislative process is an important part of delivering good health care. Earlier the compliance to central & state laws & regulations were not important issues for hospital and health administrators. But as the system is constantly

evolving now, the increasing knowledge and enlightenment about healthcare practices among the health care service users has opened a Pandora's box in terms of legal and ethical issues which pose daily challenges for health and hospital administrators.

Health and Hospital Administrators have been given the responsibility of keeping their organization in compliance with central and state laws and regulations. Enforcement activity has lead to increased scrutiny and a greater potential for fines, penalties, and even criminal liability. Thus it is all the more imperative for the health functionaries to keep themselves continuously updated on laws applicable to hospitals to have better and efficient functioning.

Studies also show that the practice of medicine in India has undergone considerable change during the

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last five decades effecting delivery of health in both positive and negative directions<sup>1</sup>. There have been many reports stressing the importance of incorporating ethical and legal issues into medical curricula<sup>2-4</sup>. There is also an argument that doctors and nurses should be taught law and medical ethics simultaneously<sup>5</sup>. This can be done by continuing professional development of health professionals. It includes the continuous acquisition of new knowledge, skills, and attitudes to enable competent practice as clinicians, diagnosticians and administrators. Continuing medical education has come to include managerial, social, and personal skills, topics which are beyond the traditional clinical medical subjects.<sup>6</sup>

It is mentioned in literature that adult learning is likely to be better with a higher engagement process<sup>7</sup>. The department of Hospital Administration, of a tertiary care institute of northern India chose the workshop mode in providing continuous knowledge & education to health and hospital administrators about the more commonly practiced laws applicable to hospitals. The department has conducted three CME programmes on "Laws applicable to hospitals – Issues, challenges & Possible Solutions" attended by delegates from all over the country.

The more commonly practiced yet challenging laws were taken up in the workshop.

- 1) The Consumer Protection Act, 1986
- 2) The Biomedical Waste (Management & Handling) Rules, 1998
- 3) Contract Labor Regulation and Abolition Act, 1970 & Rules 1971
- 4) The Transplantation of Human Organs Act, 1994
- 5) The Pre conception and Pre Natal Diagnostic Techniques Act, 1994
- 6) The Right to Information Act, 2005
- 7) The Indian Medical Council Act, 1956

In conducting CME programmes, the organizers have to perform necessary pre-programme work and programme planning<sup>8</sup>. The senior management also has to look in to the training evaluation. This study was thus conducted to assess the increase in knowledge score and satisfaction level of senior administrative functionaries who attended the

programme. Also the suggestions and inputs from the feedback forms would help to improve future programmes.

## METHODOLOGY

The pre and post programme questionnaire was prepared under the guidance of faculty of department of hospital administration. It was vetted by experts on various medical laws. There were 35 multiple choice questions with single correct answer, 5 each for the 7 different acts discussed. The questions for both pre & post assessment were kept same to evaluate the difference in knowledge gain before & after the programme. The pre-assessment form was distributed to all the delegates (69) at the time of registration. The assessment questionnaire was explained to the delegates and they were asked to complete and hand it over before the start of first session. The delegates registering after the start of first session were not included in this study. Similarly the post assessment questionnaire was distributed to delegates on the second day of CME after completion of the final session and 65 post assessment forms collected. Satisfaction survey was prepared after considering the most important determinants influencing the programme. Survey was included in the CME programme kits and the delegates were requested to complete and hand it over before departure while collecting the participation certificate at the end of the programme. The satisfaction survey was compiled for the same 65 delegates who had submitted pre and post tests.

## DATA ANALYSIS

The programme effects were tested by comparing differences in mean scores between before and after, by pretest-posttest design with respect to each law and the overall score. Paired sample tests were used to compare mean scores. Data analyses were carried out with SPSS<sup>®</sup>. The satisfaction survey data based on Likert scale from 1 to 5 was collated and percentage scores for individual parameters and total overall experience calculated.

## RESULTS

In the present study data analysis was done for 65 delegates. 38.5% of the delegates were in the age group of 50- 60 years, 76.9% were males and 23.1 % were females. The programme was attended by senior functionaries as seen in table 1 below.

**Table 1 Demographics**

Age group		Number(%)
1	20-30 years	3 (4.6)
2	30-40 years	8(12.3)
3	40-50 years	24(36.9)
4	50-60 years	25(38.5)
5	60-70 years	4(6.2)
6	Not Mentioned	1(1.5)
Sex		
1	Male	50(77)
2	Female	14(21.5)
3	Not Mentioned	1(1.5)
Designation		
1	Deputy Directors, and Directors	5(7.6)
2	Medical Superintendent	10(15.5)
3	Professors	10(15.5)
4	Deputy Medical Superintendents	4(6.2)
5	Chief Medical Officers	9(13.8)
6	Senior Medical Officers	11(16.9)
7	Vigilance officers	1(1.5)
8	Hospital administrators	3(4.6)
9	Medical Officers	12(18.4)
10	Total	65
Sector		
1	Private sector	5(8.3)
2	Public sector	60(91.7)

State wise representation: The programme had a national representation. More of the delegates were

from the northern states. Participants from Karnataka, Maharashtra, West Bengal, Madhya Pradesh, Gujrat etc attended the programme.

**Table 2: State Wise Representation**

S. No	State	No(%)
1	Chandigarh	6 (9.0)
2	Delhi	11 (18.0)
3	Gujrat	1 (1.5)
4	Himachal Pradesh	13 (20.0)
5	Haryana	13 (20.0)
6	Karnataka	2 (3.0)
7	Maharashtra	4 (6.0)
8	Madhya Pradesh	2 (3.0)
9	Punjab	10 (15.0)
10	Sikkim	1 (1.5)
11	West Bengal	2 (3.0)

The source of information about the programme for the delegates was their own organization in 69.2% of the cases

The pre-post tests in table 3 depict the total percentage increase in knowledge score (78.3%) with significant p values. The highest percentage increase in knowledge score was seen in the Transplantation of Human Organs Act 1994(300.2%) followed by Contract Labor Act 1970(111.4%)

**Table 3: Evaluation of Pre and Post CME scores**

S. No	Act	No. of Questions	Pre- Test		Post- Test		% increase in Score	p value
			Mean Score (SD)	%	Mean score (SD)	%		
1	Right to Information Act 2005	5	2.86(1.07)	57.2	4.51(.61)	90.2	57.6	<0.000
2	Contract Labour Act 1970	5	2.09 (0.86)	41.8	4.42 (1.07)	88.4	111.4	<0.000
3	Pre Conception & Pre Natal Diagnostic Techniques Act 1994	5	1.08 (1.03)	21.6	2.17 (1.19)	43.4	100.9	<0.000
4	Transplantation of Human Organs Act 1994	5	0.78 (.92)	15.6	3.14 (1.18)	62.8	302.5	<0.000
5	Indian Medical Council Act 2002	5	1.11 (0.97)	22.2	2.08 (0.77)	41.6	87.3	<0.000
6	Biomedical Waste Management 1998	5	2.37 (1.24)	47.4	3.15 (1.29)	63.0	32.9	<0.001
7	Consumer Protection Act 1986	5	2.46 (1.16)	49.2	3.28 (1.05)	65.6	33.3	<0.000
8	Total	35	12.75 (3.24)	36.4	22.74 (4.21)	64.9	78.3	<0.001

The level of satisfaction with respect to various determinants of the programme was studied by a 5 point Likert Scale ranging from very good to very bad. Very good rating was given by 71% delegates with

respect to case presentations of various laws. The overall Experience was rated very good by 66% delegates (Table 4).

**Table 4. Satisfaction survey parameters**

S.No	Parameter	Very goodNo(%)	GoodNo(%)	AverageNo(%)	BadNo(%)	Very badNo(%)
1	Presentation	46(71)	16(25)	3(4)		
2	Group task	30(46)	26(40)	9(14)		
3	Resource faculty	38(58)	25(39)	2(3)		
4	Group discussion	35(54)	26(40)	4(6)		
5	Audio visual	51(78)	12(19)	2(3)		
6	Food & Beverage	51(78)	13(20)	1(2)		
7	Networking	25(38)	31(48)	7(11)	2(3)	
8	Overall	43(66)	21(32)	1(2)		

Subjective responses about the part of the CME cum Workshop liked most included presentations, case studies and discussions. Some delegates appreciated time management and organization of the event.

Regarding subjective inputs about programme improvement, it was suggested that prior study material should be provided. More laws should be incorporated in the programme like National Building Code, Fire Safety Laws, AERB Regulations, Medico Legal Case Handling, Blood Bank Licensing Procedures etc.

Some specific suggestions were to include laws applicable to hospitals in the MBBS curriculum, discussion about a particular law should be side by side along with the presentation and not later, the registration fee should be lowered, outside experts may be called to have a better discussion and such kind of workshops should be organized in other parts of the country also.

## DISCUSSION

Satisfaction and Knowledge Assessment surveys are objective methods to study the impact of the CME programme and its further continuation. The Pre & Post test study enable us to make a comparative evaluation, before and after the programme.

This CME cum workshop on “Laws applicable to hospitals: Issues, Challenges and Possible Solutions” was the third in the series. The programme was visualised and conceptualised considering the problems and challenges encountered by the senior functionaries in their day to day administrative working based on practical real life case studies and providing hands on experience. The more common and challenging laws were taken up in this two day

event. Problem solving domain with respect to these laws in health & hospital settings was kept in the perspective.

As is seen from the results most of the delegates are senior functionaries who practice administration daily and need to keep themselves abreast. The attendance by the male delegates is higher which could be either them being handed administrative duties more often or lack of interest on the part of female counterparts or less number of senior female functionaries in administrative positions. Though it was a national level workshop there was more participation of delegates from the northern states

It is believed that those who drafted healthcare rules & regulations probably were unaware of implementation & monitoring issues, in part due to absence of necessary infrastructure & in part due to casual approach by the concerned authorities, the truth of which is reflected in the attendance by the directors, joint directors, medical superintendents etc. The organizations ranging from state health services, Central Government Health Services, Directorate General of Health services, Ministry of health and family welfare, Defence, Railways, National Rural Health Mission etc recognized the need to keep their functionaries up dated and nominated their delegates for this programme. This accentuates on the need for such programmes. The practical approach to the whole event may be the reason for such a wide spectrum of delegates. In one of the studies 52% of senior medical staff and 20% of senior nursing staff knew little of the laws pertinent to their work.<sup>9</sup> The same study outlines the knowledge source for consultants for learning ethics and law as 56%, 59% and 59% from workshops, lectures and panel discussions respectively.

More attendance was by senior functionaries from public sector, either because they are sponsored and do not have to spend from their pocket or they seriously feel the need to keep themselves updated. Another reason for low participation by corporate and private sector could be suggestive of the need for improvement in the marketing strategy.

The pre post test to assess the increase in knowledge of the participants at the end of the programme showed a 78% increase in the overall knowledge score of the delegates. The p value was significant with respect to each of the individual laws. The percentage increase in scores was very high with respect to Transplantation of Human Organs Act (302.5%) which means either there is lack of awareness about this law or it is not in practice in all institutions and the later seems to be more true. With respect to PCPNDT, CLA, IMCA there was again a 100%, 111% and 87% increase in the post test scores. These are the laws dealt with daily by most of the practicing administrators.

There was comparatively less increase in percentage scores of RTI, BMW and CPA. This means that the institutions are doing a good job of implementing the BMW law in terms of letter and spirit and in keeping their officers up dated. Probably the strict enforcement practices being followed in case of BMW have lead to greater awareness but further knowledge update is desirable. CPA is what most of the delegates were knowledgeable about as frequent complaints pertaining to medical negligence are being reported. The professionals need to update their understanding on consumer protection act and its amendments to be on a legally safer side<sup>10</sup>. Under RTI, regarding the penalty for delayed information initially 29% delegates were aware but the number rose to 87% at the end of the programme. The need and importance for IMCA being incorporated emerged in the workshop as the lack of awareness levels about the ethical and technical aspects was highlighted.

In the 2<sup>nd</sup> CME the overall percentage increase in the scores was 57% as compared to 78.3 % this time. The process of learning improves both for the organizers and participants with each event. The programme not only contributed to increase the knowledge score of the delegates but the satisfaction

survey pointed out certain lacunas which will be taken care of in the next event. The need for continuing such programmes is reflected in the increased knowledge score

The satisfaction level of the delegates was based on Likert scale. Overall experience was mentioned as very good by 66% delegates. The satisfaction levels with respect to group task whereby the delegates were given a practical exercise and asked to frame solutions to it after discussing amongst the group with inputs from resource faculty was 46 %. The panel discussion on both days was rated as very good by 54 % delegates. This reflects on the need for further improvement on the part of the organizers, maybe by calling external experts specially during group task.

## CONCLUSION

The increase in knowledge score from 36.4 at the start of the programme to 78 % by the end does reflect on the need for frequent updating about hospital laws for the health and hospital administrators. While organizing such events it is also equally important to assess the satisfaction levels of the participants to enable the organizers to improve the subsequent programmes. Thus it is a learning experience both ways as one delegate had mentioned, "We can always improve."

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# Study on the effect of Light Meal on Some Biochemical Parameters

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## ABSTRACT

The present study was carried out on 40 healthy volunteers, to analyze their SGPT (serum glutamate pyruvate transaminase) and uric acid level in the serum. The volunteers had the access to light meal containing a standard amount of carbohydrate, protein and lipid. Blood was taken for analysis of aforesaid parameters, before the meal and 1, 2, & 4 hours thereafter. Clinically significant variations were observed for SGPT at different time intervals post prandial. However uric acid concentration remains unchanged at all the time intervals. Results of the study clearly indicate that requirement of the patient on fasting for uric acid estimation is of no concern, while variation of SGPT level with time after light meal demonstrate that fasting time needs to be carefully considered in order to interpret the results correctly.

**Keywords:** Light Meal, Uric acid, SGPT, Preanalytical Error

## INTRODUCTION

Negligence in the laboratory testing is the crucial issue in the country like India, has diverse implication for the patient ranging from serious health problems and threat to the life. Almost all type of illnesses occurring in the human body can be tested in a laboratory setting. Returning to results is important for the diagnosis, care and treatment of the patients. Without accurate results, patient can be left untreated, they can receive the wrong treatment, they might unknowingly infect others, and they might die. The patient related variables such as physical exercise, stress and fasting are additional sources of variability in laboratory testing. The clinical and laboratory standard institute recommends a patients fasting status especially for those tests that are more likely to be affected by food ingestion i.e. glucose estimation<sup>1</sup>, lipoprotein fraction<sup>2</sup> and triglycerides<sup>3</sup>. Ginseppe lippi et al have reported the influence of light meal on various hematological parameters<sup>4</sup>. According to national cholesterol education programmed (NCEP) the fasting period prior to measurement of lipids

should be at least 9 to 12 hours<sup>5</sup>. Nevertheless, no study so far conducted for SGPT, uric acid and other biochemical parameters. The present study was therefore designed to evaluate the influence of light meal on SGPT and uric acid.

## MATERIAL AND METHOD

40 healthy volunteers (31 males and 9 females) from 25 to 35 age group were taken into study. The study was approved by Medical College Ethical Committee. The blood sample was collected by single phlebotomist using 20 G straight niddle directly into the plain vial. The first blood sample was collected between 9 to 9.30 am. After an overnight fasting immediately after blood collection, the volunteers had access to light meal (550kcal) including two slices of brown bread, one slice of cheese, four biscuits and a bottle of packed milk. The nutritional value of the food is given in the table 1. Subsequent samples were collected 1, 2, and 4 hours after the meal. The semiautoanalyzer (ERBACHEM 7) was calibrated against appropriate reference material. Results are interpreted as mean and % mean value.

## Statistical Analysis

The significance of difference between samples was accessed by paired student t test. The value of statistical significance was set at  $p < 0.05$ .

## RESULTS & DISCUSSION

Clinically significant variations were observed for SGPT. After an hour of light meal, a significantly increased value of SGPT was observed, which came down to normal in the second hour and fourth hour. However, for uric acid the values were remaining unchanged all through the time intervals right from the fasting.

To best of our knowledge, this is the first investigation assessing post prandial variations of these biochemical parameters. The results of the study clearly indicate that even a light meal, such as that administered in this investigation, can induce a significant variation in the SGPT profile, while no significant change is observed in uric acid concentration even after dietary intake in the form of light meal. There is no single explanation to explain these happenings which are altogether different than expected. Basically food intake represents a marked intestinal exposure to antigen requiring host defense. Besides local immune activation, this defense includes a coordinated systemic immune response, which may seem to support the local immunity. The post prandial

elevation of SGPT level might be in response to this mild immune activation. Though elevation of these enzymes is most common in liver or heart diseases, there are reports that gamma-GT, SGOT, SGPT and LDH levels elevate in cases of injury and inflammation<sup>6</sup>, tumor formation<sup>7</sup>, and drug reactions<sup>8</sup>. Further studies are also needed to be done in order to evaluate the association between the level of other liver enzymes and dietary intake.

As such no plausible explanation can be given for the unexpected pattern of concentration of uric acid. At this moment it is very difficult to state with precision, how long food ingesta remain in stomach, small intestine and when the dietary proteins after being digested and absorbed amino acids are available to cellular metabolism. No significant increase in the level of uric acid concentration was observed during the period of 4 hours, which might be due to unavailability of dietary amino acids to the cells for cellular metabolism. As the uric acid is the end product of purine degradation, any elevation in the blood amino acid pool will definitely affect the level of uric acid. But here the concentration of uric acid remains unchanged indicating no significant addition to the amino acid pool during this time period. There may be the chances of delayed elevation of uric acid concentration i.e. after 4 hours. Further studies are required to be done to evaluate the level of uric acid for more extended period of time till 6<sup>th</sup> to 8<sup>th</sup> hours.

**Table 1: Nutritional composition of the light meal**

Nutritional composition	Slice of cheese	Slice of bread	biscuit	Flavored milk	Total
Number (overall weight grams)	1 (20)	2(54)	4(25.7)	1(200)	371.1
Kcal	55	132.6	142.8178	178	508.4
Protein(gms)	2.4	3.7	2.4	6.4	14.9
Carbohydrate(gms)	0.4	25.4	20.8	24	70.6
Sugar (gms)	0.8	1.8	8.0	16	26.6
Total lipids(gms)	4.6	2.4	11.2	6.2	24.4
Saturated lipids (gms)	3.4	0.8	5.6	3.8	13.6
Fibres(gms)	0	0.9	1.2	N/A	2.1
Sodium(gms)	0.2	0.286	N/A	0.1	0.586
Calcium(gms)	0.1	N/A	N/A	0.24	0.34

**Table- 2: Post prandial variations of SGPT and uric acid**

	Mean value (mg/dl)		% mean difference		S. D.		P value	
	SGPT	Uric acid	SGPT	Uric acid	SGPT	Uric acid	SGPT	Uric acid
Base line sample	25.07	5.36						
1 hour after meal	33.86	5.26	35.1	1.86	6.215	0.070	< 0.005	< 0.001
2 hour after meal	26.82	5.25	7.0	2.0	1.237	0.084		
4 hour after meal	28.59	5.24	14	2.2	2.489	0.077		

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**Conflict of Interest:** None

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# A Study on the Prevalence of Depression among Adolescent Medical Students, SS Institute of Medical Sciences & Research Centre, Davangere, Karnataka

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## ABSTRACT

**Introduction:** Adolescence is the period of transition from childhood to adulthood i.e in the age group of 10-19 years. At least 5% of adolescents, roughly 1 in 20 teenagers will experience an episode of major depression. Depression in adolescence has high risk of recurrence in adulthood and is also associated with risk of development of personality and conduct disorders. There is a clear link between Depression and suicide. Suicide is the 3rd leading cause of death in adolescents. Most of the cases go unrecognized. The burden of mental disorders is expected to rise significantly in the next 20 years.

### Objectives:

- 1) To study the prevalence of depression among adolescent medical students of SSIMS & RC, Davangere.
- 2) To study the other co-existing psychological symptoms.

**Materials and method:** A cross-sectional study was conducted among adolescent medical students of SSIMS & RC, Davangere applying 6 item Kutcher Adolescent Depression Scale (6 KADS) to identify depression. A pretested and predesigned questionnaire was used after obtaining consent from them to study the coexisting psychological symptoms. The data was collected over a period of one month. ( November 2011)

**Results:** Out of 215 students 30 (14%) were identified depressed. Out of them 50% were 19 year old, 76.7% were females and 33.3% were men, all were Hindus, 20% SC and 80% Others. Associated coexisting symptoms were sleep disturbances(60:40 increased: decreased), appetite changes (47:20 increased: decreased), weight gain(40%), weight loss(43.3%), decrease in concentration(83.3%), decrease in academic performance(93.3%) preference to stay alone(43.3%) feeling like crying(53.3%), somatic symptoms(headache:80%, stomachache: 40%, backache:60%, dizzy: 40%, nervous: 60%).

**Conclusion:** Out of 215 students 30 were identified depressed and they also had other co-existing psychological symptoms.

**Keywords:** Adolescence, depression, Kutcher's Adolescent Depression Scale

## INTRODUCTION

Adolescence is the period of transition from childhood to adulthood i.e the age group of 10-19 years. 3-9% of teenagers meet the criteria for depression at one time and at the end of adolescence 20% of them report lifetime prevalence of

depression.<sup>(1)</sup>Those who experience depression at an early age often struggle with depression throughout their lives and in many cases early onset of depression predicts more severe depression during adulthood. Depression in adolescence has high risk of recurrence in adulthood and is also associated with risk of development of personality and conduct disorders. <sup>(2)</sup>

Depression is the leading cause of disability and fourth leading contributor to the global burden of diseases in 2000. It is estimated to be the second most common cause of disability in all ages worldwide by 2020. <sup>(3)</sup> There is a clear link between Depression and suicide, which is the 3rd leading cause of death in adolescents. <sup>(4)</sup> Research shows that only 50% of adolescents with depression are diagnosed before they reach adulthood. <sup>(5)</sup>

Medical students are valuable human resources for our future and large amount of money is spent on medical education, depression among them leads to less productivity, reduced quality of life, learning difficulties and this may negatively affect patient care and investment made on medical education. Studies from other parts of the world have shown a high prevalence of depression in medical students but studies on Indian medical students are lacking <sup>(3)</sup>

Therefore, this study has been undertaken to study the prevalence of depression among adolescent medical students and also to study the other co-existing psychosocial symptoms.

### OBJECTIVES

1. To study the prevalence of depression among adolescent medical students
2. To study the other co-existing psychosocial symptoms.

### MATERIALS AND METHOD

The study was carried in a private medical

college in Davangere, Karnataka. The college based cross-sectional study design was reviewed and approved by the Institutional Ethical Committee. Students in the age group of 17 to 19 years were included in the study. A total of 215 medical students participated, out of them 108 were females and 107 were males. Those with comorbid mental illnesses and taking medication for the same were excluded from the study. The study was carried out for a period of one month (November 2011). Depression was identified by a self-administered Kutcher's Adolescent depression scale which was in English, the language understood by all the students in the college, after obtaining consent from the students. This scale has a sensitivity and specificity rate of 92% and 71%, respectively. <sup>(6)</sup> A predesigned and pretested questionnaire was used to study the other co-existing psychosocial symptoms. The students were assured that their identity would be kept confidential. Data analysis: proportions, percentages and chi-square. Statistical analysis was done using Epi info version 6 and Microsoft excel.

### RESULTS

The study was conducted among 215 adolescent medical students in the age group of 17-19 years. The mean age was 18.47 and standard deviation was 0.63. Among them 108 were males and 107 females. Out of 215 students 30(14%) were depressed. Among them students of 17 years of age were more depressed. Depression was more among females. Students belonging to scheduled caste and scheduled tribe were more depressed. (Table no. 1)

Table No. 1: Showing the distribution of students by demographic variables

Variables	Depressed	Non depressed	Total
<b>Age (years)</b>			
17	4 (23.5)	13 (76.5)	17 (100)
18	11 (13.9)	68 (86.1)	79 (100)
19	15 (12.6)	104 (87.4)	119 (100)
<b>Sex</b>			
Male	7 (6.5)	101 (93.5)	108 (100)
Female	23 (21.5)	84 (78.5)	107 (100)
<b>Caste</b>			
Scheduled caste	3 (20)	12(80)	15(100)
Scheduled tribe	1(33.3)	2 (66.7)	3(100)
OBC	2 (12.5)	14 (87.5)	16(100)
others	24 (13.3)	157 (86.7)	181(100)
Total	30 (14)	185 (86)	215 (100)

(Figures in parenthesis show percentage)

Out of those who were depressed 18(60%) felt sleepy most of the time, 12(40%) had insomnia, 12(40%) had weight gain, 13(43.3%) had weight loss, 14(46.7%) had increase in appetite, 6(20%) had decrease in appetite, 25(83.3%) had decrease in concentration, 28(

93.3%) showed decrease in academic performance, 13(43.3%) preferred to stay alone and 16(53.3%) felt like crying most of the time. Changes in academic performance, loneliness and insomnia were statistically significant. (table 2)

**Table No. 2: Showing the distribution of coexisting morbidity**

Coexisting comorbidity	Depressed with comorbidity symptoms n=30	Not depressed with comorbidity symptoms n=185	p value
Sleepy	18(60)	67(36.2)	0.13
Insomnia	12(40)	42(22.7)	0.043
Weight gain	12(40)	54 (29.2)	0.234
Weight loss	13(43.3)	70 (37.8)	0.566
Increase in appetite	14(46.7)	54 (29.2)	0.56
Decrease in appetite	6(20)	54 (29.2)	0.298
Decrease in concentration	25(83.3)	88 (47.6)	<0.001*
Decrease in academic performance	28(93.3)	115 (62.2)	0.001*
Prefer to stay alone	13(43.3)	39 (21.1)	0.008*
Feel like crying	16(53.3)	51 (27.6)	0.005*

(Figures in parenthesis show percentage) \* Chi-square test p value significant

Many of the depressed students showed somatic symptoms such as headache 24(80%), stomachache 12(40%), backache 18(60%), dizziness 14(46.7%) and

nervousness 18 (60%). Out of them headache, stomachache, backache, dizziness were statistically significant. (table3)

**Table No. 3: Showing the distribution of somatic symptoms**

Somatic symptoms	Depressed with somatic symptoms n=30	Not depressed somatic symptoms n=185	p value
Headache	24 (80)	87(47)	0.001*
Stomachache	12(40)	24(13)	<0.001*
Backache	18(60)	53(28.6)	0.007*
Feel dizzy	14(46.7)	43(23.2)	0.005*
Feel nervous	18(60)	62(33.5)	0.152

(Figures in parenthesis show percentages)\* Chi-square p value significant

**Limitations**

Since it is a college based study findings cannot be generalized.

**DISCUSSION**

In our study 30 (14%) of the medical students were depressed and depression was more among female students 23(76.7%), Whereas a study conducted by Singh A, et al. on medical students in a private medical college at Bareilly showed that 62% of the adolescent medical students were depressed and depression was more among female students.<sup>(3)</sup> Also other studies

conducted in Saudi Arabia and United States showed that depression was more among female students.<sup>(7,2)</sup>

In our study depression was more among students of 17 years of age (23.5%) ie . first year students as compared to students of other age groups. This may be because of change in the environment and home sickness. Whereas a study conducted in Saudi Arabia showed that 64% of 1<sup>st</sup> year students and 62% of second year students were depressed. Depression was more among female students.<sup>(7)</sup> In our study prevalence of depression is lower compared to that in Saudi Arabia, may be because of the difference in the sociocultural practices followed in our country.

In our study somatic symptoms were more common among depressed students, which was consistent with the findings of Saluja G, et. al. in their study of depression among young adolescents in United States.<sup>(2)</sup>

In our study depression was more among students belonging to scheduled caste and scheduled tribe. This may be because of changes in their social background. This has to be explored through future studies. As per our knowledge no study has been conducted on this parameter.

### CONCLUSION AND RECOMMENDATIONS

Foundation courses like communication, capacity building, and extracurricular activities like sports, music, dance, yoga and meditation introduced at the entry to the medical courses. Recommend to have mentor for every five students.

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# Scope of Biochemical Markers in Tuberculosis

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## ABSTRACT

Tuberculosis is one of the major causes of the mortality from single infectious agent worldwide. India has the highest number of TB cases in the world. It is the leading cause of death, because of its high mortality and morbidity because of the disease, is due to emergence of multidrug resistant TB strains, and the HIV infection which reactivates the latent TB making it more severe. Moreover, failure to diagnose TB early remains one of the primary hurdles in controlling of the disease. The disease is diagnosed generally by its symptoms, radiographic methods, and sputum smear microscopy and by cultivation of the Mycobacterium Tuberculosis, which is considered as gold standard. Current advances in molecular biology and molecular epidemiology and a better understanding of drug resistance in TB have given a new horizon to its rapid diagnosis. However the cost effective techniques, and their requirement for sophisticated equipments & skilled personals have excluded their implementation on a routine basis especially in low income countries.

**Keywords:** Biochemical Markers, TB, M. Tuberculosis

## INTRODUCTION

Despite so many studies reported over the past several years, biochemical markers have insignificant contributions in routine diagnosis of TB. Even though it is rapid and does not require specimen from the site of the disease. Focusing upon the various aspects of the biochemical markers, the scope of this article is to summarize the current state of knowledge about these markers both in pulmonary and extra pulmonary tuberculosis and their potential as prognostic and diagnostic tool and also present some of the future perspectives & challenges.

Over the last hundred years one of the most important additions in the field of diagnostics has been the development of assay based on the interferon- $\gamma$  determination. So far the only diagnostic test available was Tuberculin T Test (TST). The IFN- $\gamma$  is based on the principle that T cells of the sensitized individuals produce IFN- $\gamma$  when they reencounter the antigens of M. Tuberculosis. A high amount of IFN- $\gamma$  production is then assumed to correlate with TB infection<sup>1-4</sup>. The

very first IFN- $\gamma$  assay made use of purified protein derivative (PPD) as the stimulating antigen<sup>1</sup>. The more advance assays exploiting the use of antigen that are specific to M. tuberculosis, such as early secretory antigen target 6 (ESAT6) and the culture filterate protein 10 (CFP10)<sup>1</sup>. These protein antigens are coded by the genes located on the region of difference 1 (RD1) of M.tuberculosis genome and they are much more specific than PPD, since they are not shared with M. bovis, Bacillus Calmette Guerin (BCG) or various other non tubercular mycobacterium (NTM). Currently, commercially available INF- $\gamma$  assays are QuantiFERON-TB assay and T- spot TB test. These tests based on leveling of INF-  $\gamma$  by T- cells in response to TB antigen by ELISA and enzyme linked immunospot respectively. The QuantiFERON-TB a is whole blood assay, and used PPD as antigen. Its current version QuantiFERON-TB Gold uses ESAT6 and CFP10 antigens, while T-spot-TB assay uses peripheral mononuclear cells and ESAT6 and CFP10 as antigens to measure the number of T- Cell producing INF-  $\gamma$ .



Various studies done apparently show that INF- $\gamma$  assay using RD1 antigen more reliable over TST as QuantiFERON-TB Gold and ELISpot highly specific and they better correlate with previous exposure to *M. tuberculosis* and rarely cross react due to BCG vaccination or previous exposure to nontubercular mycobacteria. Also this assay uses variety of antigen rather than individual antigen, having better accuracy<sup>5</sup>. However there is need to assess the usefulness of these tests in the immunocompromized individual, in children and in those with extrapulmonary TB.

Studies done predominantly in western countries<sup>6</sup> have reported an ELISA assay based on mycobacterial antigen 60 (A60) for estimation of specific immunoglobulin in serum, has been used successfully for rapid diagnosis of tuberculosis. Their findings showed very good specificity (92%) and good sensitivity (75%) when combined IgM & IgA antibody titer was considered in disease of childhood Tuberculosis. In another report the serum of the patients with active TB along with control serum group were assayed for IgA, IgG, IgM, IgE antibody activity to PPD using the ELISA. The patients with active TB clearly had higher level of IgG antibody to PPD antigen. None other immunoglobulin was found in good correlation with the disease<sup>7</sup>. Now a day's many commercial tests are available in the market for diagnosis of TB. Most of these are based on the detection of IgA, IgG, IgM antibodies to specific mycobacterium antigen or mixture of antigens. But this also is not very reliable as many a times there is lack of consistent rise of all three immunoglobulin classes even during the active phase of infection. Thereby there is need to detect or determine an ideal antibody isotype assay for reliable diagnosis of TB, saving unnecessary expenditure of the patients<sup>8</sup>.

Among other markers of the TB serum adenosine deaminase (ADA) concentration is also well reported in the literature. The enzyme ADA belong to purine salvage pathway and catalyzes the conversion of the adenosine and deoxyadenosine to inosine and deoxyinosine with the release of the ammonia. It is one of the important enzyme in T- lymphocytes where it is 10 times higher in concentration. Its activity increases during reproduction and in response to antigenic stimulation of lymphocytes. Its increased concentration has been found in the region of tubercular serocities, and that can be used for the diagnosis<sup>9-11</sup>. ADA concentration in effusion has already been proved as tuberculosis marker of great importance.

Piras *et al* for the first time reported high ADA level in tubercular pleural effusion<sup>12</sup>. Various studies done between 1966 to 1999 concluded the good performance of the test with significant sensitivity and specificity in cases of pleural effusion<sup>13</sup>. In 2007 a systematic review of ADA by NSG health technology assessment programme gave conflicting conclusion that there is no evidence to support the use of ADA test for pulmonary TB diagnosis<sup>14</sup>. However, there is considerable evidence to support the use of ADA in pleural fluid samples for diagnosis of pulmonary tuberculosis, where sensitivity was very high and to a slightly lesser extent for tubercular meningitis. In both, the pleural and meningeal tuberculosis ADA test was proved to be highly sensitive than any other test<sup>14</sup>.

There are reports to show the role of ADA in differential diagnosis of pleural effusion<sup>15</sup>.

The diagnostic value of the ADA activity was also studied to evaluate the differential diagnosis of tubercular meningitis by Rohani *et al*, and in all the patients<sup>16</sup>, ADA activity was observed to be greater than the cut off value of 9 IU/L. But high ADA activity was also seen in 13 % nontubercular cases giving specificity of around 87 %. Other researchers also say the importance and usefulness of ADA activity in the diagnosis of tuberculosis<sup>17,18</sup>. So it is very apparent to state that even though the ADA activity determination is sensitive for tuberculosis, it is not specific enough to be used as rapid diagnostic test. However, it is useful adjunctive marker for tuberculosis when correlated with clinical signs, symptoms and other laboratory tests.

In another published journal, the ratio of serum ferroxidase and albumin was established as marker in pulmonary tuberculosis<sup>19</sup>. The ferroxidase is a serum ceruloplasmin, a copper transporting globulin protein and a very well known antioxidant. Ferroxidase is synthesized in the liver microsomes and acts in the serum by oxidizing ferric iron which could otherwise act as catalyst in generating toxic free radicals via lipid peroxidation etc<sup>20</sup>. The high level of serum ceruloplasmin was observed with low albumin level in the patients of pulmonary TB. In this study ferroxidase/albumin ratio was used in diagnosis and therapy of the pulmonary TB. Statistically more significant results were obtained. While using this ratio, its prognostic role on the prognosis of pulmonary tuberculosis could be assessed with follow up studies.

Present knowledge for detection of *M. Tuberculosis* biomarker does not have sufficient valid data. There is need for understanding the interplay between the immune system of the host and *M. Tuberculosis*<sup>21</sup> in order to look for some reliable biomarker. The current diagnostic methods available for tuberculosis are sputum for AFB, Histopathology, and Radiological assessment of the chest. A reliable diagnosis of the tuberculosis depends upon assessing the level of *M. tuberculosis* by various well established microbiological, cytological, or histopathological methods but these classical methods have their own limitations<sup>22</sup>. Cultivation of the bacteria is very difficult and time taking. Also the material for PCR is every time is not available (except for CSF and urine). For histopathological confirmation there is requirement of invasive biopsies<sup>3, 4, and 23</sup>. Keeping in mind, increasing incidence of tuberculosis especially in the patients with HIV infection, there is a pressing need in today's scenario for effective immunological diagnostic test which is relatively easy to perform and economical too for diagnosis of the disease and its management. Since the tuberculosis bacillus generates antibodies against different antigens, a multiple immunoassay approach is needed. There are reports in the literature upon over expression of six *M. tuberculosis* specific antigens, their purification and potential use in development of MMIA Multiplex microbead immunoassay for the detection of *M. tuberculosis* infection in TB patients<sup>24</sup>. Such kind of studies will definitely provide base for the development of a multiple antibody based diagnostic test for detection of *M. tuberculosis* infection in reactivated TB patients and also in other categories like latent and active TB patients.

Biomarkers in the form of antibody profile can be potentially useful for sputum negative childhood tuberculosis and extrapulmonary tuberculosis which account for approximately 20- 25 % of tuberculosis patients in our country<sup>1</sup>. Mycobacterium Tuberculosis Maleate Synthase and MPT- 51 are dominant antigens in the organism and antibodies to these antigens have been found to be important biomarkers in the diagnosis of incipient subclinical tuberculosis. Detection of these antigens is not been effected by concurrent HIV infection<sup>25, 26</sup>. Volatile organic compounds (VOC) in breath have been identified as biomarkers for pulmonary tuberculosis. VOC include oxidative stress products like alkanes and alkane derivatives such as cyclohexane and benzene derivative<sup>27</sup>.

Of great concern, for management and control of disease, in present time is the discovery of some more effective diagnostic tool which is economical too. Though most of the biochemical markers have high specificity but poor sensitivity. While initial use of IFN- $\gamma$  for detecting latent infection appear promising, but it still requires reconsideration upon its practical usefulness. IFN- $\gamma$  tests are expensive tests and their high cost appears to limit their wider application, especially in developing and underdeveloped countries where the disease is prevalent at alarming level. ELISpot test cannot be performed in normal clinical laboratories as it requires isolation of mononuclear cells which is very invasive procedure. Also there is requirement to assess the usefulness of these tests in immunocompromised patients and children. Other biochemical markers like ADA and ferroxidase/albumin ratio need comprehensive evaluation in well designed and controlled clinical trials and tested in high endemic, low resource setting where the implementation and use of these methods are more needed to contribute to the improvement of TB control<sup>28-31</sup>.

Although targeted testing and preventive therapy for latent *M. Tuberculosis* infection is well established in low incidence countries, the exact role of testing and treatment in disease- endemic countries remains controversial. However, testing latent *M. Tuberculosis* infection is receiving increased attention in vulnerable subgroups, such as HIV- infected people and childhood contacts of active tuberculosis cases<sup>32, 33</sup>.

Some future developments are desirable and worthy of consideration

- Improvement of study design of clinical studies trying to identify some biochemical marker
- Increased international cooperation and pooling of the patient clinical data from different parts of the world
- Standardization and further development of reliable clinical tool for disease activity evaluation
- Reinforcement of the target lesion focused approach in order to identify the marker.
- More and more research should be focused on existing biochemical markers that could of help to diagnostic dilemma.

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# Study of Serum Lipids in Hypothyroidism

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## ABSTRACT

**Objectives:** The association between established hypothyroidism and high cholesterol level is well known. The aim of the present study is to assess the association of thyroid hormones with serum lipids in hypothyroidism patients compared with normal person.

**Material And Method:** The study included 30 diagnosed hypothyroid patients between the age group of 20-60 years as cases and 30 age and sex matched normal person as controls.

**Results:** Hypothyroid patients had an increase in total cholesterol, Triglycerides and LDL cholesterol when compared to normal persons. Statistical analysis showed a significant correlation between raised TSH levels and serum total cholesterol and LDL cholesterol levels ( $p < 0.001$ ).

**Conclusion:** Serum lipids abnormalities might be a potential link between hypothyroidism and Atherosclerosis.

**Keywords:** Hypothyroidism, TSH, Lipid Profile, Atherosclerosis

## INTRODUCTION

Anatomically thyroid gland is located at front section of the neck. In hypothyroidism, the thyroid gland produces less amount of thyroid hormone. The symptoms of hypothyroidism can put the patients' life at risk, therefore the diagnosis and management of thyroid abnormalities is a crucial task for the clinicians and medical diagnostic laboratories world wide.<sup>1</sup>

Serum TSH is the earliest biochemical parameter to increase followed by decrease in serum T<sub>3</sub> and T<sub>4</sub> resulting in hypothyroidism.<sup>2</sup>

Elevation of plasma cholesterol concentration is a hallmark of untreated hypothyroidism. The catabolic rate of low density lipoprotein, the major transport form of plasma cholesterol has been shown to be delayed in hypothyroidism.<sup>3</sup>

Hypothyroidism is a common metabolic disorder in the general population, especially in older women. In hypothyroid patients, decreased activity of LDL –

receptors resulting in decreased receptor mediated catabolism of LDL and IDL is the main cause of hypercholesterimia seen in hypothyroidism.

The abnormalities of lipid metabolism associated with hypothyroidism may predispose to the development of atherosclerosis & coronary artery disease.<sup>4</sup>

## MATERIAL AND METHOD

This study was conducted in Chigateri General Hospital and Bapuji Hospital Davanere. 60 patients (mostly females) clinically diagnosed as hypothyroidism in the age group of 20-60 years were studied over a period of one year.

Each gave an informed consent and this study was approved by Ethical and Research Committee of J.J.M. Medical College, Davangere to use human subjects in the research study. The patients and controls voluntarily participated in the study.

## Sample Collection

After noting the name, age and sex, venous samples were drawn after 12 hours of overnight fasting. Serum was separated and assays were performed within 24 hrs.

Serum  $T_3$ ,  $T_4$ , TSH were measured by chemiluminescence immunoassay on lumax clia strip reader using commercially available kit (Acculite Master Clia Vast enabled kit with individual traces).u

The concentration of serum total cholesterol, HDL cholesterol and triglycerides were measured by semiautoanalyser (Erba Chem-5 plus V<sub>2</sub> Manheim, Germany) by using commercially available kits (Transansia Medical Ltd)

LDL was calculated using friedewald's formula.<sup>6</sup>

Data collected was subjected to standard statistical analysis, by t-test and correlation

## RESULTS

**Table 1: Level of  $T_3$ ,  $T_4$ , TSH and Lipid Profile in cases and controls**

Parameter	Normal Range	Cases (n = 30)	Controls (n = 30)	Mean Diff.	Cases V/s Controls	
					t*	P
$T_3$ (ng/ml)	0.8-1.9	0.73 ± 0.09	1.31 ± 0.37	0.58	8.35	< 0.001
$T_4$ (µg/dl)	5.0-13.0	4.12 ± 0.95	9.42 ± 2.69	5.30	10.20	< 0.001
TSH (µ/v/ml)	0.3-6.0	81.80 ± 6.16	3.97 ± 1.55	77.83	67.15	< 0.001
Total cholesterol (mg/dl)	130-220	240.8 ± 27.5	170.3 ± 24.1	70.5	10.55	< 0.001
Triglycerides (mg/dl)	135-160	183.4 ± 24.3	94.9 ± 35.2	88.5	11.34	< 0.001
HDL cholesterol (mg/dl)	35-55	27.6 ± 4.8	43.6 ± 4.0	16.0	13.94	< 0.001
LDL cholesterol (mg/dl)	130-150	177.8 ± 24.1	141.4 ± 6.4	36.4	8.00	< 0.001

\* t- test

Table-1 shows mean levels of  $T_3$ ,  $T_4$ , TSH & lipid profile in cases and controls. These results suggest that patients with hypothyroidism had significantly higher levels of total cholesterol, triglycerides & LDL cholesterol while lower levels HDL cholesterol when compared to controls.

**Table 2: Correlation between TSH and lipid parameters in cases**

Correlation between	Correlation coefficient*	P-value
TSH and TC	+ 0.36	< 0.05, S
TSH and TG	+ 0.23	0.22, ns
TSH and HDL	+ 0.13	0.48, ns
TSH and LDL	+ 0.23	0.22, ns

Pearson's correlation-coefficient (r value)

Table -2 shows a positive correlation between TSH & lipid profile

## DISCUSSION

A relation between dyslipidemia and atherosclerosis is well established in hypothyroidism<sup>7</sup>. From the results, most common abnormality of lipoprotein metabolism associated with hypothyroidism are elevated levels of total cholesterol and LDL-cholesterol. These changes are due to the effect of thyroid hormone on lipoprotein lipase activity and the expression of LDL receptor that probably plays an important role in atherogenesis in untreated hypothyroidism<sup>8</sup>. Hypothyroidism increases the oxidation of plasma cholesterol mainly due to an

altered pattern of binding and also due to the increased levels of cholesterol, which presents substrate for oxidative stress<sup>9</sup>. In this study the patients with hypothyroidism had significantly higher levels of Total Cholesterol, Triglycerides, LDL-cholesterol & decreased levels of HDL-cholesterol. The study also showed a positive correlation between TSH and Lipid profile.

## CONCLUSION

From this study it can be concluded that hypothyroidism is associated with lipid disorders characterised by elevated levels of total cholesterol,

triglycerides & LDL cholesterol and decreased levels of HDL cholesterol .Hence the risk of atherosclerosis and coronary artery disease in hypothyroidism.

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# Pharmacokinetic Studies of 4, 5 CIS-5-STYRYL-2-OXO-Oxazolidine-4- Carboxylic Acid from its Prodrug

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## ABSTRACT

Recent studies which were undertaken at CDRI to study the effect of N- acyl derivatives of various aminoacids, have culminated in the identification of an oxazolidine derivatives 4, 5 cis-5-styryl-2-oxo-oxazolidine-4-carboxylic acid(CDRI 85/92) having good proton pump inhibitory activity. This compound is as potent as omeprazole in in vitro inhibition of H<sup>+</sup>/K<sup>+</sup> ATPase and in various animal models. The compound is undergoing advanced stage of clinical trials. Preclinical pharmacokinetics of oxazolidine derivatives 4, 5 cis-5-styryl-2-oxo-oxazolidine-4- carboxylic acid after a single 20 Mg/Kg oral dose and I. V. administration in male Sprague Dawlay rats showed that the compound is rapidly absorbed. After attaining a peak concentration at 1 hour, it is rapidly eliminated with elimination half life of 2 hours. The clearance of the compound was high. The systemic bioavailability of the compound was more than 60 %. This compound is short acting and has to be administered frequently. In an effort to increase the duration of action of the compound, the compound was prepared by capping the carboxylic group of the parent compound with ethyl acetate group, generated the prodrug. The pharmacokinetics of the parent compound, after administration of the prodrug was studied. The concentration of the parent compound from the prodrug in rat serum was determined using the validated HPLC method with gradient elution. The concentration time profile of the parent compound from its prodrug showed rapid absorption with maximum concentration of 956ng/ mole at 5 min. The serum concentration time data was subjected to noncompartmental approach using winNonlin software, to determine the pharmacokinetic parameters. The clearance of the compound was reduced to 1/4th as compared to the administration of parent compound, thereby increasing the half-life from 4.3 hours to 17.7 hours which was higher than the parent compound. The compound therefore stays longer in the body and may be effective for a longer period of the time than the parent compound.

**Keywords:** Pharmacokinetic studies, CDRI 85/92, HPLC, Prodrug, Antiulcer agent, Proton pump inhibitor

## INTRODUCTION

Drug Development and research encompass several disciplines united by a common goal, namely development of a novel therapeutic agent. Recent studies which were undertaken at CDRI to study the effect of N- Acyl derivatives of various aminoacids,

have culminated in the identification of an oxazolidinone derivative 4, 5cis-5-styryl-2-oxo-oxazolidine-4-carboxylic acid (CDRI-85/92)<sup>1,2</sup> having good proton pump inhibitory activity. This compound is as potent as omeprazole in *in vitro* inhibition of H<sup>+</sup>/K<sup>+</sup> ATPase and in various animal models. The studies have indicated that inhibition of the enzyme by the compound occurs in a competitive manner and it binds at high affinity luminal site<sup>3</sup>. Preclinical pharmacokinetic studies of the compound after oral and intravenous dosing to rats have shown that it is a high clearing drug agent with half elimination half life but good bioavailability<sup>4,5</sup>. It is well established that

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bioavailability of the drug has implication on the dose. The compounds, which are poorly absorbed or rapidly metabolized, show weak activity and are required in the higher amounts. The lipophilicity of a compound helps in retaining the molecule in the body for extending period of the time, thus increasing the bioavailability<sup>6, 7, and 8</sup>. Various arylalkyl, acyl, alkyl, alkylalkanoate esters etc. of CDRI-85/92 have been synthesized as prodrug designed to improve the oral absorption of parent compound. The compound ethylacetate ester prodrug of the parent compound was synthesized by capping its carboxylic group with ethylacetate group (was obtained with >99% purity) with the aim to increase the hydrophobicity and therefore absorption and bioavailability of CDRI-85/92. Estimation and quantitation of the parent compound was done after the oral administration of its prodrug.

## MATERIAL AND METHOD

The compound CDRI-85/92 and its prodrug were synthesized in house in the Medicinal Chemistry division (>99 % pure) and were used for present study. HPLC grade acetonitrile, methanol was purchased from Ranbaxy Laboratories, SAS Nagar, India. Ammonium acetate was obtained from E-Merck (India) Ltd., Mumbai. Milli Q TDW from Milli Qv plus PF, Millipore, 18.2 M $\mu$ cm was used in the preparation of buffer. The blood was collected in the clean dry testube from the inferior vena cava of healthy adult male, *Sprague Dawley* rats. It was allowed to clot at room temperature and serum was separated by centrifuging at 1000g. The serum was stored at -20°C in ultralow freezer and was used whenever needed.

### Instrumentation

The HPLC system consisted of a binary HPLC pumps A and B (LC-10 AVP, Shimadzu), with a controller (class VP ver. 03 Shimadzu), an autoinjector (Sil- 10 AV, Shimadzu). Separation was achieved on a reverse phase C- 18 column (250\* 4mm, E. Merck, Darmstadt, F.R. Germany, No. S19429), a reverse phase guard column (RP-18) with a mobile phase. The eluant were monitored using a SPD-10 AVP UV detector (Shimadzu, Japan) set at  $\lambda_{\max}$  250 nm and chromatograms were integrated using class- VP software (Shimadzu, Japan). The HPLC system was equilibrated for 30 minutes at a flow rate of 1 ml/ min before the analysis commenced. A vortex- mixer (Cecon, India), ultrasonic bath (Biansonic, Shelto, CY), a model SVC-220H speed vac concentrator (Savant,

NY) and a model C-30 centrifuge (Remi, India) were used for sample preparation.

### Chromatographic Conditions

Preparation of 10 mM ammonium acetate buffer (pH 4)

Ammonium acetate buffer was prepared by dissolving 0.76 gms of ammonium acetate in 1 litre of Millipore water. PH was adjusted to 4 with 20% orthophosphoric acid. Buffer was filtered through 0.22  $\mu$ m membrane filter.

The mobile phase for pump A was prepared by mixing acetonitrile, 10 mM ammonium acetate buffer (pH 4) and methanol in the ratio 1.5: 18.5: 80. For pump B buffer was mixed with 1.5 % acetonitrile. The mobile phase was degassed for 5 min. before use and was pumped at flow rate of 1ml/min. The chromatography was performed at ambient temperature. The optimum separation of the compound from the endogenous serum component was achieved using gradient elution. Gradient started with % respectively. The concentration of the mobile phase in pump A decreased linearly with in 9 min to 10 % followed by stabilization for 3 minutes and then increased to 68% by 2 min.

### Stock and standard solutions

The stock solution was prepared by weighing 5 mg of the drug candidate using a glass boat on the mettle weighing balance (accuracy set up to the 4<sup>th</sup> decimal place) and transferring into a clean dry 50 ml volumetric flask. It was then dissolved by sonication in a small volume acetonitrile, volume was made up to 50 ml with acetonitrile. Working stock solutions were prepared from the stock solution by method of individual dilutions in the acetonitrile. Analytical standards in mobile phase and calibration standards in rat serum of different range of concentrations were prepared individually by diluting working stock solutions and stock solutions to 1mm with acetonitrile and serum respectively.

### Sample preparation and HPLC analysis in serum

To 0.5 ml serum (blank, spiked and test) in 10 ml capacity testube, 1.5 ml of acetonitrile was added and vortex mixed for one min. The tubes were kept in the fridge for 30 min. for complete precipitation, vortex mixed for 1 min. and cold centrifuged at 1400 RPM for 10 min. Without disturbing the lower bed, supernatant was transferred to some other testube by pipette. Supernatant was directly analyzed through HPLC.

## DATA ANALYSIS

A calibration curve was created by plotting peak heights of the calibration standards against their corresponding concentrations. In the present study, linear least square regression analysis of the regression curve has been done using Microsoft Excel software. After examining the residuals and the percentage deviation, a proper model was chosen.

### Validation of assay method

The HPLC assay method<sup>4,5</sup> was revalidated in terms of linearity, accuracy, recovery and precision. A validation protocol containing the complete details of the compound, chemicals and instrumentation, stock and serum spiking for the HPLC method and plan of the validation was prepared.

### Preparation of formulation (5 mg/ml)

45.15 mg of the ester prodrug was weighed in a vial and dissolved in 9 ml of 70 % ethanol in water.

### Animal study protocol

Young healthy, male *Sprague Dawley* rats (Wt. 250 ±25) were obtained from the animal house of the institute. Rats were housed in plastic cages and were given food and water *ad libitum*.

The study was conducted in 3 sets of 16 rats (4 in each set) including one control in each set. The rats were weighed and marked and fasted overnight prior to dosing. An oral dose (20 mg/ Kg) of the formulation was administered (1 ml to a rat weighing 250 gms) to the rats under light ether anesthesia. The time of dosing was also recorded. Blood (1- 1.5 ml, one rat at each time point) was collected from the rats at 5, 15, 30, 60, 120, and 1440 minutes post dose by means of cardiac puncture under light ether anesthesia. The blood sampling was done in such a way that each rat was used for 2 time points only. The volume of the blood collected by cardiac puncture from each rat was not more than 3 % of the total body volume. Subsequently the blood samples were centrifuged and stored at -50°C. Validated HPLC method was applied to find out the concentration of drug in test samples. Test sample was analyzed along with calibration standards and quality control samples.

### Pharmacokinetic analysis

Serum peak concentration ( $C_{max}$ ) and time to reach  $C_{max}$  were directly analyzed from concentration-time profile of CDRI 85/92 following an oral dose of its

prodrug (20 mg/Kg/ b. wt.). The concentration time data was subjected to non- compartmental analysis using winNonlin programme (version 1.5)<sup>9</sup> to obtain pharmacokinetic parameters.

## RESULTS AND DISCUSSION

With the HPLC conditions the compound CDRI 85/92 eluted at the optimum retention time ( $T_R$ ) of  $7.0 \pm 0.3$  min. and prodrug at  $T_R$   $13.6 \pm 0.3$  min. Endogenous impurities did not interfere with the elution of the compound indicating that the method was selective. A comparative account of the concentration time profile (mean ± SD) of the parent compound following 20 mg/Kg oral administration of the compound itself and its prodrug in rat serum is shown in figure. 1. The concentration of the compound could be determined up to 24 hours. Due to irregularity in serum concentration time profile of CDRI 85/92; pharmacokinetic parameters were obtained by noncompartmental analysis of the data using winNonlin software. However estimation or determination of its prodrug could not be done in rat serum because it immediately hydrolyzed in the presence of serum esterases. Rate of hydrolysis of the prodrug is so fast that there is complete conversion of the prodrug to the parent compound in less than 10 minutes. Preclinical pharmacokinetics of CDRI 85/92 after a single 20 mg/ Kg oral dose and intravenous administration in male *Sprague Dawley* rats showed that the compound is rapidly absorbed. After attaining the peak concentration at 1 hr., it is rapidly eliminated with elimination half life of 2 hrs. The clearance of the compound is high. The systemic bioavailability of the compound is more than 60 %. Thus the compound is short acting and has to be administered frequently. Therefore it was thought worthwhile to alter the physiochemical properties of the compound so that its residence time in the body and in turn the duration of action could be increased and frequency of the dosing could be minimized. In an attempt to increase the duration of action of the compound, the compound was prepared by capping the carboxylic group of the compound with ethyl acetate group and pharmacokinetics of the parent compound was generated in the male *Sprague Dawley* rats after a single 20 mg/ Kg oral dose prodrug in solution formulation. The concentration of the parent compound from prodrug in rat serum was determined using a validated HPLC method with gradient elution.

The concentration-time profile of the parent compound from prodrug is shown in the table. 1. It

was rapidly absorbed with a maximum concentration of 956ng/ ml in 5 minutes. Another peak (conc. 107 ng/ml) was observed at 4 hr post dose. The serum concentration- time data was subjected to noncompartmental approach using winNonlin software, to determine the pharmacokinetic parameters that are listed in the table. The clearance of the CDRI 85/92 from prodrug became 1/4<sup>th</sup> as compared the parent compound, thereby increasing the half-life from 4.3h to 17.7h which is 3.7 times higher than the parent compound. Thus the prodrug is rapidly converted to parent compound stays longer in the body and may be effective for a longer period of time than the Parent compound.

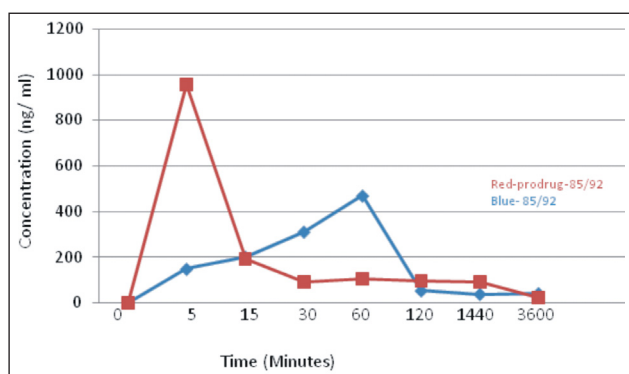


Fig. 1. Concentration- time plot of CDRI 85/92 after 20 mg/Kg oral dose of prodrug (▲) and CDRI 85/92 (●) in rats.

Table 1. Pharmacokinetic parameters of CDRI 85/92 after 20 mg/Kg dose of prodrug and CDRI 85/92 in rat serum

Parameters		Compounds administered orally	
		Prodrug	Parent compound
C <sub>max</sub> (ng/ml)	1	956	469
	2	107	-
t <sub>max</sub> (h)	1	0.08	1.02
	2	4	-
Elim.t <sub>1/2</sub> (h)		17.7	4.3
Cl/F(L/h)		6.1	25.3
MRT (h)		8.3	3.9
AUC <sub>0-4</sub> (ng.h/ml)		3263	892
AUC <sub>prodrug</sub> /AUC <sub>85/92</sub>		3.7	

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**Conflict of Interest:** None

**Ethical Clearance:** From Institutional ethical committee

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# Prophylactic Ureteral Stenting in the Excision of Large Broad Ligament Fibroid

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## ABSTRACT

Leiomyomas in uterine broad ligaments are usually asymptomatic but may grow to a very large size and alter the pelvic anatomy. This may result in difficulties during surgical excision with attendant complications, the most serious one being ureteral injury. A 45 year old lady presented with pain and distension of abdomen. On evaluation, a pelvic mass of 28 weeks size of varying consistency was observed. Ultra sonogram and Magnetic Resonance Imaging confirmed the diagnosis of right sided broad ligament fibroid. Anticipating possible ureteral injury owing to its size, preoperative stenting of the ureters was performed. Laparotomy was performed with the excision of tumour in toto, followed by total abdominal hysterectomy and bilateral salpingo-oophorectomy. With the post-operative period being uneventful, ureteral stent was removed.

*Keywords:* Broad Ligament Fibroid, Ureteral Stenting

## INTRODUCTION

Uterine leiomyomata are the most common benign tumors of female genital tract. Rarely, fibroids may arise from muscle elements of the broad ligament and grow to a very large size. Because of its rarity and anatomical distortion it causes, broad ligament leiomyomata pose specific diagnostic and operative difficulties, most serious one being ureteral injury<sup>1</sup>. The incidence of ureter injury during pelvic surgeries has been reported to range from 1 -13 per 1000 surgeries<sup>2</sup>. The best way in the prevention of ureteral injuries is to be forewarned of any abnormal position and displacement of ureters or existing pathologic condition prior to surgery. This can be achieved by prophylactic ureteral stenting prior to any pelvic surgery where there is a possibility of ureteral injury. This case has been presented to stress the importance of prophylactic ureteral stenting in a large broad ligament fibroid where ureteral injury is likely to occur.

## CASE REPORT

A 45 year old lady Para3Live3 presented to our Gynecology clinic with complaints of abdominal distension of three months duration associated with

abdominal pain for last five days. She had positive history of dyspepsia. She had no history of vomiting, fever, weight loss. She had nil history of bladder and bowel disturbances. She had normal menstrual cycles. On evaluation, she had mild pallor with nil significant lymphadenopathy. Her vital parameters were normal. Her respiratory and cardiovascular systemic evaluation was normal.

Her distended abdomen revealed a mass of 28 weeks size originating from the pelvis occupying the hypogastrium and umbilical region extending into right iliac and lumbar regions. The non tender mass had irregular surface and varying consistency. There was no free fluid. Speculum examination revealed a healthy appearing cervix. On bimanual pelvic examination, a firm to hard non tender mass felt in the pelvis extending into the abdomen almost reaching upto 28 weeks size. Uterus could not be delineated from the mass. Cervix was firm and drawn high up. Per rectal examination was normal.

On detailed investigation, she was anemic with hemoglobin of 8.5g%. Her baseline renal parameters and blood sugar were within normal limits. Urine culture showed nil significant bacteriuria.

Ultrasonogram of pelvis showed a mixed echogenic space occupying lesion of 23x15x11 cm size located in the pelvis, more towards right side obscuring the details of right adnexa and entire uterus. It had low to moderate vascularity. Left adnexa was normal. Both kidneys were normal. These findings were suggestive of probable uterine fibroid with a differential diagnosis of ovarian mass. Intravenous pyelogram showed bilateral functioning kidneys. Magnetic Resonance Imaging revealed a large heterogeneous abdomino-pelvic lesion of size 22.4x13.6x11 cm with low to intermediate signal intensity on T1-weighted images and low signal intensity on T2-weighted images, suggestive of right sided broad ligament leiomyoma.

With the working diagnosis of broad ligament leiomyoma, we planned for exploratory laparotomy.

Anticipating the possibility of ureteral injury during surgical maneuvers in lieu of the large size and anatomical location of the fibroid, bilateral Double J ureteral stenting was performed under cystoscopic guidance preoperatively under local anaesthesia.

Intraoperatively, we observed a huge mass occupying the entire pelvis originating from right broad ligament of the uterus (Figure.1). It had a variable, firm to cystic consistency with adherence noted at the posterior uterine wall. The uterus, right fallopian tube and ovary were anatomically displaced to the left side of the midline. In addition, multiple small uterine fibroids were also noted. The fallopian tubes and ovaries on both sides appeared healthy. After meticulous adhesiolysis, through anterior broad ligament approach, the mass was excised in toto. We then proceeded with total abdominal hysterectomy along with bilateral salpingo-oophorectomy.

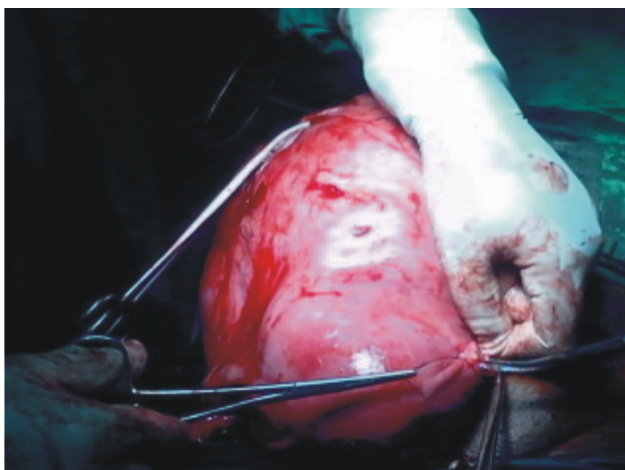


Fig. 1. Large fibroid arising from right broad ligament on laparotomy

Macroscopically, the excised mass had dimensions of 25x15x14 centimetres and weighed 4.1kilograms. Microscopically, it had cystic and myxoid degenerations with features consistent with leiomyoma. Her post operative period was uneventful. She was discharged satisfactorily after removal of her ureteral catheters under cystoscopic guidance on her eighth postoperative day.

## DISCUSSION

Broad ligament fibroids even though rare can grow to a large size to the extent of distorting the entire pelvic anatomy as in this case. Ureteral course can be variable depending on the anatomy of the patient as well as the anatomic distortion that can coexist with the pelvic abnormality. Intraoperative techniques to avoid ureteric injury and the ability to ensure ureteral patency should be in the realm of every gynaecologic surgeon. The literature is replete with numerous articles written over several years regarding the incidence of injury to the ureters, intra operative ureter identification and ureter repair in extensive pelvic surgeries<sup>3-6</sup>. Few authors have also highlighted the significance of prevention of ureteral injuries with cystoscopic catheterization<sup>7</sup>.

With large pelvic tumors especially those that have been developed between the leaves of the broad ligament, freeing the tumor from the pelvis may endanger an adherent ureter. When an intraligamentary fibroid suggests proximity or adherence of ureter, preoperative stenting of the ureters is both time saving and a great safety factor. By this procedure the ureter can be identified more swiftly and easily during surgery and its course can be followed throughout the pelvis without dissection and attendant danger of impairment of its blood supply<sup>1</sup>.

The cost of cystoscopy with ureteral catheterization is miniscule compared with the magnitude of the catastrophe caused by even one ureteral injury during the lifetime of a surgeon<sup>8</sup>. Prophylactic ureteral stenting is a safe and highly cost effective way of preventing injuries to the lower urinary tract. It also facilitates instant recognition and immediate intraoperative repair when an ureter injury occurs during the procedure. We also conclude that as technology exists today to essentially prevent all injuries to the lower urinary tract, it should be appropriately applied in the gynecological surgical settings where the potential for such complication does exist.

### ACKNOWLEDGEMENT

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### Disclosure Statement

None of the authors have any financial interest in the publication of this case report.

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# Estimation of Streptococcus Mutans Count in Saliva of Pregnant Women- A Case-Control Study

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## ABSTRACT

**Background and objectives:** Pregnancy is a physiological process associated with many functional and biochemical alterations in almost all systems of the body. The hormonal changes during pregnancy increase a woman's susceptibility to oral infections. Cariogenic flora, in particular *Streptococcus mutans* count is found to be increased during pregnancy. Hence, the present study was carried out to estimate the *Streptococcus mutans* in saliva of pregnant women and non-pregnant women. The results of the study could be further used to educate the pregnant women about the importance of oral hygiene during pregnancy.

**Materials & methods:** The study group comprised of 30 pregnant women and 30 non-pregnant women. Unstimulated whole saliva was collected to determine *S.mutans* colony count. The Student's 't' test and Mann Whitney 'U' test was used to determine whether there was a statistical difference between pregnant and non-pregnant women in the parameters measured.

**Results:** The mean *Streptococcus mutans* colony count was increased in saliva of pregnant women compared to that of the non-pregnant women. The mean *Streptococcus mutans* colony count between different trimesters in pregnant women showed that the third trimester of pregnancy had a higher mean compared to the first and second trimester but difference was not statistically significant.

**Conclusion:** The results of our study provide a baseline data regarding the changes in the *Streptococcus mutans* colony count during pregnancy. This could be used to emphasize the need for preventive dental care during pregnancy.

**Keywords:** Pregnancy, Cariogenic flora, Streptococcus Mutans, Saliva, Colony Count

## INTRODUCTION

In a woman's life, the major physiological and hormonal changes occur in pregnancy. All functions of the mother's body must adapt to the new condition. Clinical studies have shown that oral tissues can be affected by pregnancy which can be mainly attributed to changes in diet and poor oral hygiene. Dental caries is a multifactorial disease caused by interaction of host, agent, substrate and time. The effect of pregnancy on initiation or progression of dental caries is not clear. It is mainly the environment of the tooth that is affected.<sup>1</sup>

Saliva is a unique body fluid. One of the important functions of the saliva is that it controls the reproduction of microorganisms in the oral flora, thus playing an important role in preventing caries. It is reported that among microorganisms believed to lead to the occurrence of caries within the oral flora, *Streptococcus mutans* and lactobacilli play major roles.<sup>2</sup>

Saliva can be easily, non-invasively and inexpensively collected and it can be used in the diagnostic tests as a natural ultrafiltrate of plasma to estimate the microbiological count. Changes in

salivary composition during pregnancy may predispose to dental caries and erosion.<sup>2</sup>

The aim of this study is to estimate the levels of *Streptococcus mutans* in saliva of pregnant women and compare the levels with non-pregnant women to demonstrate whether there is any increase in cariogenic flora during pregnancy. This could be used to emphasise the need for preventive dental care to reduce these effects occurring during pregnancy and modify the oral hygiene practices in pregnant women.

## MATERIALS AND METHOD

The study was conducted in the Department of Oral Pathology, M.S.Ramaiah Dental College, Bangalore. It is a case-control study where in saliva samples were collected from 30 pregnant women reporting to Department of Obstetrics and Gynaecology and 30 non-pregnant women reporting to general Out-Patient Department at M.S.Ramaiah Medical and Dental College, Bangalore. Patients were fully informed about the study procedure and informed consent was taken.

### Inclusion criteria

Pregnant women (20-35 year old) between the first and ninth month of pregnancy, comprised the study group. Non-pregnant women (20-35 year old) comprised the control group. Patients who are having DMFT (Decayed, Missing and Filled Teeth) score within the range of 5-15 were considered to match the cases and controls.

### Exclusion criteria

The exclusion criteria's included for the study were pregnant women who are having pregnancy-related diabetes or hypertension and any other systemic disorders, patients with history of use of antibiotic during the last 2 months prior to the beginning of the study, patients using of any form of medication that modifies the saliva secreted, patients who are having Xerostomia and patient who are having less than 5 DMFT score.

## METHOD OF COLLECTING DATA

A thorough case history was taken; all the demographic details of the patients like name, age, occupation, address, family history, medical history, dental history were recorded. Patient's oral examination was done under good illumination using mouth mirror and dental probe. Oral Hygiene Index

Simplified (OHI-S) index was performed to assess the patient's oral health and DMFT index was performed to record the caries experience. Unstimulated saliva was collected in the morning (between 9am to 11am) at least one hour after breakfast to avoid any alteration in the salivary flow and rate. Patients were asked to wash the mouth prior to saliva collection. Unstimulated saliva (passive method) was collected into a sterile disposable container. 1ml of Saliva was mixed with 4 ml of 0.05M Phosphate Buffer Saline (PBS) (pH - 7.2-7.4) and transferred to the laboratory within 30 min for processing.

### Estimation of streptococcus mutans colony count

Saliva and 0.05M Phosphate Buffer Saline solution were vortexed in Cyclomixer for 1 min. From the solution, 20µl Saliva sample was pipetted using a micropipette and pour plate culture method was used to plate saliva on Mitis Salivarius Bacitracin (MSB) Agar. The plates were incubated anaerobically in CO<sub>2</sub> incubator (72 hour at 37°C). After incubation, count of colony was made depending upon morphological characteristics (raised highly convex colony) of *S.mutans* on MSB agar. The count of number of colonies was made using digital colony counter and expressed as number of colony forming units per millilitre ( $\times 10^3$  cfu/ml) of saliva. For confirmation of *S.mutans* colonies - Fermentation of mannitol for acid production was conducted on selected colonies in the culture plates.

### Statistical analysis

The Excel and SPSS (SPSS Inc. Chicago) software packages were used for data entry and analysis. The Student 't' test was used to determine whether there was a statistical difference between pregnant and non-pregnant women in the parameters measured. Mann Whitney 'U' test was applied to find out the significant difference between two independent groups. Kruskal Wallis test was applied to find out significant difference between the groups. In all above test a "p" value of less than 0.05 was accepted as indicating statistical significance.

## RESULTS

In the present study, the mean age of cases and controls was  $25.67 \pm 3.986$  and  $25.43 \pm 2.967$  years respectively. The mean DMFT score for the controls was  $6.50 \pm 1.796$  and for cases was  $6.20 \pm 1.297$ .



In the OHI-S score among pregnant women, 3 (10.0%) had good OHI-S, 17 (56.7%) had fair OHI-S and 10 (33.3%) had poor OHI-S score. Among the non-pregnant women, 10 (33.3%) of them had good OHI-S score, 18 (60.0%) had fair OHI-S score and 2 (6.7%) had poor OHI-S score. The difference between the scores was statistically significant with a 'p' value of 0.01.

The mean *Streptococcus mutans* colony count in cases was  $1385.97 \pm 787.859 \times 10^3$  cfu/ml and among controls was  $808.07 \pm 430.544 \times 10^3$  cfu/ml. The difference between the mean *Streptococcus mutans* count between the pregnant and non-pregnant women was found to be statistically significant with a 'p' value of 0.003. (Table 1)

When the mean *Streptococcus mutans* colony count between different trimesters in cases were considered, the third trimester of pregnancy showed a higher mean ( $1700.30 \pm 347.118 \times 10^3$  cfu/ml) compared to the first and second trimester but not statistically significant. (Table 2)

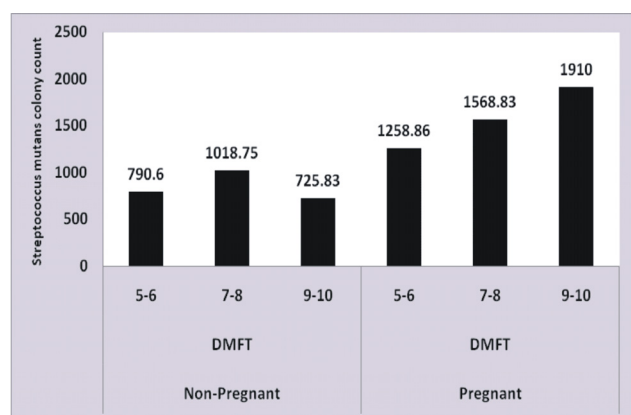
Pregnant women who had DMFT index of 9 & 10 had the highest *Streptococcus mutans* colony count of  $1910.00 \pm 320.468 \times 10^3$  cfu/ml and non-pregnant women who had DMFT score of 9 & 10 had the lowest *Streptococcus mutans* colony count of  $725.83 \pm 419.624 \times 10^3$  cfu/ml. (Graph 1)

**Table 1: *Streptococcus mutans* colony count in pregnant and non-pregnant women (units  $\times 10^3$ /ml)**

Groups	N	Mean	SD	Median	Min.	Max.	Mann-Whitney U	'p' value
Controls	30	808.07	430.544	750.00	110	1880	249.00	0.003
Cases	30	1385.97	787.859	1400.00	55	3210		

**Table 2: *Streptococcus mutans* colony count in pregnant women during the three trimesters of pregnancy (units  $\times 10^3$ /ml)**

Trimesters	n	Mean	SD	Median	Min.	Max.	Chi Square*	'p' value
First	10	1068.00	1130.200	607.50	55	3210	4.161	0.125
Second	10	1389.60	616.545	1318.00	250	2450		
Third	10	1700.30	347.118	1575.00	1375	2275		



**Graph 1. Comparison of mean *Streptococcus mutans* colony count in pregnant and non-pregnant women according to DMFT index**

Among these the cariogenic bacteria (*Streptococcus mutans*) contributes to initiation of dental caries.<sup>3</sup>

In our study, the age distribution among the pregnant and non-pregnant women ranges between 20-35 years. The mean DMFT score for the non-pregnant women was  $6.50 \pm 1.796$  and for pregnant women DMFT score was  $6.20 \pm 1.297$ .

In a study conducted by Vasiliauskiene I, of the 1070 pregnant women between the age range of 15-45 years, the mean DMFT of the pregnant women was  $12.065 \pm 0.106$ .<sup>4</sup>

In another study conducted by Guler E & Koprulu H, the average age of the study group (pregnant women in second trimester) was 24.57 years, and the average decayed, missing, and filled permanent teeth (DMFT) score was 6.63. The average age of the control group (pregnant women in third trimester) was 24.43 years, and the average DMFT score was 7.83.<sup>5</sup>

In our study, the DMFT score in non-pregnant women was slightly higher than the pregnant women

## DISCUSSION

Oral diseases (e.g., caries and periodontitis) during pregnancy are caused by a great variety of different factors and therefore, require the application of different preventive strategies. The four main factors implicated in the etiology of dental caries are cariogenic microorganisms, substrate, host, and time.

but the difference was not statistically significant. This could be an incidental finding as the sample size considered for the study was 30 patients in each group and DMFT caries index is a cumulative index which records the lifetime caries experience of a person whereas our study is a cross sectional study.

In our study, the OHI-S score recorded among 30 pregnant women showed that 3 (10%) had good OHI-S, 17 (56.7%) had fair OHI-S and 10 (33.3%) had poor OHI-S score. Among the 30 non-pregnant women, 10 (33.3%) of them had good OHI-S score, 18 (60%) had fair OHI-S score and 2 (6.7%) had poor OHI-S score. The difference of OHI-S scores between pregnant and non-pregnant was statistically significant with a 'p' value of 0.01.

A study conducted by Vasiliauskiene I, the mean of OHI-S was  $1.51 \pm 1.017$ , which shows a satisfactory oral hygiene in their study group. The poor OHI-S score during pregnancy can be attributed to the reduced importance given to maintenance of good oral hygiene. This might be due to an altered immune response or be related to stress and anxiety during pregnancy, resulting in inadequate attention to oral hygiene and contributing to the deterioration in a woman's oral condition. The habits of poor oral hygiene and dental health care behavior in pregnancy correlated with the risks of gingivitis. These findings are similar to the study done by Rakchanok N et al, according to them pregnant women were 2.2 times more likely to suffer from gingivitis than non-pregnant women.<sup>4,6</sup>

Based on our findings, pregnant women deserve additional attention during preventive dental examinations and it is necessary to motivate them to take particularly good care of their oral health. Since mothers play a crucial role in demonstrating and passing on proper health habits to their children, pregnant women should be regarded as a prime target group for oral health education.

In our study, the mean *Streptococcus mutans* colony count in pregnant women was  $1385.97 \pm 787.859 \times 10^3 / \text{ml}$  and among non-pregnant women was  $808.07 \pm 430.544 \times 10^3 / \text{ml}$ . The difference between the mean *Streptococcus mutans* count between the pregnant and non-pregnant women was found to be statistically significant with a 'p' value of 0.003.

The results are consistent with other study conducted by Villagrán E et al, in which they have taken pregnant and puerperal women (women immediately after delivery of child) as two groups and the pregnant women as a group had higher *Streptococcus mutans* counts than puerperal women.<sup>7</sup>

The increase in *Streptococcus mutans* count during pregnancy can be attributed to any changes in dietary habits, i.e. smaller meals at more frequent intervals because of the increased energy demands during pregnancy and lactation. Our study findings are in accordance with the above mentioned studies.<sup>8,9</sup>

In our study, the mean *Streptococcus mutans* colony count in pregnant women during the three trimesters revealed that the third trimester of pregnancy showed a higher mean compared to the first and second trimesters but the difference between the groups was not statistically significant. There was a gradual increase in the mean count between the first, second and third trimesters of pregnancy.

In a study conducted by Villagrán et al, in which they have taken 174 pregnant and puerperal women (women immediately after delivery of child) as two groups, they found no differences in *Streptococci mutans* counts among the three trimesters of pregnant women.<sup>7</sup>

According to Laine et al, an increase in salivary *Streptococcus mutans*, yeast, and lactobacilli levels has been found in the 3rd trimester of pregnancy and during lactation.<sup>10</sup>

The increase in the cariogenic bacteria during pregnancy especially during the third trimester can be attributed to the secretion of female sex steroid hormones in saliva which is significantly increased during late pregnancy, reflecting the increase in serum hormone levels.

Estrogens increase the proliferation and desquamation of epithelial cells, which may provide a better nutritional environment for bacteria in supragingival as well as subgingival sites. The flow of Gingival Crevicular Fluid (GCF) increases in gingival inflammation and provides access to serum derived nutrients and hormones, especially for subgingival flora. Similarly, cariogenic flora has also modified during pregnancy. *S. mutans* has been found capable

of metabolizing estradiol (main form of estrogen during pregnancy) but much less than *Streptococcus sanguis*.

It is not definitely known whether dental caries incidence increases during pregnancy. Most studies of pregnancy and caries have been cross-sectional or short-term follow-up studies with conflicting results. As the development of caries usually takes several years, the possible pregnancy-related increase in caries incidence is difficult to estimate.

Various factors which could be implicated for higher risk of tooth decay during pregnancy include increased acidity in the oral cavity, sugary dietary cravings, and limited attention to oral health. Saliva pH and buffering capacity reach their lowest values during the third trimester of pregnancy, thus increasing the risk of caries.<sup>11</sup>

Therefore, estimation of salivary *Streptococcus mutans* count in pregnant women can be used as a valuable data to assess their risk level for dental caries. This can be used to emphasise the need for preventive dental care to reduce these effects occurring during pregnancy and modify the oral hygiene practices. This could also be used as a baseline data to reduce the load of *Streptococcus mutans* count in the saliva of pregnant women, thus reducing the risk of transmission of the cariogenic bacteria and the development of early childhood caries in their infants.

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# Approaching Dentistry with Evidence

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## ABSTRACT

American Dental Association defines -"Evidence based care as an approach to oral health care that requires the judicious integration of systematic assessments of clinically relevant scientific evidence, relating to the patient's oral and medical condition and history, with the dentist's clinical expertise and the patient's treatment needs and preferences." Evidence is an important requirement for any clinical diagnosis and treatment. Any clinical decision requires reliable data to support the decision. An evidence-based approach has several advantages. One is that it will serve patients better because only tested procedures will be endorsed. Second is that it will increase the standing of the profession because it will ensure that proven treatments offered. Dentists are expected by patients, colleagues, and Government to keep abreast of new techniques and developments.

**Keywords:** Evidence, Copernicus, Embase, Court, Medline

## INTRODUCTION

Evidence based dentistry is the use of current best evidence in making decisions about the care of individual patients.

Carrying out evidence based dentistry requires that the practitioner question and think about what they are doing, particularly in this era of expectation that dentists will keep abreast of new techniques and developments.

## HISTORY

Professor Archie Cochranen – A Scottish epidemiologist wrote *Effectiveness and Efficiency: Random Reflection on Health Services* (1972) as an acceptance of the concepts behind evidence based practice.

In late 1970s the explicit methodologies use to determine "best evidence" were largely established by the McMaster University research group was led by David Sackett and Gordon Guyatt.

In 1992 the term "Evidence based medicine" first appeared in the medical literature Oxford University.

The first centre for Evidence based dentistry was established in 1995.

In 2000 Evidence based dentistry was introduced in India.<sup>1</sup>

## DEFINITIONS

### Evidence

Evidence in its broadest sense includes everything that is used to determine or demonstrate the truth of an assertion.

### Evidence based medicine

The conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients. The practice of evidence based medicine means integrating individual clinical expertise with the best available external evidence from systemic research.

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## Evidence based Dentistry

An approach to oral health care that requires the judicious integration of systemic assessment of clinically relevant scientific evidence, relating to the patient's oral and medical condition and history, with the dentist's clinical expertise and patient's treatment needs and preferences.

Evidence Based Dentistry (EBD) process that restructures the way in which we think about clinical problems and is characterized by making decisions based on known evidence.

### Why Evidence Based Approach ?

Objective

Scientifically sound

Patient focused

Incorporates clinical experience

Stresses good judgment

Is thorough and comprehensive

Uses transparent methodology<sup>2</sup>

### BASIC PHASES OF EBD

**Step 1:** Convert the need for information about prevention, diagnosis, prognosis, therapy etc, into an answerable question which relates specifically to all patient's requirements and population of interest.

**Step 2:** Track down the best evidence with which to answer that question

**Step 3:** Critically appraise the evidence for its validity (closeness to the truth), impact (size of the effect), and applicability (usefulness in clinical practice).

**Step 4:** Applying this information in a way to help the clinical practice

### Asking Evidence Based Questions

Clinical questions are normally framed in terms of the Problem (P), Intervention or Exposure (I/E), Comparison (C), Outcome (O)

## Searching for the Best Evidence

### Databases for searching literature

MEDLINE

The Cochrane Library

EMBASE

LILACS

The York University Centre for Reviews and Dissemination

Bandolier

The Centre for Evidence Based Medicine at Oxford

The University of Sheffield School of Health and Related Research

The Centre for Evidence Based Dentistry

### Medline

MEDLINE (Medical Literature Analysis and Retrieval System Online) remains the standard English language bibliographic database for biomedical information with free internet access from the National Library of Medicine. Covers the fields of medicine, nursing, dentistry, veterinary medicine, the health care system, and the preclinical sciences. Medline is freely available on the internet and searchable via PubMed and NLM's National Centre for Biotechnology Information system. The database contains more than 18 million records from approximately 5,000 selected publications covering biomedicine and health from 1950 to the present.<sup>3</sup>

Website: [www.ncbi.nlm.nih.gov/PubMed/](http://www.ncbi.nlm.nih.gov/PubMed/)

### Cochrane Library

The Cochrane library is a collection of databases in medicine and other healthcare specialties provided by the Cochrane Collaboration and other organizations. Its core is the collection of Cochrane reviews, a database of systemic reviews and meta-analyses. The Cochrane Library aims to make the results of well conducted controlled trials readily available and is a key resource in evidence based medicine.

The Cochrane Library consists of the following databases:

The Cochrane Database of Systemic Reviews (Cochrane Reviews)

The Database of Abstracts of Reviews of Effects (DARE)

The Cochrane Central Register of Controller Trials (CENTRAL)

The Cochrane Database of Methodology Reviews (Methodology Reviews)

The Cochrane Methodology Register (Methodology Register)

Health Technology Assessment Database (HTA)

NHS Economic Evaluation Database (NHS EED)

The Cochrane Library is a subscription based database, originally published by Update Software and now part of the Wiley Interscience system. In many countries, including Canada, United Kingdom, Ireland, the Scandinavian countries, New Zealand, Australia, India, South Africa and Poland, it has been made available free to all residents by "national provision."

### **Embase**

Embase, or the *Experta Medica Database*, is a biomedical and pharmacological database produced by Elsevier and containing over 11 million records from 1947 to the present. Covers 5,000 biomedical journals from 70 countries. It is available online through a number of database vendors. The emphasis is on the pharmacological effects of drugs and chemicals. Additional areas of coverage are human medicine, biological sciences, health affairs, drug and alcohol dependence, psychiatry, forensic science, pollution control, biotechnology, medical devices and alternative medicine.<sup>4</sup>

Website: [www.info.embase.com](http://www.info.embase.com)

### **LILACS**

LILACS stands for Latin American and Caribbean Health Sciences. Uses preferentially the languages

Portuguese, Spanish or English, since the majority of the articles LILACS are in one of these languages.

Website: [www.epm.br/cochrane/lilacs.htm](http://www.epm.br/cochrane/lilacs.htm)

The Centre for Review and Dissemination

The Centre for Reviews and Dissemination (CRD) is a health services research centre based at the University of York, England. CRD was established in January 1994, and aims to provide research based information for evidence based medicine. CRD carries out systemic reviews and meta-analyses of healthcare interventions, and disseminates the results of research to decision makers in the NHS.

Website: [Agatha.york.ac.uk/welcome.htm](http://Agatha.york.ac.uk/welcome.htm)

### **CEBM**

Promote evidence based health care and provide support and resources to doctors and health care professionals to help maintain the highest standards of medicine.

Website: [cebm.jr2.ox.ac.uk/](http://cebm.jr2.ox.ac.uk/)

The centre for Evidence Based Dentistry

The centre for Evidence Based Dentistry is a central reference source for all topics related to evidence based dentistry. It provides training in evidence based dentistry and is site for the editorial office for the evidence based dentistry journal<sup>5</sup>

Website: [www.ihs.ox.ac.uk/cebd/](http://www.ihs.ox.ac.uk/cebd/)

### **Bandolier**

Bandolier is an independent online electronic journal about evidence based healthcare, written by Oxford university scientists. It was started in 1994 and the National Health Service paid for its distribution to all doctors in the UK until 2002. Publication of the printed version ceased in 2007 and the new material is now published entirely electronically.

Website: [www.jr2.ox.ac.uk/Bandolier/](http://www.jr2.ox.ac.uk/Bandolier/)

### **The University of Sheffield School of Health and Related Research**

Offers internet resources for finding information

Website: [www.shef.ac.uk/scharr/ir/netting/](http://www.shef.ac.uk/scharr/ir/netting/)

### Strategies used for advanced electronic literature search<sup>6</sup>

Boolean operators

Truncation

Wild card

Controlled vocabulary

#### Boolean operators

AND

OR

NOT

#### Truncation

Truncation allows searching of terms that all begin with the same search string.

Truncation symbols vary between databases.

The asterisk is the symbol used within most databases.

#### Wildcard

In order to search for variations in spelling, some databases allow wildcard characters.

The wildcard characters may be denoted by a questionmark ? in some databases.

The wildcard is inserted in the word to denote a possible variation in spelling.

#### Controlled vocabulary

A search using just indexing terms is referred as controlled vocabulary.

Improves the sensitivity of our search.

Eg: MEDLINE(Pubmed) – MeSH terms are used

#### Research studies

To evaluate research studies critically, clinician must have a working knowledge of the principles of scientific research and an understanding of the various types of research studies. Briefly, there are two broad categories of research: Basic research and Clinical research.

All clinical research studies are encompassed under the broad heading of epidemiologic studies.<sup>7</sup>

#### Intervention studies

Intervention studies or clinical trials are considered to be the “gold standard” for clinical research studies.

#### Observational studies

An observational study is one in which the investigators do not intervene in any way.

#### Systemic Reviews

Cornerstone of EBD

It is a form of overviews or meta-analyses that offers a solution for busy practitioners who have difficulty keeping abreast of current literature.

Because systemic reviews can condense numerous studies into valid and reliable summaries of the best available evidence for a specific clinical problem, they offer significant benefit to busy clinicians.<sup>8</sup>

#### Important questions to be answered when assessing a systemic review

Was the clinical question clearly stated and addressed?

Were the search methods comprehensive enough to find all the relevant articles?

Were explicit methods used to evaluate which articles to include in the review?

Was validity of the articles assessed and was this assessment reliable and biasfree?

Were inconsistencies in the findings of the included studies analyzed?

Were the findings of the primary study combined appropriately?

Were the reviewers conclusion supported the data?

#### Meta-analysis

A useful definition was given by Huque: “A statistical analysis that combines or integrates the results of several independent clinical trials considered by the analyst to be ‘combinable.’”

Meta-analyses applies scientific strategies that limit bias to the systemic identification and collection, critical appraisal and synthesis of relevant studies on a specific topic

It uses statistical methods to combine and summarize the results of several studies.

Meta-analysis is therefore useful tool in decision making and health technology assessment.<sup>9</sup>

**Bias**

Bias is a systemic error that distorts the true relationship between an event and its outcome.

*Publication bias:* it is the tendency for journals to publish only ‘significant’ results.

*Recall bias:* when certain patients have a differential ability to remember details about their past.

*Allocation bias:* when the treatment groups in an experimental study are not comparable with respect to the variables influencing the response of interest.

Observer bias: when one observer consistently over reports (or under reports) a variable. This may be resolved by training and calibration.

Selection bias: when the individuals in the study are not representative of the population of interest.

**Journals**

Journal of evidence based dentistry:  
www.nature.com/ebd/about.html

Journal of evidence based dental practice:  
www.jebdp.com/home

**LEVELS OF EVIDENCE**

Level of Evidence	Study type
1	Systemic Reviews of Randomized Controlled Trials and Randomized Controlled Trials
2	Systemic Reviews of Cohort Studies and Cohort Studies
3	Systemic Reviews of Case Control Studies and Case Control Studies
4	Case Series, Case Reports
5	Expert Opinion

**Critically Appraise the Evidence**

Once the best evidence has been identified, three question are asked before applying the evidence to the clinical scenario.

The first question on validity concerns the article’s closeness to the truth or unbiased results.

Finally, answering the question “is this information relevant to my patient?” depends heavily on clinical judgment.

Put most simply, how similar (or different) is my patient or my patient’s problem from those in the study?

**Critical appraisal by checklist**

The CONSORT includes a checklist and flow diagram originally developed by an international group of clinical investigators, statisticians, epidemiologists and biomedical journal editors to help researchers improve the quality of reporting randomized controlled trials.

The QUOROM checklist was also developed through consensus by a heterogeneous group of health professionals.<sup>10</sup>

**Consort**

It consists of twenty one headings and subheadings that assess the quality of various steps necessary for conducting a systemic review, regarding search and selection of studies, validity assessment, data abstraction, study characteristics and quantitative data synthesis.

**CONCLUSION**

Evidence based health care offers a broader, deeper and faster moving approach to clinical decision making than tradition based care. Evidence based health care has potential to improve health care by providing mechanisms for transforming the teaching and practice of oral health care professionals as they continue to face an exploding volume of literature, rapid introduction of new technologies, deepening concern about health care disparities and increasing attention to the quality and outcome of oral health care.

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# A Bacteriological and Mycological Study of Cases of Corneal Ulcer in a Tertiary Care Hospital of Assam with Reference to Antimicrobial Susceptibility

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## ABSTRACT

**Background:** Corneal ulceration is a potentially devastating infection that can rob a person of sight.

**Objectives:** The present study was carried out with the intention to isolate and identify the microbial agents infecting the patients with corneal ulcer admitted to RIO and to the invitro sensitivity pattern of the isolated bacteria to different antimicrobial agents.

**Materials and Method:** Scraping were also smeared on slides for direct smear. Multiple scraping were taken for KOH with Bard Parker Blade No 15 from margins as well as base of ulcer and inoculated bedside in BA ,MA agar, SDA and thioglycollate broth. Antibiotic sensitivity testing was done in Muller Hinton Agar by standard disc diffusion method.

**Keywords:** Corneal Ulcer, Perforation, Bacteria, Blindness

## INTRODUCTION

The gift of sight is more precious to mankind, deprivation of which is the worst disability a human being can suffer. Corneal ulceration is break in the epithelium with an underlying stromal necrosis. It is a potentially devastating infection that can rob a person of sight. Any case of corneal infection should be dealt with as an emergency condition.

Among the several agents than can elicit an inflammatory response in the cornea, the two common are microbial infections and various immunologic conditions including allergy, immunology and hypersensitivity. Microbial pathogens can cause corneal damage directly or by release of toxins and enzymes or by activating the immune mechanism.

An intact epithelium acts as a barrier against most organisms except *Neisseria gonorrhoeae*, *Corynebacterium diphtheria* and *Haemophilus influenzae*. For all other bacteria, a breach in the epithelium is useful.

In the Nepal Blindness Survey, corneal trauma and ulceration was found to be the second leading cause of unilateral visual loss after cataract accounting for 7.9% of all blindness. In Tanzania and Bangladesh, corneal scarring was found to be responsible for 33.55% of all cases of unilateral blindness. Surveys of blind children in Africa have shown that approximately 70% of visual disability is caused by corneal specification.

The hall mark of treating keratitis is the prompt institution of appropriate antimicrobial therapy to minimize corneal scarring and visual loss.

The spectrum of microorganism responsible for corneal ulceration varies according to geographical location. Reports from northern part of United States of America show Gram positive organism while the southern parts show a striking number of fungal and Gram negative isolates. A recent study from Britain shows Gram positive isolates.

Morbidity can be significantly reduced when the treatment modality is guided by the knowledge of the causative organism and its antimicrobial susceptibility.

Much of the hope for the future lies in continuous clinical research and therefore it was considered worthwhile to study a group of patients to develop a better insight into the condition.

### MATERIAL & METHOD

The cornea was anaesthetized with 4% lignocaine and universal eye speculum was applied to eye for proper exposure. Multiple scrapings were taken with Bard Parker blade Number 15 from the margins as well as the base of the ulcer.

The following investigations were carried out with this scraped material.

- a) A smear was made of on a dry glass slide by taking a little material directly from the scraping of the corneal ulcer with the help of a platinum loop, after proper sterilization by heating.
- b) Two slides were taken for Gram staining and 10% KOH preparation.

It is imperative to collect multiple scrapings from as well as the center of the ulcer. If the lids are sticky or loose debris is found over the ulcer it was cleaned with sterile cotton swabs before collection of clinical materials. All solid agar media were inoculated on the surface without cutting the agar and C-shaped inoculations were made at sites. The media used aerobically, were Blood agar, Mac Conkey Agar, Chocolate Agar and Brain heart infusion broth. The media used anaerobically were blood Agar and Thioglycollate broth.

Thioglycollate broth was also used for transport of anaerobic specimens. Besides subjecting the colonies which appeared on blood agar and Mac Conkey Agar to various tests. Any turbidity which appeared in brain heart infusion broth were first identified by Gram stain and subcultured into Mac Conkey and blood agar media.

#### Characterization and Identification of the organisms were done by studying the following

- 1) Colony characteristics
- 2) Gram staining
- 3) Motility of the organisms

- 4) Biochemical reactions, when necessary.

Culture of anaerobic bacteria by inoculating specimens on Thioglycollate broth. For inoculation into Thioglycollate broth it was initially boiled for 10 mins in a water bath and cooled rapidly prior to inoculation. The specimen was inoculated in the bottom of the Thioglycollate broth, avoiding introduction of air bubble into the broth. The anaerobic system considered of anaerobic jar made of plastic, lid, clamps and an anaerobic charge. First silicon grease was applied generously on the rim of the anaerobic jar on the lid. The streaked plates were kept ready on the stand. From the turbidity on the thioglycollate broth incubated for 24 hours in the incubator at 37°C, the blood agar plate were streaked. The contents of 1 unit of Dyanox J:1 anaerobic charge was placed at the bottom of the jar 40 ml of 1:4 Sulphuric acid was poured on the charge. The stand containing the streaked plates was placed inside the jar test tube containing freshly prepared Methylene blue (as an indicator of anaerobiasis) was also put inside the jar. The lid was quickly placed over the jar and clamped tightly. Three fourth of the external tube of the anaerobic jar was filled up with a saturated solution of sodium carbonate. A vigorous bubbling started immediately in the external tube. The anaerobic jar containing the plates were incubated at 37°C and examined after 48-72 hours. Culture plates showing no growth were further incubated anaerobically for 5 days and examined on alternative days before discarding. Organism that grew on anaerobic condition were identified by various tests.

All the isolated agents for different antimicrobial agents were tested by standard disc diffusion method (Kirby Bauer Technique, 1996). Commercially available antibiotic discs were obtained from Hi Media laboratories Ltd. Muller Hinton Agar was the media used for anti microbial sensitivity testing. Freshly prepared blood agar was to be used for anti-microbial sensitivity testing of anaerobes. For mycological specimen – LPCB was done along with routine for processing of yeast and moulds nutrient test for processing.

### RESULTS

#### Isolation of bacteria

Out of 70 specimens tested, there was no growth of any bacteria in 35 specimens. Mixed (bacterial + fungal) growth were in 30 positive cultures. 5 culture showed only growth of bacteria.

**Table 1 Showing the pattern of growth in positive cultures**

Types of isolation	Number	Percentage
Multiple	30	85.7%
Single (bacteria)	5	14.2
Total	35	100

**Table 2: Bacteria Isolated in 35 culture Positive Cases:**

Aerobic Isolates	Number of Isolates (n=35)	Percentage
CONS	15	42.8
Staphylococcus aureus	12	34.28
Pseudomonas	5	14.28
E. Coli	2	5.57
Klebsiella	1	2.85

**Table 3. Individual Fungal Spp. Isolated in 30 cultures.**

Fungal Spp.	Number of Isolates (n=30)	Percentage
Aspergillus Fumigatus	6	20%
A Flavus	4	13.33%
Fusarium	6	20%
A Niger	1	3.33%
Candida Spp.	7	23.33%
Alterneria Spp.	6	20%
Total	30	100%

Sex and Age Distribution of Cases:

Age and sex distribution of 70 patients with corneal ulcers are shown in table 1 and figure 1 A and 1B

**Table 4. Sex and Age distribution of 70 cases of corneal ulcers**

Age Group in years	Male (No)	Female (No)	Total No. (%)
0-10	1	1	2 (2.85)
11-20	2	1	3 (4.28)
21-30	5	2	7 (10)
31-40	10	6	16 (22.85)
41-50	9	5	14 (20)
51-60	10	7	17 (24.28)
61-70	10	1	11(15.71)
Total	47 (67.14%)	23 (32.85%)	70 (100)

**Table 5 : Showing seasonal variation of 70 corneal ulcer cases.**

Month	No. of cases	Incidence in prevalence
January	9	12.8
February	7	10
March	3	4.28
April	3	4.28

**Table 5 : Showing seasonal variation of 70 corneal ulcer cases. (Contd.)**

Month	No. of cases	Incidence in prevalence
May	4	5.71
June	4	5.71
July	5	7.14
August	6	8.57
September	8	11.42
October	6	8.57
November	7	10
December	8	11.42
Total	70	100

Occupational variation of Corneal ulcer Cases:

**Table 6 and Figure 4 shows incidence of corneal ulcer cases in relation to occupation of the patients.**

Occupation	No of Cases	Incidence (%)
Cultivator	19	27.14
House wife	17	24.28
Students	4	5.71
Business man	7	10
Government servant	7	10
Labourer	11	15.71
Carpenter	2	2.85
Others	3	4.28
Total	70	100

Table 7 Shows corneal ulcer in relation to modes of trauma and figure 5 shows incidence of Keratitis in relation to different traumatic agents.

**Table 7 : Corneal ulcer in relation to trauma.**

Trauma	No of Cases	Incidence (%)
Paddy leaf	12	17.14
Paddy grain	4	5.71
Bamboo stick	4	5.71
Bamboo leaf	3	4.28
Vegetable matter	3	4.28
Grass	1	1.42
Other leaves	2	2.85
Straw	3	4.28
Wood pieces	3	4.28
Dust particle	7	10
Mud	4	5.71
Insect bite	2	2.85
Cows tail	4	5.71
Finger nail	2	2.85
No history of trauma	16	22.85
Total	70	100

**Table 8 : Showing results of the invitro antimicrobial sensitivity tests of different Gram positive aerobic isolates.**

ISOLATES	Of	Cf	C	Va	G	Tb	Gf	Mo	Nx	AK
CONS (15)	68.75% (11)	62.5% (10)	62.5% (10)	100% (15)	75% (12)	100% (15)	100% (15)	87.5% (14)	81.25% (13)	87.5% (14)
Staphylococcus aureus (12)	58.3% (7)	60% (6)	66.66% (8)	100% (12)	75% (9)	100% (12)	100% (12)	83.33% (10)	83.33% (10)	66.66% (8)
Sensitive Isolates (28)	64.28% (18)	57.14% (16)	64.2% (18)	100% (28)	75% (21)	100% (28)	100% (28)	85.7% (24)	82.14% 23	85.71% (24)

**Table 9 : Showing results of the antimicrobial sensitivity of Gram negative bacilli**

ISOLATES	Of	Cf	C	G	Gf	Mo	Nx	AK
Pseudomonas (5)	40% 2	80% 4	100% 5	60% 3	100% 5	100% 5	40% 2	60% 3
Klebsiella (1)	100% 1	0% 0	100% 1	100% 1	100% 1	100% 1	0% 0	100% 1
E. Coli (2)	100% 2	100% 2	100% 2	50% 1	100% 2	100% 2	50% 1	100% 2
Total sensitive isolates 8	62.5% 5	75% 6	100% 8	62.5% 5	100% 8	100% 8	60% 3	75% 6

### Outcome Of Treatment

Outcome of Treatment of culture positive cases of corneal ulcers are shown in Table 10.

Organism	Total Number of positive cases	2 Weeks Follow up	4 weeks Follow up	6 weeks Follow up	8 weeks Follow up	No Follow up
Coagulase negative Staphylococcus	15	2 (12.5%)	5 (31.25%)	5 (31.25%)	3 (18.75%)	0(6.25%)
Staphylococcus aureus	12		3 (25%)	5 (41.6%)	3(25%)	1(8.33%)
Pseudomonas Spp.	5			1(20%)	1(20%)	3(60%)
E. coli	2		1 (50%)		1 (50%)	
Klebsiella Spp.	1			1 (100%)		
Total	36					

### DISCUSSION

The present study was carried out to find the bacterial etiology of corneal ulcers in the Department of Microbiology, Gauhati Medical college with coordination with RIO, Assam, over a period of one year from August 2005 to September 2006. Corneal scrapings from 70 patients were processed for isolation and identification of the causative bacteria with their antimicrobial susceptibility pattern.

In the present study, the incidence of corneal ulcers was found to be higher in males (67.14%) than in females (32.85%), the male to female ratio being 2:1.

Ormerod et al (1987) in the Department of Ophthalmology, Southern California found higher incidence of corneal ulceration in males. Out of 210 patients, 149 patients were males and 61 patients were females, the male to female ratio being 2.44:1.

Corneal ulcers are found to be more common in the harvesting months. Highest incidence of corneal

ulcers were observed in January 9 (12.8%) and September 8 (11.42%) in the present study.

Jones et al (2006) in their study found that 9(30%) cases were prevalent during winter months and 8 (27%) cases during Autumn season.

We have found in our study that cultivators 9 (27.14%) were the most frequently affected followed by housewives 17 (24.28%) by corneal ulcer, probably due to the nature of their work.

Similarly, Upadhyay et al (1991) in the Department of Ophthalmology, Tribhuvan University, Nepal studied a group of 405 corneal ulcer patients, where 201 (49.5%) were farmers followed by housewives 91(22.5%).

India, primarily being an agricultural country, we have seen that most the cases had relevant history of trauma. In our study, the most common being from paddy leaf in 12 (17.14%) followed by injury with dust particle in 7 (10%) cases.

Islam et al (1987) in Bangladesh under took a study, where paddy injury was reported in 7 (24.13%) of 29 patients.

Corneal ulceration is mainly of microbial etiology. In the present study, out of 70 cases, 35(50%) cases were culture positive. Single bacterial isolates were seen in 5 (14.2%) culture positive cases. Mixed (bacterial + fungal) were seen in 30 (85.7%) in culture positive cases. All the bacterial isolates were aerobic.

Khanal et al (2001) conducted a study on 86 patients, out of which 38.37 % (33 out of 86 patients) yielded aerobic bacterial isolates and none yielded anaerobic bacteria. Polybacterial growth was however detected in 15% (13 out of 86 patients) of cases.

Among 35 bacterial isolated, we have found 42.8% coagulase negative Staphylococci, 34.28% Staphylococcus aureus, 14.28% Pseudomonas spp, 5.55%, E, coli and 2. 85% Klebsiella Spp.

Cameron et al. (2006) in Sydney Eye Hospital isolated 38% Coagulase negative Staphylococci, 21% Pseudomonas, 11% Staphylococcus aureus and 1.8% Klebsiella in their study.

In another study by McKeller et al (2004) their was positive culture in 58.6% of corneal scrapings. The commonest Gram positive organism were Coagulase negative Staphylococci in 19.3% and Staphylococcus aureus in 11.2% of cases. Other organisms isolated were Pseudomonas Spp. In 3.1% and Klebsiella in 1.5% of cases.

Varaprasathan et al. (2004), conducted a study where organisms were isolated from 427 ulcers, 38% of all cases. Among them, 278 (59%) were Gram positive bacteria, 145(31%) were Gram negative bacteria, 16 (3%) were Acanthamoeba Spp. And 36 (8%) were fungi.

**Antimicrobial sensitivity trend:** In the present study, all the serobic Gram positive coccoi showed 100% sensitivity to Vancomycin, Tobramycin and Gatifloxacin

Srinivasasan et al (2001) in Arvind Eye Hospital, Madurai found that 85% of patients showed healed keratitis, on proper microbiological evaluation, after 26 days of treatment.

Fungal keratitis was first described by Leber et al. in 1879. It represents one of the major cause of infectious keratitis in topical areas of the world.

Once 70 different type of fungi have been implicated as causing fungal keratitis two most important are yeast & filamentous fungi.

The list includes many fungi but not limited to yeast of candida spp. Filamentous fungi with septa such as Aspergillus, Fusarium, cladosporium, etc. Risk factors include, trauma, ocular surface disease and tropical steroid use. Risks and type of fungi vary Geographical location. In warm climates, the rule is that most of the common org. are filamentous fungi like fusarium and Aspergillus Spp. In our study we have found Candida to be the most common Spp. followed by aspergillus.

## CONCLUSION

1. The findings of the present study reveals Staphylococcus epidermidis and Staphylococcus aureus as the predominant bacterial pathogen in Corneal ulceration.
2. Chloramphenicol, Gatifloxacin, Ofloxacin, Moxifloxacin are quite effective antibiotics for the treatment of Corneal ulcer of bacterial origin. Among fungal isolate, candida opp was the predominant fungal pathogen followed by Aspergillus fungation.
3. Complications of corneal ulcer like perforation, blindness, scarring continue to challenge the clinician who care for these patients. This problems demand a multidisciplinary of ulceration and hospital stay.
4. Hence it needs to be emphasized that a routine microbiological examination of the patients with corneal ulcer is to be carried out in this institution so as a analyse and compare the changing trends in the microbial etiology and their antibiotic sensitivity pattern. This can help in formulating a proper and appropriate antibiotic response against corneal ulcers.

**Conflict of Interest:** None

**Acknowledgement:** Nil

**Source of Funding:** Self

**Ethical Clearance:** There was no provision of ethical clearance during our post graduation study period in Gauhati Medical College & Hospital, Guwahati, Assam. This study was my actually thesis for MD, Microbiology.

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# Study of Falciparum Malaria in a Rural Tertiary Center in Karnataka

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## ABSTRACT

**Background:** Malaria is one of the most serious parasitic diseases. Of the four species of Plasmodia causing human malaria, P. falciparum can cause life threatening complications.

**Objectives:** To study various complications of falciparum malaria and to study outcome of falciparum malaria.

**Material and Method:** 50 adult cases of falciparum malaria confirmed by positive peripheral smear were included in the study. Study was conducted from January 2008 to June 2009. Cases were observed with reference to the presentation, complications and outcome. Data was analysed with descriptive statistical tools.

**Results and Conclusion:** The male to female ratio was approximately 2:1. The maximum number of patients was in the age group of 26-40 years, i.e. 42%. Majority of the patients (52%) was of the low socioeconomic group. Fever was present in all cases. Pallor (62%) was the most common sign followed by splenomegaly (62%) and icterus (48%). Jaundice (51.4%) was the most common complication, followed by cerebral malaria (48.6%), anemia (45.9%), ARF (29.7%), ARDS (13.5%). More patients presented with multiple complications (54.05%) than single complication (49.95%). Majority of patients of complicated falciparum malaria responded to IV quinine or artemisinin-based combination therapy. The overall mortality out of 50 patients was 3 (6 %) in our study. All 3 patients who expired had multiple complications and they constituted 8.3% of all complicated malaria cases.

**Keywords:** Falciparum Malaria, Anemia

## INTRODUCTION

Malaria is one of the most serious parasitic diseases of the world. Of the four species of plasmodia causing human malaria, P. falciparum has the potential of developing life threatening complications, which may result in fatality.<sup>1</sup> According to world malaria report 2010, there were 225 million cases of malaria and an estimated 7,81,000 deaths in 2009.<sup>2</sup> Malaria is one of the major health problems in Karnataka and contributes about 7-10% of total cases of malaria in

the country.<sup>3</sup> Kolar district has always been endemic area for malaria.<sup>4</sup>

Recently, there is a changing trend in both clinical manifestations and complications of falciparum malaria.<sup>5</sup> The knowledge about the prevalence of different complications in a particular geographic area could help in early diagnosis and treatment there by reducing mortality.<sup>6</sup>

## OBJECTIVES

1. To study clinical presentation and complications falciparum malaria
2. To study outcome of falciparum malaria

## MATERIALS AND METHOD

The present work is a prospective study conducted

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in R. L. Jalappa rural tertiary centre, Kolar from January 2008 to June 2009. A total 50 patients of falciparum malaria who fulfilled inclusion criteria were included in the study.

**Inclusion criteria**

Adult patients of falciparum malaria confirmed by positive peripheral blood smear

**Exclusion criteria**

Patients less than 18 years of age

Plasmodium vivax smear positive and mixed smear positive.

Patients presenting with clinical feature mimicking malaria as in leptospirosis, dengue fever and sepsis

Patients with liver disease, chronic kidney disease

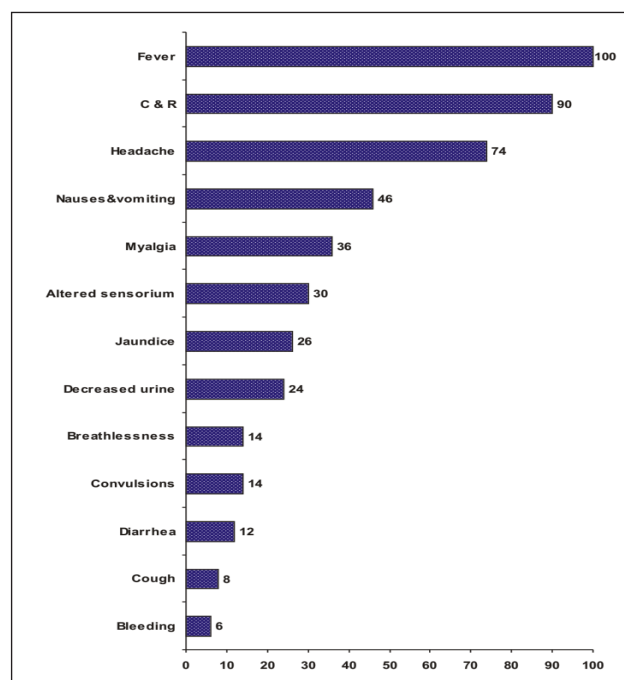
The clinical data of all the cases were gathered as per proforma. The institutional ethical clearance was obtained and written informed consent was taken from all subjects. Peripheral blood smear were collected from all patients at admission for detection of malaria parasite. All patients underwent Blood investigations like complete hemogram, LFT, renal function tests, Blood sugars and chest x-ray, ECG. Patients presenting with complications like cerebral malaria, ARDS and Jaundice were subjected for specific investigations like CSF analysis, ABG and hepatitis B and C serology respectively.

Diagnosis of Falciparum malaria was made with detection of asexual form of P. falciparum from peripheral blood smear. Severe complicated malaria was diagnosed according to guidelines by WHO.<sup>7</sup> Cerebral malaria was diagnosed when a patient had unarousable coma not attributable to any other cause with GCS<9 or impairment of consciousness less marked than unarousable coma, multiple convulsions (more than two episodes in 24 hours), renal failure, hyperbilirubinemia, hypoglycemia and severe anemia and metabolic acidosis were diagnosed when serum creatinine was more than 3.0 mg/dl, serum bilirubin was more than 2.5 mg/dl, random blood glucose was less than 40 mg/ dl and hemoglobin was less than 7.0 gm/dl, and ph <7.5 respectively. Circulatory collapse (Algid malaria) was defined as systolic blood pressure (SBP) < 70mm Hg and Respiratory distress when patient had tachypnea with or without pulmonary edema (radiological).

Patients were observed with reference to presentation, complications and outcome. Patients with complications were classified under single and multiple complications and were studied with reference to onset, progression, duration and outcome. Cases were managed as per standard treatment protocol as put forward by WHO. All cases of complicated malaria received parenteral Quinine/ Artemisinin derivatives .Quinines was given I.V in a dose of 20mg /kg over 4 hrs followed by 10mg/kg 8<sup>th</sup> hourly combined with oral Doxycycline 100mg twice daily until patient could take orally. Artesunate was given at dose of 2.4 mg/kg on first day followed by 1.2mg/kg daily with oral Doxycycline 100mg twice daily. Patients with uncomplicated falciparum malaria were treated with oral Quinine or Artemesinate derivatives with Doxycycline for 7 days .Necessary supportive measures and treatment of complication were done and outcome was studied.

**Statistical Analysis:** Descriptive statistical analysis has been carried out in the present study. The Statistical software namely SPSS 15.0, Stata 8.0, MedCalc 9.0.1 and Systat 11.0 were used for the analysis of the data. Chi-square/ Fisher Exact test was used to find the significance of study parameters on categorical scale between two or more groups.

**RESULTS**



**Fig. 1. Clinical presentation of patients studied**

Fever was the chief presenting complaint in all the patients (100%), followed by chills and rigors in 90%, headache (74%), nausea & vomiting (46%), myalgia (36%), altered sensorium (30%), breathlessness and convulsions in 14% of patients. Raised temperature was present in 96% of the patients, pallor in 62%, icterus in 48%, dehydration in 24%, BP < 90 mmHg in 8% of the patients. Splenomegaly was present in 62% of patients and hepatomegaly was present in 32% of patients. Impaired consciousness in 42% of patients, neck stiffness in 12% and convulsions in 14% of patients was observed.

Out of 50 patients of falciparum malaria, complicated malaria was seen in 74 % (37) of patients and uncomplicated malaria in 26 % (13) of patients.

**Table 1: Complications of falciparum malaria**

Complications	Number of patients(n=37)	%	95%CI
Jaundice	19	51.4	35.89-66.55
Cerebral Malaria	18	48.6	33.45-64.11
Anaemia	17	45.9	31.04-61.62
Thrombocytopenia	15	40.5	26.35-56.51
ARF	11	29.7	17.49-45.78
ARDS	5	13.5	5.91-27.98
Hypoglycemia	3	8.1	2.80-21.30
Hypotension/Shock	3	8.1	2.80-21.30
Bleeding/DIC	3	8.1	2.80-21.30
Hemoglobinuria	2	5.4	1.50-17.70

Among various complications, Jaundice (51.4%) was the most common complication, followed by cerebral malaria (48.6%), anemia (45.9%), ARF (29.7%), ARDS (13.5%), hypotension (8.1%), hypoglycemia (8.1%), DIC (8.1%). Blood pressure less than 90 mm Hg was seen in 8% of patients. Thrombocytopenia was seen in 40.5% of patients. Three patients had platelet counts less than 50,000 with bleeding manifestations. 16 patients had severe anemia (Hb < 6 gm %) and required blood transfusion. There were 17 (45.95%) patients with single complication (SC) and 20 (54.05%) patients with multiple complications (MC).

**Table 2: Treatment modalities and outcome in complicated malaria.**

Treatment	Number of patients (n=37)	Outcome		
		Death	Discharged & Lost for followup	Recovered
Quinine	20	2(10.0%)	3(15%)	15(75%)
Artemisinin-based combination therapy	17	1(5.9%)	1(5.9%)	19(88.2%)
Total	37	3(8.1%)	2(5.4%)	32(86.48%)

Inference Mortality is positively associated with Quinine with p=0.246

Of 37 cases of complicated falciparum malaria 20(40%) received quinine and 17(34%) received artesunate combination therapy. mortality was 2(10%) in quinine Group and 1(5.9%) in artemisinin combination therapy group. Thirteen patients with uncomplicated malaria were treated with oral chloroquine or quinine or artemisinin and all of them completely recovered completely.

Overall Mortality was 6% in our study. All 3 patients who died had multi-organ dysfunction at admission and delayed presentation to hospital. About 8% of patients got discharged against medical advice. About 86% of patients recovered.

## DISCUSSION

The present study is comparable in regards to most of the signs and symptoms with the study by Murthy GL et al, <sup>8</sup> 100% of patient had complained of fever and fever was associated with chills and rigors in 90% of patients in our study. Another study by Murthy GL et al, <sup>9</sup> showed that fever with chills and rigors in 98.10% of patients which is comparable. Yellowish discoloration of eyes was complained by 26% of our patients. It was 23.41% in study by Murthy GL et al.<sup>8</sup>

In the present study, patients demonstrated atypical symptoms such as vomiting in 23 (46 %), diarrhea in 6 (12%), convulsions in 7(14%), and breathlessness in 7(14%) cough in 4 (8%) of patients. A study conducted in Jamshedpur in Jharkhand state of India has described the atypical presentation of falciparum malaria comprising convulsion in 28.55%, abdominal pain in 5.7%, generalized weakness and palpitation in 5.5% cases.<sup>9</sup>

**Table 3: Comparison of complications of Falciparum malaria with the studies of Murthy GL et al<sup>8</sup> and Kochar DK et al.<sup>6</sup>**

Complication	Present study	Kochar DK et al <sup>6</sup>	Murthy GL et al <sup>8</sup>
Anemia	45.9%	26.04%	74.68%
Thrombocytopenia	40.50%	19%	40.50%
Cerebral malaria	48.6%	10.94%	48.1%
Jaundice	51.4%	58.85%	40.50%
Acute renal failure	29.7%	6.25%	24.68%
Hypoglycemia	8.1%	1.56%	8.22%
Hypotension/shock	8.1%	10.94%	-
DIC	8.1%	25.52%	16.45%
Pulmonary edema	13.5%	2.08%	11.49%
Hemoglobinuria	5.4%	-	4.27%

In our study, the most common complication was jaundice (51.9%) followed by cerebral malaria (48.6%), anemia (45.9%), ARF (29.7%), ARDS (13.5%). In the study by Murthy GL et al<sup>8</sup>, anemia (74.6%) and cerebral malaria (48.1%) were the common manifestations followed by jaundice (40.5%) and ARF (24.6%). In a study by Kochar et al,<sup>6</sup> conducted in Bikaner Rajasthan, jaundice and anemia were most common manifestations followed by DIC and cerebral malaria. This shows that the spectrum of common manifestations and complications of malaria vary in different geographical regions depending upon parasitic factor, epidemiological factors and host defence factors.

Various manifestations of falciparum malaria are mainly due to sequestration of RBC's containing parasites in microcirculation of vital organs, Immunological reactions and release of cytokines (TNF ALPHA, IL 1, IL 6) induced by malarial parasite causing tissue damage.<sup>10</sup> Anemia in malaria is secondary to parasite mediated RBC destruction and marrow suppression.<sup>10</sup> Hyperbilirubinemia results from intravascular hemolysis of parasitized and non parasitized RBCs, microangiopathic hemolysis due to DIC, direct hepatocyte injury and cholestasis.<sup>11, 12</sup> Thrombocytopenia is thought to be caused by increased splenic sequestration and immune mediated destruction of platelets.<sup>13</sup> ARDS is due to sequestration of parasitized RBC's in the lung and leakage from pulmonary vasculature resulting from cytokine release.<sup>14</sup>

In the present study deranged renal failure was observed in 29.7% subjects which was comparable to study by Mahakur et al, where renal failure was observed in 27.70% patients.<sup>15</sup> Thrombocytopenia was present in 40.5% of cases. Majority of the patient with thrombocytopenia were of mild degree i.e.30%. Our study resembles closely to that of Murthy GL et al,<sup>8</sup> where the incidence of thrombocytopenia was 40.50%.

**Table 4: Single vs. Multiple Complications**

Complication	Present study (n=37)	Mohapatra MKet al <sup>2</sup> (n=608)
Single Complication	17(45.94%)	288(46.8%)
Jaundice	6(35.29%)	14.6%
Cerebral malaria	4(23.52%)	74.3%
Anemia	4(23.52%)	6.9%
ARDS	2(11.76%)	2.1%
ARF	1(5.88%)	
Multiple Complications	20(54.16%)	320(53.2%)
2 complications	9(45%)	42.5%.
3 complications	5(25%)	30.4%
4 complications	1(5%)	24.4%
5 complications	1(5%)	2.5%
6 complications	3(15%)	1.3%

In our study, there were 17 (45.94%) patients with single complication (SC) and 20 (54.06%) patients with multiple complications (MC). This is comparable to study by Mohapatra et al<sup>16</sup>, in which there were 46.8% patients with single complication and 53.2% of patients with multiple complications. Of the 17 patients with Single complication, 4 (23.52%) patients had cerebral malaria, 6 (35.29%) patients had jaundice, 4 (23.52%) had anemia, 2 (11.76%) had ARDS, and 1 (5.88%) patient had ARF. Of 20 patients with multiple complications, 9(45%), 5(25%), 1(5%), 1(5%), 3(15%) patients had a constellation of 3, 2, 4, 5, and 6 different types of complications respectively. Jaundice and cerebral malaria were most common isolated manifestations of complicated falciparum malaria. This study shows more patients present with multiple complications (54.06%) than single complication (45.94%) and jaundice, cerebral malaria, ARF are common combination in patients presenting with multiple complications.

**Outcome:** In our study for majority of cases the duration of hospital stay was 1-5days (54%), followed by 6-10 days (38%), and more than 10 days (8%). The Overall mortality was 6% in our study. 3(6%) patients out of 50 cases of falciparum malaria expired and all had complications. Of the 37 cases of complicated malaria, 3 (8.1%) patients died, all of them had multiple complications and presented late to the hospital. This is comparable to study by Kochar et al,<sup>6</sup> where mortality in complicated malaria was 10.93%. The presentation with multiple organ dysfunction was very high and was the important cause of death in our study. This indicated that multi-organ dysfunction carried poor prognosis as concluded by the other similar studies.<sup>6</sup>

**Table 5: Comparison of treatment and Mortality in complicated malaria**

Out come	White NJ et al,	Present study
Quinine group	22%	10%
Artemisinin based combination Therapy	15%	5.9%

All cases of uncomplicated malaria were treated with Chloroquine or Artemisinin-based combination therapy or quinine, all of them responded well to treatment. All cases of complicated malaria were treated with I.V quinine or artemisinin-based combination therapy. Of the 3 patients who died, 2(10%) received quinine and 1(5.9%) received artesunate combination therapy. This shows that outcome was better in patients who received

artesunate combination therapy when compared to quinine. Present study is comparable to study by White NJ et al,<sup>17</sup> where treatment mortality was less in artemisinin combination therapy group(15%) as compared to quinine group(22%).

### CONCLUSION

Complicated Falciparum malaria should be considered in all cases of fever with multiple organ dysfunction syndrome especially in endemic areas. MODS can be a presenting feature of complicated malaria and has high mortality and morbidity. Jaundice, Cerebral malaria and ARF are most common complications of falciparum malaria. Diagnosis of Cerebral malaria should be considered in all patients from endemic areas who present with fever and altered sensorium or convulsions and early treatment has to be started. High degree of suspicion, early diagnosis and early treatment with anti-malarials and supportive treatment in the form of hemodynamic stabilization, hemodialysis, artificial ventilation and platelet transfusion can be life saving. Quinine and artemisinin derivatives are very effective in treatment of complicated malaria & can reduce mortality if started early (with artemisinin having slightly better outcome).

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**Conflict of Interest:** Nil

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# Inverse Paradigm: A Relation between Periodontal Disease and Coronary Artery Disease

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## ABSTRACT

Evidence from epidemiologic studies suggests that periodontal infections are independently associated with subclinical and clinical atherosclerotic vascular disease (AVD). Although the strength of the reported associations is modest, the consistency of the data across diverse populations and a variety of exposure and outcome variables suggests that the findings are not spurious or attributable only to the effects of confounders.

**Keywords:** Atherosclerosis, Periodontitis, Oral Bacteria, Bacteremia

## INTRODUCTION

Entry of oral bacteria and/or bacterial products into the blood-stream is thought to be one of the key initiators of biological events that link oral infections to atherosclerotic vascular disease (AVD). Transient bacteremias are common after dental procedures, regardless of periodontal status. The incidence and intensity of these bacteremias correlate positively with the extent and severity of periodontitis and are in line with histopathologic observations demonstrating disruption of the epithelial integrity of the peri-odontal pocket.

Oral and periodontal bacteria have been occasionally incriminated as causative for infections at distant organs, including the lung, the central nervous system, or endovascular prostheses, suggesting that they are able to establish themselves at extra-oral locations. Many studies have thus

evaluated whether bacteria of oral or periodontal origin are detectable, retrievable, and cultivable from athero-thrombotic plaques or vascular biopsies. Bacterial DNA from several peri-odontal pathogens has been detected in human endarterectomy specimens by Polymerised Chain Reaction (PCR), by a combination of anaerobic culture and subsequent PCR identification, by checkerboard DNA-DNA hybridizations, or by fluorescence *in situ* hybridizations (FISH).

The Periodontium has four components the gingiva, alveolar bone, the periodontal ligament and cementum. The junction between the tooth and oral mucosa, the dentogingival junction, is unique and peculiarly vulnerable. It is the only attachment in the body between a soft tissue and a calcified tissue that is exposed to the external environment.<sup>1</sup> This junction is a highly dynamic tissue with its own battery of protective mechanisms.

Periodontal disease is an infectious disease, but environmental, physical, social and host stresses may affect and modify the disease expression, also certain systemic conditions clearly may affect the initiation and progression of this disease. Systemic disorders affecting neutrophils, monocytes/macrophage and lymphocytes function result in altered production or activity of host inflammatory mediators<sup>2</sup>.

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Furthermore, viable *A. actinomycetemcomitans* and *P. gingivalis* were recovered and cultured from human atheromatous plaques originating from a patient with periodontal disease.

Advances in science and technology has also shed light on the converse relationship between systemic health and oral health, i.e. potential effects of periodontal disease on wide range of organ systems.<sup>3</sup>

Subgingival microbiota acts as a reservoir of gram negative bacteria which poses a challenge to the host. Their products such as Lipopolysaccharides have ready access to the circulation via sulcular epithelium which is usually ulcerated. Now, these periodontal tissues mount an immunoinflammatory response to bacteria and their products inducing a vascular response. This host response may offer explanatory mechanisms for interactions between periodontal inflammation and a variety of systemic disorders.<sup>4,5,6</sup>

**Table 1: Organ systems and conditions possibly influenced by periodontal infection**

<b>Cardiovascular System/ Cerebrovascular System</b>	<b>Endocrine System</b>
Coronary artery disease.	Diabetes Mellitus
Angina	
Myocardial infarction	
Stroke	
<b>Reproductive System</b>	<b>Respiratory System</b>
Preterm low birth weight	COPD
	Acute Bacterial Pneumonia

### CORONARY ARTERY DISEASE

Cross sectional studies suggest a possible link between oral health and coronary artery disease, both related to life style and share numerous risk factors, including smoking, diabetes, low socio economic status. Bacterial infections have significant effects on blood coagulation, lipid metabolism, monocytes and macrophages<sup>7</sup>.

Systematic reviews by Janket et al<sup>8</sup> and Scannapieco et al<sup>9</sup> concluded that a moderate degree of evidence exists to support an association between periodontal disease, atherosclerosis, MI, and cardiovascular disease<sup>10,11</sup>

Platelets selectively bind some strains of *Streptococcus sanguis*, *Porphyromonas gingivalis* pathogens closely associated with periodontitis. Aggregation is further induced by platelet aggregation associated protein(PAAP).<sup>12,13</sup>

Some individuals with heavy plaque accumulation and high proportions of pathogenic organisms appear resistant whereas others develop extensive periodontal destruction even with small amount of plaque and putative pathogens. Patients with such a response tend to have a hyperinflammatory monocyte / macrophage phenotype (MØ) which secrete significantly increased levels of proinflammatory mediators (IL-1, TNF-K, PGE<sub>2</sub>) in response to bacterial LPS. Patients with aggressive periodontitis, refractory periodontitis and type 1 diabetes mellitus have shown to possess MØ phenotype. MØ adhere to vascular endothelium and penetrate into arterial media producing proinflammatory cytokines and growth factors leading to ingestion of oxidized low density lipoprotein(LDL) enlarging the monocytes to form foam cells<sup>14</sup>. Later, smooth muscle proliferation and plaque formation occurs leading to thickening of the vessel wall and narrowing the lumen. Arterial thrombosis often occurs after an atheromatous plaque ruptures.<sup>15</sup> Platelet and fibrin accumulation further forms a thrombus occluding the vessel wall leading to ischemic events such as Myocardial infarction or Cerebral infarction.

### PERIODONTAL DISEASE AND STROKE

Ischemic cerebral infarction or stroke is often preceded by systemic bacterial or viral infection.<sup>16</sup> Recent infection was a significant risk factor for cerebral ischemia and was independent of other known factors. Stroke patients with a preceding infection had significantly higher levels of plasma fibrinogen and significantly higher levels of CRP than those without infection.<sup>17,18</sup>

Most cases of stroke are caused by thromboembolic events, whereas others are related to cerebrovascular atherosclerosis. Periodontal infection can contribute directly to the pathogenesis of atherosclerosis as discussed earlier. It may also have a series of indirect systemic effects such as elevated production of fibrogen and CRP, which serve to increase the risk of stroke. Finally, bacteremia with PAAP positive bacterial strains from the subgingival plaque can increase the platelet aggregation contributing to thrombus formation and subsequent thromboembolism, the leading cause of stroke<sup>19</sup>

In another study, men and women age 50 and older who had a stroke had significantly more severe periodontitis and more periapical lesions than non stroke controls. Poor dental health was an independent risk factor for stroke.<sup>20</sup>

## CONCLUSION

Dentistry has come a long way since 1900 when Willoughby Miller and William Hunter proclaimed that oral disease caused most systemic disease.<sup>21</sup> A century later we are developing a scientifically based understanding as to how periodontal disease may be a risk factor for certain systemic diseases. Now dentistry has new responsibility in caring for the patients, as it is no longer just the teeth which are at risk.

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# Cluster Survey to Study the Prevalence and Socio-Demographic Correlates of Under-Nutrition among Infants in Urban Slums of Amritsar City (Punjab), India

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## ABSTRACT

**Introduction:** Explosive increase in urban population without the requisite economic and social infrastructure has resulted in the formation of slums putting a great threat to health of slum dwellers. The most vulnerable population in these urban slums are children; especially newborns and infants. Their nutritional status is far from being satisfactory. Hence, the present study was conducted to assess the prevalence of under-nutrition among infants and to explore the impact of socio-demographic on nutritional status of infants in various slum areas of Amritsar city.

**Material and Method:** A total of 30 clusters of 7 infants each were studied to make a sample of 210 units. Socio-demographic factors were observed with the help of a pre-designed and pretested proforma. Nutritional status of infants was studied by using WHO Child Growth Standards. Regression analysis was applied to evaluate the effect of various socio-demographic factors on their nutritional status.

**Results:** Out of 210 infants, 49% were suffering from under-nutrition. On bivariate analysis age and sex of infants, nativity, socio-economic status, literacy status of mothers and place of delivery were the statistically significant factors affecting nutritional status of infants. But, multivariate regression analysis showed that infants of more than six months of age, girls and infants who delivered at home were more prone to under-nutrition.

**Conclusion:** Infants of more than six months of age, girls and infants who delivered at home are more prone to under-nutrition. Hence, mothers should be motivated for institutional deliveries which provides platform for effective health education in relation to health care practices and gender bias.

**Keywords:** *Correlates, Infants, Slums, Socio-Demographic, Under-Nutrition, Urban*

## INTRODUCTION

Urban population in India has increased in the last decade with a growth rate of 31.8% in comparison to 12.3% in rural areas<sup>1</sup>. This explosive increase in urban population without the requisite economic and social infrastructure has resulted in the formation of slums. According to Census 2011, 65.4 million people are living in slums in India whereas the figure was 45

million during 2001 census<sup>1</sup>. The most vulnerable population in these urban slums are children; especially newborns and infants whose health depends entirely upon the availability of the mother to breastfeed, the ability of the care taker and household to provide nutritious meals, the quality of the public health care system and lastly overall community support. Their nutritional status is far from being satisfactory and is worst among all urban groups<sup>2</sup>. In



Mumbai and New Delhi, 35% and 36% of slum children respectively, under the age of five are underweight<sup>3</sup>. Another dismal feature is the lack of any significant improvement over the years in this population. With growing urban migration in the years ahead, the problem of malnutrition in urban slums will acquire alarming dimensions unless special efforts are initiated. Hence, it requires a more focused, direct, and integrated approach. Addressing the issue of malnutrition among infants requires a special endeavour due to the reason that this age group is the 'window of opportunity' where the foundation for physical and cognitive growth potential is established. It is an established fact that after 36 months (three years) of age, children's nutritional status is irreversible.<sup>4</sup>

In Punjab, Amritsar is at the top as regards its slums population with 3.6 lac slum dwellers constituting 31.7 % of its total population<sup>5</sup>. Therefore, targeting children in infancy in slum population is essential to solve the problem of under-nutrition. With this objective, the study was conducted to assess the prevalence of malnutrition among infants and to determine socio-demographic correlates impacting the nutritional status of infants in urban slum areas of Amritsar city.

### MATERIAL AND METHOD

A cross-sectional epidemiological study was carried

out in slum areas of Amritsar city. According to records available from Civil Surgeon Office Amritsar, there are 108 pockets of slum areas. By adopting cluster sampling technique<sup>6</sup>, 30 clusters of 7 units each, were taken making a total sample of 210 study units. The infants born within one year before the interview were taken as study subjects. The mothers or care givers of infants were interviewed with the help of a pre-designed, pre-tested proforma after taking informed consent. Modified Udai Pareek Scale<sup>7</sup> was used to study socio-economic status (SES). Weight of infants was weighed with light clothing by using salter scale. Standard procedure was adopted while weighing the infants. Weighing scale was regularly standardized by putting a known weight over it. WHO Child Growth Standards were used to assess the nutritional status of infants. The data was compiled and analysed by using SPSS 17.0 version for windows. Various socio-demographic factors were studied for under-nutrition by applying bivariate regression analysis and Odds Ratios (ORs) with 95% confidence interval were generated. The factors found to be significant were further evaluated by applying multivariate logistic regression analysis.

### Exclusion criteria

1. Mother/ care giver not willing to participate
2. Infant suffering from any congenital abnormality or chronic illness

### FINDINGS

**Table 1: Distribution of infants according to their nutritional status**

Nutritional status	Number	Percentage
Overweight	09	04.3
Normal (-2SD to +2SD)	98	46.7
Mild to moderate under nutrition(<-2SD to -3SD)	83	39.5
Severe under-nutrition (<-3SD)	20	09.5
Total	210	100

The above table shows that 39.5% infants were mild to moderately under-nourished and 9.5% were

severely undernourished where as 4.3% infants were overweight.

**Table 2: Bivariate regression analysis of under-nutrition among infants in relation to various socio-demographic factors.**

Parameter		Nutritional Status		Crude OR (CI)*	p value
		Normal n= 108 No. (%)	Under- nourished n=102 No. (%)		
Age in months	0- 6 (98)	68 (69.4)	30 (30.6)	4.1 (2.3-7.3)	0.000
	6-12 (112)	40 (35.7)	72 (64.3)		
Sex	Male (112)	72 (64.3)	40 (35.7)	3.2 (1.8-5.6)	0.000
	Female (98)	36 (36.7)	62 (63.3)		
Maturity at birth	Pre-term (14)	5 (64.3)	9 (35.7)	0.9 (0.4-2.2)	0.7
	Term (196)	103 (52.5)	93 (47.5)		
Birth order	≤ 2 (131)	70 (53.4)	61 (46.6)	1.2 (0.7-2.2)	0.45
	>2 (79)	38 (48.1)	41(51.9)		
Nativity	Native (90)	55 (61.1)	35 (38.9)	1.99 (1.14 -3.46)	0.02
	Migrant (120)	53 (44.1)	67 (55.9)		
Caste	Upper (67)	39 (58.2)	28 (41.8)	1.5 (0.8-2.7)	0.18
	Lower (143)	69 (48.2)	74 (51.8)		
SES**	Upper (51)	33 (64.7)	18 (35.3)	2.05 (1.1-3.9)	0.03
	Lower (159)	75 (47.2)	84 (52.8)		
Type of family	Joint (111)	58 (52.3)	53 (47.7)	1.07 (0.6-1.8)	0.8
	Nuclear (99)	50 (50.5)	49 (49.5)		
Place of delivery	Home (134)	54 (40.3)	80 (59.7)	0.3 (0.1-0.5)	0.000
	Hospital (76)	54 (71.1)	22 (28.9)		
Literacy status of mother	Literate (79)	50 (63.3)	29 (36.7)	2.2 (1.2-3.8)	0.008
	Illiterate (131)	58 (44.3)	73 (55.7)		
Occupation of mother	Working (59)	29 (49.2)	30 (50.8)	1.14 (0.6-2.1)	0.68
	Housewife (151)	79 (52.3)	72 (47.7)		
Height of mother	<145cm (44)	19 (43.2)	25 (56.8)	0.66 (0.3 -1.3)	0.22
	≥145 (166)	89 (53.6)	77 (46.4)		
Breast feeding***	Yes (181)	95 (52.5)	86 (47.5)	1.38 (0.61 – 3.1)	0.43
	No (29)	13 (44.8)	16 (55.2)		

\*OR (CI) = Odds Ratio (Confidence Interval)

\*\* MUP Scale was used. Socio-economic status groups were clubbed together for statistical analysis. Upper Middle Class was clubbed with Upper Class and Lower Middle Class was clubbed with Lower Class.

\*\*\* Breast fed with or without complementary feeding

Bivariate analysis showed (Table-2) that age of the infants, sex, nativity, socio-economic status of the family, place of delivery and literacy status of mother were statistically significant factors affecting nutritional status of infants.

**Table 3: Multivariate logistic regression analysis of under-nutrition among infants in relation to socio-demographic factors.**

Parameter		Under nourished		Adjusted OR (CI)	p value
		Yes n=108 No. (%)	No n=102 No. (%)		
Age in months	0- 6 (98)	68 (69.4)	30 (30.6)	5.75 (2.9-11.5)	0.000
	6-12 (112)	40 (35.7)	72 (64.3)		
Sex	Male (112)	72 (64.3)	40 (35.7)	3.1 (1.6-6.0)	0.001
	Female (98)	36 (36.7)	62 (63.3)		

**Table 3: Multivariate logistic regression analysis of under-nutrition among infants in relation to socio-demographic factors. (Contd.)**

Parameter		Under nourished		Adjusted OR (CI)	p value
		Yes n=108 No. (%)	No n=102 No. (%)		
Nativity	Native (90)	55 (61.1)	35 (38.9)	1.76 (0.88-3.6)	0.11
	Migrant (120)	53 (44.1)	67 (55.9)		
SES	Upper (51)	33 (64.7)	18 (35.3)	0.71 (0.28-1.26)	0.50
	Lower (159)	75 (47.2)	84 (52.8)		
Literacy status of mother	Literate(79)	50 (63.3)	29 (36.7)	1.68 (0.74-3.8)	0.21
	Illiterate(131)	58 (44.3)	73 (55.7)		
Place of delivery	Home (134)	54 (40.3)	80 (59.7)	0.24 (0.11-0.52)	0.000
	Hospital (76)	54 (71.1)	22 (28.9)		

Multivariate Regression Analysis was applied for all statistically significant factors against under-nutrition after adjusting all other factors. It showed that age of the infants, sex and place of delivery were only significant factors affecting nutritional status of the infants whereas nativity, socio-economic status and literacy status of mother had no effect on it.

### CONCLUSION

Nutritional status of infants was studied in various slum areas of Amritsar city by using WHO Child Growth Standards and the prevalence of under-nutrition was found to be unacceptably high. Nearly half of the infants (49%) were suffering from under nutrition [Table – 1] with 39.5% as mild to moderately under-nourished and 9.5% as severely undernourished. The findings are in conformity with other studies. In slums of Indore, 33.5%, 14.7% and 8.9% of infants were suffering from mild, moderate and severely undernourishment respectively<sup>8</sup>. In the slums of Jammu, it was observed that only 44% infants were weighed normal whereas 20%, 17%, 13% and 6% were suffering from grade I, II, III and IV of malnutrition respectively<sup>9</sup>. Punjab is called the granary of the nation. Still, such a high prevalence of malnutrition signifies that availability of food does not guarantee the good nutritional status of children and requires further evaluation of various factors related to malnutrition.

Bivariate Regression analysis (Table 2) was applied to explore the effect of various socio-demographic factors on nutritional status of infants. It was proved that age of the infants, sex, nativity, socio-economic status of the family, place of delivery and literacy status of mother were statistically significant factors affecting nutritional status of infants. Infants of more than 6mths

of age were 4 times more likely to suffer from under-nutrition (OR=4.1, CI=2.3– 7.3, p<0.01) in comparison to infants of less than six months of age. The findings are in conformity with a WHO study conducted in Ghana, India and Peru which showed that the prevalence of under-nutrition among infants in first half of infancy was lower in all study sites and there was a steady increase thereafter<sup>10</sup>. Similar findings were observed in the slums of Indore also.

Gender differences were also statistically significant on bivariate analysis. Girls were 3.2 times more likely to suffer from under-nutrition (OR=3.2, CI=1.8– 5.6, p<0.01). Similar observations were made in a study of nutritional status of under-5 children in the slums of Ludhiana. It was reported that girls were the worst affected and 81% of them were under-nourished in comparison to 64.9% boys<sup>11</sup>. In another study in Kolkata also, 52.1% of girls among under-five children were underweight in comparison to 47.9% boys<sup>12</sup>.

Infants belonging to migrant families were 2 times more likely to suffer from under-nutrition (OR=1.99, CI=1.14 – 3.46, p= 0.02) which needs further investigations. Similarly, inverse relationship was found between socioeconomic status and prevalence of under-nutrition. Odds of under-nourished infants were higher among those who were belonging to lower socioeconomic status (OR=2.05, CI=1.1 – 3.9, p= 0.03). Institutional delivery was also found to have a positive impact on the nutritional status of infants (OR=0.3, CI=0.1 – 0.5, p= 0.000).

Educational status of mother showed a significant impact on the nutritional status of infants. Odds of infants with under nutrition (Table 2) were higher among those whose mothers were illiterate (OR=2.2, CI=1.2 – 3.8, p= 0.008). Similar findings have been

observed in a study of under-nutrition among children in slums of Ludhiana where prevalence of under-nutrition among children was higher if mothers were illiterate<sup>13</sup>. Uneducated mothers, with little or no exposure, are unaware of effective home based health care practices such as need for immunization or preventive steps against diseases<sup>3</sup> which might be the reason for these findings.

Breast feeding was not a statistically significant factor affecting nutritional status of infants in the present study which might have occurred because of other confounding factors related to optimal feeding practices.

Multivariate Logistic Regression was applied to factors found to be significant on bivariate analysis. It was observed that age (OR= 5.75, CI= 2.9 – 11.5, p = 0.000) and sex of the infants (OR=3.1, CI=1.6 – 6.0, p=0.001) were statistically significant factors affecting nutritional status of infants. It might indicate traditional mind set of people leading to faulty feeding practices and preferential treatment for boys. Place of delivery (OR=0.24, CI=0.11 – 0.52, p= 0.000) also had correlation with the under-nutrition among infants. Infants delivered in the hospitals were 76% less likely to suffer from under-nutrition. It is a proved fact that hospital provides a safe, clean and hygienic environment for delivery preventing infectious diseases among infants. It also facilitates effective and appropriate care for the newborn<sup>3</sup>, hence protecting them from under-nutrition in the later stages. Mothers should therefore be motivated to deliver in the institutions under the supervision of trained birth attendants. Janani Suraksha Yojna and Janani Sishu Suraksha Karyakaram promoting institutional deliveries and care of neonate are positive steps towards this direction. Every opportunity of contact of health workers with the mothers should be availed to provide health education to mothers. Further studies on large scale population should be carried out to find ways to improve the nutritional status of infants.

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# A Study of Prevalence of Intestinal Parasites and Associated Risk Factors among the School Children of Dharan, Eastern Region of Nepal

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## ABSTRACT

**Background:** Intestinal parasitic infestation is a major public health problem in children of developing countries because of poor socioeconomic conditions and lack of good hygienic living. It causes not only nutritional deficiencies and anaemia but can lead to intestinal obstruction in the infested children.

**Objectives:** To measure the prevalence of intestinal parasitic infestation and to identify risk factors associated with parasitic infestation among the school children of Dharan.

**Materials and Method:** A cross sectional study was conducted among 935 Government and private school children of Grade VI, VII and VIII of Dharan during 2007 to 2008. Stratified random sampling method was applied to choose the schools and the study subjects. The prevalence was calculated, Chi-square test was used to measure the association of risk factors and intestinal parasitic infestation.

**Results:** Overall prevalence of intestinal parasitic infestation among the school children was 24.4 percent. Taenia species was found very high (5.5%) in comparison to other worms i.e. Hookworm (2%), Ascaris (1.9%), Trichuris trichuria (1.0%), Hymenolepsis nana (0.7%) and Enterobius vermicularis (0.3%). Regarding protozoal infestation, Giardia Lamblia (6.8%) was seen higher followed by Entamoeba hitolytica (6.1%). Hand wash before meal, skin, nail and cloths cleanliness was found to have significant relationship in the causation of intestinal parasitic infestation.

**Conclusion:** The prevalence of intestinal parasitic infestation was found to be high among the school children of Dharan, and was seen more among population who wash hand only with water before meal, and not having skin, nail and cloths cleanliness.

**Keywords:** Dharan, Prevalence, Risk factors, School children, Intestinal parasitic infestation

## INTRODUCTION

Intestinal parasitosis continues to be one of the major causes of public health problems in the world, particularly in developing countries. According to WHO estimate, 3.5 billion people in the globe are affected while 450 million are ill as a result of intestinal

parasitic infections, the majority being children.<sup>1</sup> Reportedly, nearly 10% of the world's population is suffer from amoebiasis.<sup>2</sup> Ascaris lumbricoides, hookworm and T. trichiura have been estimated to infect 250 million, 151 million and 45 million people, respectively accounting for thousands of deaths.<sup>2</sup>

The impure drinking water, low socio-economic state, poor sanitation coupled with low literacy rates of parents particularly the mothers are the main causes.<sup>3</sup> Helminthic infections are more prevalent among school children.<sup>4</sup> They constitute 12% of total disease burden in children.<sup>5</sup> It is of particular concern that these infestations have insidious constraint on cognition and learning abilities of the children.<sup>6,7</sup>

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Nepal is a landlocked and least developed country located in South Asia. Intestinal parasitosis still constitutes one of the major public health problems (both morbidity and mortality) in Nepal.<sup>8</sup> The reported prevalence varies considerably approaching nearly one hundred percent in some areas.<sup>8</sup> Intestinal worm infection alone ranks fourth in “top-ten-diseases” in Nepal<sup>9</sup> and attributing to low socio-economic, educational and poor hygienic status of the people.<sup>8,10</sup> Therefore, this study is designed to measure the prevalence of intestinal parasitic infestation and to identify risk factors associated with parasitic infestation among the school children of Dharan.

### MATERIALS AND METHOD

A cross-sectional study was conducted during August 2007 to August 2008 in Grade 6, 7 and 8 in Government and Private Schools of Dharan. Stratified random sampling method was applied to choose the schools and the study subjects. Out of total 90 schools in Dharan, 22 were government (25%) and 68 were private schools (75%). To represent the children for 30% intestinal parasitic infestation (Valian H et al 1993) sample size calculated was 935. Out of 935, 25 percent (229) were taken from Government schools and 75 percent (705) were taken from private schools on the basis of probability proportionate to sample size. Study subjects were enrolled till the required sample size was full filled.

Written permission was taken from each schools head and verbal consents were taken from each student. Those students who are available after three visits and willing to give verbal consents are included in the study.

Semi-structured questionnaire was administered to the study subjects and Microscopic Examination of

Stool was done. In each visit more than 20 students were enrolled & same number of plastic bottles was given for stool collection and collected next day morning. Microscopic examination of stool was done by preparing slide using Normal Saline and Lugol’s Iodine to observe the ova of different intestinal parasites.<sup>11</sup>

The prevalence was calculated, Chi-square test was used to measure the association of risk factors and parasitic infestation. The confidence level was set at 5% in which probability of occurrence by chance will be significant if  $P < 0.05$  with 95% Confidence Interval.

### RESULTS

**Table 1: Distribution of intestinal parasites among study population**

Intestinal parasites	Frequency	Percent
Positive	228	24.4
Helminths	107	11.4
Taenia Species	51	5.5
Ascaris lumbricoides	18	1.9
Hookworm	19	2
Trichuris Trichiura	9	1
E. vermicularis	3	0.3
Hymenolepsis nana	7	0.7
Protozoa	121	12.9
Entamoeba hitolytica	57	6.1
Giardia Lamblia	64	6.8
Negative	707	75.6
Total	935	100

Almost one fourth of the population (24.4%) was infested with intestinal parasites. Protozoa was seen more (12.9%) among the population than helminths (11.4%). Taenia species was seen highest (5.5%) among the Helminth infestation and Giardia lamblia (6.8%) was seen highest among protozoans.

**Table 2: Distribution of study population by gender, religion and ethnicity**

Characteristics	Parasite Positive	Parasite Negative	Total	P-Value
<b>Gender</b>				
Male	133 (26.7)	365 (73.3)	498	0.078
Female	95 (21.7)	342 (78.3)	437	
<b>Religion</b>				
Hindu	208 (24.7)	633 (75.3)	841	0.715
Buddhist	12 (22.6)	41 (77.4)	53	
Others (Muslim, Christian)	8 (19.5)	33 (80.5)	41	
<b>Ethnicity</b>				
Kirati	91 (23.8)	291 (76.2)	382	0.988
Brahmin/Chhetri	43 (26.1)	122 (73.9)	165	

**Table 2: Distribution of study population by gender, religion and ethnicity (Contd.)**

Characteristics	Parasite Positive	Parasite Negative	Total	P-Value
Janajati	68 (24.4)	211 (75.6)	279	
Dalit	10 (23.8)	32 (76.2)	42	
Terai Caste	16 (23.9)	51 (76.1)	67	
Total	228 (24.4)	707 (75.6)	935	

Almost (26.7%) of male and (21.7%) of female were infected with intestinal parasites. The respondents from Hindu were found to have higher prevalence of parasitic infestation.

**Table 3: Association between personal hygiene and food habit with parasitic infestation**

Characteristics	Parasite Positive	Parasite Negative	Total	P-Value
<b>Treat water before drinking</b>				
Yes	172 (23.7)	554 (76.3)	726	0.357
No	56 (26.8)	153 (73.2)	209	
<b>Hand wash before meal</b>				
Soap	121 (21.9)	432 (78.1)	553	0.032
Water only	107 (28.0)	275 (72.0)	382	
<b>Bath</b>				
Regular	111 (24.1)	349 (75.9)	460	0.858
Irregular	117 (24.6)	358 (75.4)	475	
<b>Hand wash after defecation</b>				
Soap	227 (24.4)	705 (75.6)	932	0.718
Water only	1 (33.3)	2 (66.7)	3	
<b>Sandal wear</b>				
Yes	226 (24.3)	704 (75.7)	930	0.415
No	2 (40.0)	3 (60.0)	5	
<b>Skin</b>				
Clean	119 (21.3)	440 (78.7)	559	0.007
Not clean	109 (29.0)	267 (71.0)	376	
<b>Nail</b>				
Clean	63 (18.8)	273 (81.3)	336	0.003
Not clean	165 (27.5)	434 (72.5)	599	
<b>Clothes</b>				
Clean	105 (20.5)	408 (79.5)	513	0.002
Not clean	123 (29.1)	299 (70.9)	422	
<b>Habit of nail Biting</b>				
Yes	51 (23.8)	163 (76.2)	214	0.83
No	177 (24.5)	544 (75.5)	721	
<b>Habit of thumb Sucking</b>				
Yes	25 (30.5)	57 (69.5)	82	0.178
No	203 (23.8)	650 (76.2)	853	
<b>Food habit</b>				
Vegetarian	20 (18.7)	87 (81.3)	107	0.145
Non-vegetarian	208 (25.1)	620 (74.9)	828	
Total	228 (24.4)	707 (75.6)	935	

The use of soap and water before meal had significantly lower prevalence of parasitic infestation (21.9%) than only use of water (28.0%). The association was also seen among the skin, nail and clothes cleanliness and parasitic infestation.



## DISCUSSION

Intestinal parasitic infestation is common among children of developing countries. After careful screening, we observed that the frequency of intestinal parasites was high (24.4%) and protozoa infestation was found higher (12.9%) than helminths (11.4%) in the schools of Dharan Municipality.

This study showed the prevalence of intestinal parasites (24.4%) which is higher than the study conducted by Mohamed MM among children in rural areas (22.2%) and in an urban area (12.9%).<sup>12</sup> Rashid MK et al 22.3%,<sup>13</sup> Bansal et al 14.6%,<sup>14</sup> and Khurana et al 19.3%.<sup>15</sup> But some studies conducted by Wani SA in India (75.28%)<sup>16</sup>, Bundy *et al* in Malaysia (62%)<sup>17</sup>, Rodriguez *et al* in Venezuela (72%)<sup>18</sup>, showed higher prevalence than this study. The differences in findings among the studies can be explained by variations in geography, socio-economic conditions, and cultural practices of the population under consideration. The category of the study population, the methods employed for stool examination, and the time of study may also have contributed to the differences.

The study showed relatively high prevalence of *Taenia* (5.5%) compared to that reported by Merid Y et al (1.4%).<sup>4</sup> But similar prevalence rates of *Taenia* (2.5%, 2% and 7%) have been reported from different parts of the Ethiopia.<sup>19,20,21</sup> But the prevalence of *Taenia* in this study was lower than the study conducted by Joshi DD et al in Nepal which showed the prevalence of taeniasis among the ethnic groups surveyed, i.e. Magars, Sarkies, Darai and bote was found to be 50%, 28%, 10%, and 30%, respectively. Magar people are known for rearing pigs and eating much more pork than other ethnic groups, while the Sarkies are the poorest of the ethnic groups and are known to consume rotting cattle carcasses.<sup>22</sup>

This study shows the prevalence of intestinal parasites higher in males (26.7%) than females (21.7%) which complies with study conducted by Wani SA in Jammu and Kashmir State, India where males were more likely to be infected (78.07%) than females (70.16%).<sup>16</sup> Other studies conducted by Bisht D in India showed Male (62%) and female (38%)<sup>23</sup>, and Tadesse G also showed higher in Male (28.8%) than female (24.3%).<sup>24</sup> This finding can be explained by the difference in gender behavior. Males in this age group are likely to acquire work responsibilities in outdoor environments and girls are likely to commence duties indoors because of social and religious restrictions.

This study shows the prevalence of intestinal parasites in Muslim and Christian together (19.5%) but a study conducted by Tadesse G showed Muslim (23.5%) and Christian (28.7%) which is higher than our study.<sup>24</sup>

In this study prevalence of intestinal parasites is lower among Dalit (23.8%) than Brahmin/Chhetri (26.1%). However, a study conducted in Nepal by Rai DR showed low prevalence among Dalits was not in agreement with their general socio-economic and hygienic status. Earlier, high prevalence of stool positive among Dalits has been reported.<sup>25</sup> In this case, this could be due to the relatively small number of subjects Dalit group compared with other groups.

This study shows the prevalence of intestinal parasites is higher among the children drinking untreated water (23.7%) as compared to those drinking treated water (26.8%). A study conducted by Shakya B in Nepal showed the infection rate was higher among the children drinking untreated water (15.0%) as compared to those drinking treated water (5.5%), however, the difference was non-significant.<sup>26</sup> This finding can be explained by the status of drinking water. In Nepal, drinking water is highly contaminated with fecal matter.<sup>27</sup>

This study shows the infection rates of intestinal parasites among hand washing with soap and water (24.4%) after defecation was lower than only use water (33.3%) which was not significantly associated. Similar study conducted by Tadesse G which showed positive parasites among hand washing with soap and water was also not significantly associated.<sup>24</sup>

This study showed the association of parasitic infection with sandal wearing habit insignificant but slightly higher among children not wearing sandal (40%) as compared to sandal wear (24.3%) which is in line with a study conducted by Tadesse G which showed positive parasites significantly lower among sandal wear (3.9%) as compared to not sandal wear (9.6%).<sup>24</sup>

Positive parasites among school children having clean nail (18.8%) was significantly lower than children with not clean (27.5%). Similar findings was observed in the study conducted by Wani SA in Gurez Valley of Jammu and Kashmir State, India which showed positive rates of parasites among clean nail (58.03%) significantly lower than not clean nail (83.33%).<sup>16</sup> But another study conducted by Tadesse G showed

positive parasites among clean nail (25.4%) not significantly different as compared to not clean nail (28%).<sup>24</sup>

In this study the prevalence of intestinal parasite is found lower among vegetarian (18.7%) than non vegetarian (25.1%) but the finding was insignificant. A similar study conducted by Rai SK in Nepal also showed Vegetarians had higher parasitic infection rate as compared to their non-vegetarian counter parts. Consumption of unwashed fruits and vegetables appeared to be the source of infection among the vegetarians.<sup>28</sup>

Limitations of this study: Firstly, It was planned to conduct stool sample testing within 2 hours of collection, however, due to logistic constraints, it was delayed at times from 3 to 6 hours as a result of which we could not detect the invasive intestinal parasites. Secondly, we cannot draw conclusions on the association of different factors with intestinal parasitic infections as this is a limitation in cross sectional study design.

### CONCLUSION

The prevalence of overall intestinal parasitic infestation is moderately high among school children of Dharan. Among all helminthes, taenia species is found very high. The prevalence of parasitic infestation was seen high among hand washing only with water before meal, and unhygienic skin, nail, cloths cleanliness.

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# Explore the Lived Experiences of Adolescent Girls on Perceived Experiences of Stress due to Primary Dysmenorrhoea

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## ABSTRACT

Qualitative and exploratory phenomenological study to learn about the lived experiences of adolescent girls stress due to primary dysmenorrhoea and describe their experiences. Ten adolescent school girls who have primary dysmenorrhoea were selected after formal permission and written consent. Standard semi structured open ended question were used and adopted an informed conversation by face to face interview. The conversations were audio recorded. Then this was transcribed in to written text. The findings were grouped in to different themes. Most of the girl's experienced severe pain and it end up in severe stress. So it is essential to help such adolescent to have menstrual cycle without pain or improvement in pain tolerance capacity.

**Keywords:** Adolescent Girls, Primary Dysmenorrhoea, Stress

## INTRODUCTION

Adolescence is a transition period from child to adult. It is characterized by the growth in the physical, emotional, mental and endocrinal system with the change from complete dependence to independence. The major physiological change occur in this age is onset of menarche, that is almost associated with problems of irregular menstruation, excessive bleeding and dysmenorrhoea.<sup>2</sup>

According to WHO "adolescent has been defined as the period of life spanning between 10-19 years". UNICEF defines adolescence in three stages: early (10-13years of age), middle (14-16) and late (17-19) adolescents

Many adolescents experience discomfort at the time of menstruation due to menstrual pain. Most of the time, it interferes their daily living. Primary dysmenorrhea, which affects from 43 to 91% of adolescent girls, is defined as painful uterine cramps that precede and accompany menses. Primary dysmenorrhea is related to an overproduction of

uterine prostaglandins which induces myometrium hyper contractility and arterial vasoconstriction, both involved in painful menstrual cramps. Primary dysmenorrhoea when severe is associated with a restriction of activity and absence from school or work.<sup>9,10,11</sup>

The severity of pain depends on the individual level of pain tolerance. Also it is associated with their weight, hereditary and diet practices. Most of the studies show that the prevalence of primary dysmenorrhoea is very common among adolescent girls. Even though it is a common problem, the stress due to this is high among the adolescent girls.

According to Patton (1970), it is a study one that focused on description of what people experience and how it is that they experience and what they experiences. One can employ a general phenomenological perspective to elucidate the importance of using methods that capture people's experience of the world without conducting a phenomenological study that focuses on the essence of shared experience." (p.71)

The researcher adopted the Giorgi's (1997)<sup>5</sup> human scientific phenomenological method.

The researcher carried out the research in the following steps,

1. Gather verbal data
2. Examine or analyze the verbal data
3. Separate the data into parts

## **Background**

Rachel Burbeck and Carla Willig (2013)<sup>3</sup> explored six women's experiences of primary dysmenorrhoea using semi-structured interviews analyzed using interpretative phenomenological analysis. Rather than focusing on pain, participants broadened the study focus to coping with the menstrual process as a whole. This was seen to be mediated by menstrual taboos and by the theme of 'order', arising from a strong feeling of a menstrual timetable and the need for rational explanation. Another theme was pain as a separate entity, which was connected to the theme of order. Placing dysmenorrhoea in its context may be useful for health-care professionals treating women with the condition.

Kim Hyun Kyoung (2011).<sup>7</sup> conducted a study to understand the meaning and nature of the lived experience of women with severe dysmenorrhea. Hermeneutic phenomenology by van Mannen and feminist philosophy informed this study involving 20 women who were 10~40 years old. Data was collected by using focus group interview 2 times from 10 women and in-depth interview from other 10 women from September to December, 2010. The essential themes were message from body, deconstruction of negative stereotyped body, and authorship of my body. Participants described their own painful experiences. They recognized that psychological stress impacted on severe dysmenorrhea, so they made self caring time. They had positive attitude to menstruation, said that dysmenorrhea was not illness, but normal life process. They had internal strength, wisdom, and sister ship. This study revealed meaning of pain experience in socio cultural context. This finding has implications for health care provider's empathic and holistic practice.

Most of qualitative research on primary dysmenorrhoea had been conducted to find out the personal experience of dysmenorrhoea in general and

management of primary dysmenorrhoea by school adolescent lived experiences of women with severe dysmenorrhoea. All the above said aspects examine the intensity of pain.<sup>8</sup>

Few quantitative studies found the relationship between the existing stress and primary dysmenorrhoea. These findings support that the adolescent girls are having severe menstrual cramps and the stress exacerbates during their dysmenorrhoea.<sup>6</sup>

Now the present study question is, the primary dysmenorrhoea exacerbates the stress among adolescent girls during their menstruation? So the study title is, "A study to explore the lived experiences of adolescent girls on perceived experiences of stress due to primary dysmenorrhoea among the adolescent girls in selected schools at Salem".

This can be accomplished by in depth understanding about the lived experiences of this population.

## **Study purpose**

The present study aims to provide the qualitative exploration of a perceived stress of adolescent girls due to primary dysmenorrhoea and describe the phenomena.

This research will increase the understanding of the adolescent girls' lived experience of perceived stress during primary dysmenorrhoea. This will help to acknowledge their stress and able to support them to come out of it.

Also this finding will initiate an another researcher to describe the other aspects of qualitative experiences of adolescent girls with primary dysmenorrhoea.

## **METHODOLOGY**

### **Research context**

The selected school was St. Joseph's matriculation Higher Secondary school, Gugai, Salem- 636006, Tamil Nadu, and India. This is one of the popular girls school in salem city. It was started in the year 1958, is a catholic institution open to all students with special preference to the poor. They have classes from lower kinder garden (LKG) to twelfth (12<sup>th</sup>) standard. The total strength is around 2250. There are 3 sections in 9<sup>th</sup> standard and each section has 50 students.

The samples were selected by Non probability – purposive sampling technique. Totally 10 adolescent girls studying 9<sup>th</sup> standard who fulfill the sampling criteria were selected after the formal permission.

### **Tool development**

Researcher prepared an open ended interview schedule and validated by an experts in the field. The questions were not asked in the same order. The question is given the framework for the conversation. During the informal conversation the researcher brought back the participants when they deviated from the conversation. Standard open ended question were used and adopted an informed conversation by face to face interview. The conversations were audio recorded. Then this was transcribed in to written text

### **Field work**

Formal permission was got from the school correspondent and the principal. Student who have primary dysmenorrhoea were identified by asking the oral enquiry. From each section three to four students were selected based on the criteria. Got written consent from the samples. The students were interviewed individually in a room. Participants interacted in both mother tongue (Tamil) and English. Researcher encouraged them to ventilate their experiences freely. With the permission from the school authority and the samples the conversation were recorded by the digital audio recorder. Then it is brought in to the written text by the researcher. The duration of interview varied from 25 – 40 minutes. When completed asking the prepared question the researcher added few question to get more description and explanation needed. Few questions were not same for all the samples. After the interview the researcher encouraged the participants to share their additional thoughts.

### **DATA ANALYSIS**

According to Giorgi's (1997)<sup>5</sup> human scientific phenomenological method is a process. As a first step the verbal data were gathered through interview from participant. The second step is to analyze the data. The researcher listen the audio recorded data more than 3 times for better understanding. The researcher felt that this is important to create a picture about each participant's experiences as a whole. The important relevant points were brought into written form for each individual samples. Again it was rechecked with the audio recorded conversation. Final draft was made.

Then the written data were grouped into different headings. To do this the researcher put line (/) in between each idea. For each idea different coding were given (for example duration of menstrual pain as general data) according to the convenience. Then the separated data were grouped according to headings.

### **FINDINGS**

The results were grouped under different theme like general data, cognitive aspects, emotional aspects, behavioral area and physical aspects. The 10 adolescent with moderate to severe dysmenorrhoea and often takes leave due to that were included in the study.

**General data:** The onset of primary dysmenorrhoea was 6 months to one year after menarche. They experienced pain during first two days of menstruation. Most of the girls had irregular periods. The common symptoms of dysmenorrhoea are lower abdomen pain, thigh pain and head ache. The intensity of pain was moderate to severe.

**Cognitive aspects:** Most of the girls were worried about their menstruation in general. They expressed that they could not do their home work during menstruation. Few girls expressed that they feel uneasy to sit in the class room. Even they felt worry, if the examination or tests falls on the day of menstruation. On the whole they said that their concentration was reduced during the menstruation due to pain.

**Emotional aspects:** They felt restless and discomfort both in school and home. They had fluctuation in their mood, either they are in irritable or sad. They showed their anger on their friends, siblings and mother. They felt nervous when they think about menstruation or if the date near.

**Behavioral aspects:** Majority of the girls expressed sleep disturbance at night. They reason for insomnia are pain, overflow and discomfort. They said that they cannot do their regular work. They felt isolated from others. Few ate more and few ate less during menstruation.

**Physical aspects:** Girls had discomfort, went to rest room often, felt tired even during climbing steps and walking to their class room.

## DISCUSSION

This study focused on the qualitative exploration of perceived stress of adolescent girls due to dysmenorrhoea. The study reported that most of the girls were disturbed in all aspects during menstruation due to pain. This may be due to their poor level of pain tolerance and life style modification. Since the menstruation is a normal phenomenon, in olden days they did not have any such critical situation, but now a day it is a big problem among adolescent girls, parents as well as to their teachers. There are few controversial studies stated that the existing stress can increase the menstrual pain (Rachel Burbeck and Carla Willig (2013))<sup>3</sup>. It may be present, but here the girls expressed like

“Why it happened to me every month?”

“I pray god not to have such cycle in my life hereafter?”

“It’s a sin to born as a girl to bear such a painful menstruation?”

A depressed girl said “Please madam do something for me to get rid of this painful menstruation”. This is not an emergency problem to take immediate action, but this may affect the adolescent girl’s self-esteem and in turn it ends up with poor quality of life. So this is the need of the hour to health care professionals to bring up the healthy adolescent girls.

### Limitation

1. Researcher bias
2. Purposeful sampling technique
3. Face to face interview

## CONCLUSION

Thus the menstruation and its pain are major aspects in the adolescent girls’ life. The class teachers shared that most of the girls used to take leave during each cycle and few of them take rest in the school. So they miss the classes and in turn their academic performance is disturbed. It is essential to identify the simple corrective measures to rectify this problem.

## ACKNOWLEDGEMENT

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**Conflict of Interest:** There is no economical burden given to the subjects.

**Ethical Clearance:** Ethical clearance Obtained and informed written consent were obtained from the subjects and witness signature from their class teachers.

**Source of Funding:** Self

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# A Randomized Double Blind Comparative Study of Intravenous Butorphanol and Tramadol on Haemodynamic Stress of Laproscopic Cholecystectomy

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## ABSTRACT

A Prospective double blind randomized study was conducted on 60 adults patients undergoing laproscopic surgery. Patients of group I received butorphanol (25µg/kg) and patients of group II received tramadol (2mg/kg) just before induction of anaesthesia. Haemodynamic parameters including heart rate, systolic and diastolic blood pressure were recorded throughout the surgery. On statistical analysis of data, there was statistically significant increase in heart rate, systolic and diastolic blood pressure in tramadol group as compared to butorphanol group just after intubation, which got settled after 10 minutes of intubation. So, we concluded that Butorphanol (25µg/kg) is a good alternative to tramadol (2mg/Kg) as a balanced anaesthetic technique for laproscopic cholecystectomy.

**Keywords:** Laproscopic Cholecystectomy, Pneumoperitoneum, Haemodynamic Changes, Butorphanol

## INTRODUCTION

In this modern day era, laproscopic cholecystectomy has become the 'Gold Standard' treatment of cholelithiasis. Laproscopic surgeries offer many benefits over conventional method of open surgeries. Increase in adrenergic activity caused by laryngoscopy, intubation and carbon dioxide insufflation causes marked haemodynamic alterations, which may be sometimes deleterious. Various pharmacological agents had been tried to prevent haemodynamic changes during laproscopy like nitroglycerine,  $\alpha$  blockers<sup>1</sup>  $\alpha_2$  adrenergic receptors (Clonidine<sup>2</sup>, dexomedetomidine<sup>3</sup>), opioids<sup>4</sup> (butorphanol, fentanyl, tramadol) gabapentin<sup>5</sup> and magnesium sulphate<sup>6</sup>.

Butorphanol, a synthetic opioid derivative is a mixed agonist-antagonist with analgesic potency greater than morphine and pethidine. Butorphanol and its metabolites are agonist at kappa – receptor and mixed agonist- antagonist at  $\mu$  receptors. Butorphanol exhibits a ceiling effect on respiratory depression.

The present study, was designed to compare the haemodynamic effects of intravenous tramadol and

intravenous butorphanol in patients undergoing laproscopic cholecystectomy.

## Material and Methods

A prospective double blind, randomized study was conducted at Sarswathi institute of medical sciences, Hapur. After obtaining approval from institutional ethical committee, 60 patients of either gender, of age group between 18 to 60 years, ASA grade I or II booked for laproscopic cholecystectomy under general anaesthesia were enrolled in the study. Informed consent was obtained from all the patients.

Patients with history of hypertension, diabetes mellitus, obesity, compromised cardiorespiratory conditions, Thyroid disease were excluded from the study. Patients on any kind of prolonged medications like phenothiazines and MAO inhibitors, any history of drug allergy or anticipated difficult intubation were also excluded. All patients were divided into two groups and were administered oral Alprazolam 0.5 mg on the night before surgery.

## Method of Randomization-

To eliminate bias two operator technique was employed and the cases were randomly allocated

(sealed envelop technique using computer generated random number) to one of the two groups by a investigator selected to prepare the study drug solutions and further monitoring was done by a investigator blinded to group allocated.

Patients of group I received butorphanol (25µg/kg) and patients of group II received tramadol (2mg/kg). Both drugs were diluted to volume of 5ml. Patients were taken inside the operation theatre and monitored for pulse oximetry, NIBP, five lead ECG and baseline values were recorded. Intravenous line established with 18G intravenous cannula. Test drugs were given according to the assigned group in a double blind fashion. After preoxygenating the patients with facemask using 100% oxygen for 3 minutes, anaesthesia was induced with injection propofol till loss of verbal commands and injection vecuronium was given in dose of 0.1mg/kg. IPPV was done and patients were ventilated with face mask using nitrous oxide in oxygen for 4 minutes. Laryngoscopy was done using Macintosh laryngoscope and atraumatic tracheal intubation done with in 15 seconds and capnography and temperature monitoring was initiated. Anaesthesia was maintained with 60% nitrous oxide in oxygen, isoflurane (1.2-1.5%) and vecuronium. Ringers lactate as intravenous fluid was administered at rate of 15 ml/kg in first hour followed by 7.5ml/kg/hr till end of surgery to all patients. Intraabdominal pressure was kept between 11-15mm of Hg. The value of ETCO<sub>2</sub> were maintained between 35 -45 mmHg. Injection ondansetron 0.1mg/kg given half hour before completion of surgery. At the end of surgery the residual effect of relexant was reversed with neostigmine 50µg/kg and glycopyrrolate 10µg/kg and trachea was extubated when patient started breathing spontaneously. Patients were shifted in post anaesthesia recovery unit and were monitored for hemodynamic parameter and post operative complication namely nausea, vomiting, respiratory depression. Cardiovascular parameters recorded were heart rate, systolic blood pressure, diastolic blood pressure as per following schedule;

- 1) Baseline value (in operation theatre)
- 2) After test drug or placebo
- 3) At intubation
- 4) 3, 5, 10, 15 min after intubation; and then every 15 min throughout procedure
- 5) At pneumoperitoneum

- 6) At trochar insertion
- 7) Off pneumoperitoneum
- 8) After extubation.

The mean and standard deviation of the parameters studied during observation period were calculated for two treatment groups and compared using student's t-test. The critical value of 'p' indicating the probability of significant difference was taken as < 0.05 for comparisons.

## OBSERVATIONS AND RESULTS

Patients in both groups were statistically similar in terms of age, weight and sex (table 1).

Duration of anaesthesia and duration of surgery in both groups were also statistically similar.(table 2).

Mean heart rate, systolic blood pressure and diastolic blood pressure at preoperative (baseline), after intravenous cannulation, after premedication and after induction were comparable.

Group II (tramadol) showed a rise in mean heart rate values after intubation. At one minute mean heart rate in group I (butorphanol) was 89.10±10.04 and in group II (tramadol) was 99.63±13.75, this rise in heart rate is statistically highly significant. This rise in heart rate in group II (tramadol) was also statistically significant at 3 minute, 5 minute and 10 minute which however got settled later on (Figure 1). This rise in heart was statistically significant at the creation of pneumoperitoneum and at trochar insertion which gradually become non significant at the time of off pneumoperitoneum and at the time of extubation ( Table 3). Similarly mean systolic blood pressure and diastolic blood pressure in both groups were comparable at preoperative (baseline), after intravenous cannulation, after premedication and after intravenous induction. At one minute after intubation mean systolic blood pressure in group I (butorphanol) was 120.13±13.69 mm Hg and in group II (tramadol) was 133.27±17.45 mm Hg, which shows that increase in mean systolic blood pressure in group II (tramadol) is significantly high as compare to group I (butorphanol). This rise in mean systolic blood pressure was also statistically significant at 3 minute, 5 minute and 10 minute (Figure 2). Similarly mean systolic blood pressure was statistically significantly high at creation of pneumoperitoneum and at trochar insertion in group II (tramadol)(Figure 3). Similar trend

was seen with diastolic blood pressure in both groups . However this difference was not seen at off pneumoperitoneum and at extubation. Incidence of nausea was 6 out of 30 in group II (tramadol) and vomiting 2 in group II (tramadol). Incidence of nausea was one out of 30 and there was no incidence of vomiting in group I (butorphanol).

**DISCUSSION**

Now a days, laproscopic surgery has taken over open surgery because of benefits like small incision, relatively less painful, less incidence of complications and faster recovery. But major physiological changes occur in laproscopic surgeries, because of initial Trendelenburg position, creation of pneumoperitoneum, potential of systemic absorption of carbon dioxide and reverse Trendelenburg position<sup>7</sup>. The haemodynamic effects include an increase in mean arterial pressure(MAP)<sup>8,9,10</sup>, decrease in cardiac output(CO)<sup>11</sup> and increase in systemic vascular resistance(SVR)<sup>12</sup>. These effects can sometime be deleterious also.

Various drugs have been used to attenuate these hemodynamic responses. Beta adrenergic blockers like esmolol, alpha -2 agonist like clonidine and dexmedetomidine ,opiods like fentanyl ,butorphanol and morphine, magnesium sulphate and gabapentin have been tried.

As a protocol, in our institute we were using tramadol (2 mg /Kg) routinely in patients undergoing laproscopic cholecystectomy. Studies to investigate the role of butorphanol in laproscopic surgeries has been conducted earlier. Our study is the first randomized double blinded controlled study to compare the role of butorphanol and tramadol in attenuating stress response to airway manipulation and pneumoperitoneum.

Butorphanol is a kappa receptor partial agonist as well as weak μ receptor antagonist whereas tramadol is predominantly μ receptor agonist. The ability to produce analgesia is associated with both kappa and μ receptors.

The number of females who underwent laproscopic cholecystectomy was more when compared to the males in both groups, this was in consensus with the well established fact that cholecystitis is more common in females.

In our study baseline hemodynamic parameters (heart rate, systolic blood pressure, diastolic blood

pressure ) before induction of anaesthesia were comparable between two groups. After endotracheal intubation, all hemodynamic variables were statistically lower in group I (butorphanol) as comparison to group II (tramadol). These hemodynamic variables were lower in group I till ten minutes of endotracheal intubation.

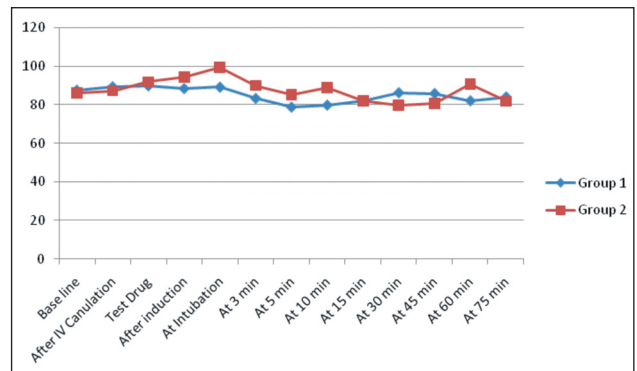
We conclude that Butorphanol (25μg/kg) is a good alternative to tramadol (2mg/Kg) as a balanced anaesthetic technique for laproscopic cholecystectomy. Butorphanol 40μg/kg can be tried in further studies for better haemodynamic control through out the laproscopic surgery.

**Table no 1: Demographic profile**

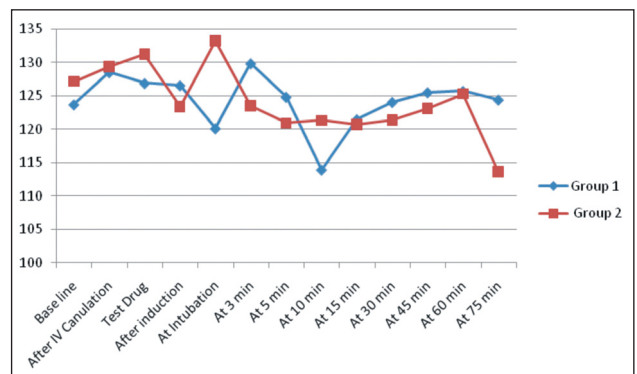
	Group 1	Group 2
Age	36.53±8.56	35.33±9.11
Weight	56.53±7.63	57.97±1.87
M:F Ratio	2:28	4:26

**Table no 2: Duration of anaesthesia and duration of surgery**

	Group 1	Group 2	Significance
DOA(Minutes)	88.73±14.35	85.60±11.32	P >0.05
DOS(Minutes)	79.87±19.91	71.03±18.45	P >0.05



**Fig. 1. Graph showing heart rate in two groups st**



**Fig. 2. Graph showing systolic blood pressure in two groups.**

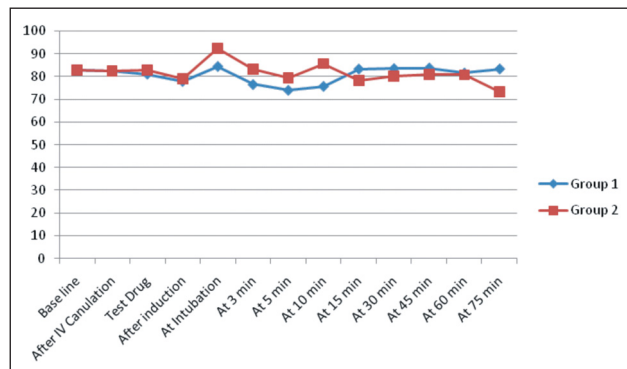


Fig. 3. Graph showing diastolic blood pressure in two groups.

Table 3: Heart rate at various point of time

Study Group	Group 1	Group 2	Significance
Pneumoperitoneum	82.63±12.21	91.60±11.32	P<0.001
At trochar insertion	85.40±11.50	92.93±11.25	P<0.05
GB handling	80.33±10.76	88.53±10.44	P<0.05
Off pneumoperitoneum	84.23±10.79	81.87± At 14.00	p>0.05
Extubation	88.17±17.88	94.67±15.97	p>0.05

Table 4: Systolic blood pressure at various point of time

Study Group	Group 1	Group 2	Significance
At pneumoperitoneum	120.73±15.13	114.37±11.56	P < 0.05
At trochar insertion	123.20±12.15	115.57±14.83	P < 0.05
Gb	115.60±11.06	126.87±16.30	P<0.001
Off pneumoperitoneum	125.73±10.78	124.43±14.86	p>0.05
Extubation	137.17±19.42	136.37±16.04	p>0.05

Table 5: Diastolic blood pressure at various point of time.

Study Group	Group 1	Group 2	Significance
At pneumoperitoneum	76.57±11.13	83.93±9.32	P< 0.05
At trochar insertion	80.13±10.42	87.60±10.12	P< 0.05
Gb	81.53±8.28	89.70±10.43	P < 0.001
Off pneumoperitoneum	82.17±8.73	80.77±11.35	P >0.05
Extubation	88.67±12.63	89.30±12.44	P >0.05

Conflict of Interest: None

Acknowledgement: Nil

Source of Funding: Self

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# A Randomized Double Blind Comparative Study of Intravenous Diltiazem and Lignocaine in Attenuating Haemodynamic Stress during Laryngoscopy and Endotracheal Intubation in Western Uttar Pradesh

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## ABSTRACT

The procedure of laryngoscopy and endotracheal intubation frequently induces a cardiovascular stress response characterized by hypertension, tachycardia, arrhythmias and increased serum concentration of catecholamines. Our study was undertaken to evaluate and compare the influence of lignocaine and diltiazem on the cardiovascular responses to laryngoscopy and intubation. A total of sixty patients of ASA grade I or II patients, between 18 -60 years of age, of either sex, scheduled for non-cardiac surgery, were selected for the study. Baseline parameters i.e. heart rate, systolic blood pressure, diastolic blood pressure and mean arterial pressure were recorded and same parameters were recorded at one minute interval till the completion of study period. The percentage change (increase or decrease) was calculated and was analyzed statistically. There was minimal change in heart rate, systolic blood pressure, diastolic blood pressure and mean arterial pressure after intubation in patients who were given diltiazem as compared to lignocaine and was more stable drug. We concluded that Diltiazem 0.3 mg/kg is able to attenuate the haemodynamic response better as compared to lignocaine.

**Keywords:** Laryngoscopy, Tracheal Intubation, Cardiovascular Response, Lignocaine, Diltiazem

## INTRODUCTION

Direct laryngoscopy and endotracheal intubation are considered among the most invasive stimuli in the practice of general anaesthesia. Their physiopathological effects are as important as their traumatic complications. The cardiovascular response to these procedures arises from sympatho-adrenal reflexes evoked by the stimulation of laryngeal and tracheal tissues during the procedure<sup>1-3</sup> These haemodynamic changes are well tolerated by normotensive individuals but are of greater significance in patients with coronary artery disease and cerebrovascular disorders and have been recognized as a potential source of a number of complications.

Several techniques like deepening of anaesthesia, omitting cholinergic premedication<sup>4</sup> pretreatment with

vasodilators such as Nitroglycerine<sup>5</sup>, Beta blockers<sup>6</sup>, Calcium channel blockers<sup>7</sup> and opioids have been tried to prevent / attenuate this response. Diltiazem is a calcium channel blocker. It binds only to open depolarized channels. It reduces heart rate, blood pressure and also relieves coronary artery spasm.

Lignocaine is an amide linked local anaesthetic agent. It acts by decreasing the entry of sodium ions during upstroke of action potential. It is a cardiac depressant and causes a fall in blood pressure due to sympathetic blockade.

The present study, was designed to compare the haemodynamic effects of intravenous diltiazem and intravenous lignocaine in patients undergoing surgery under general anaesthesia with endotracheal intubation.

## MATERIAL AND METHOD

A prospective double blind, randomized study was conducted at Sarswathi institute of medical sciences, Hapur. After obtaining approval from institutional ethical committee, 60 patients of either sex, of age group between 18 to 60 years, ASA grade I or II scheduled for non cardiac surgery requiring general anaesthesia with orotracheal intubation were enrolled in the study. Informed consent was obtained from all the patients.

Patients with history of hypertension, diabetes mellitus, obesity, compromised cardio respiratory conditions, thyroid disease were excluded from the study. Patients on any kind of prolong medications like phenothiazines and MAO inhibitors, any history of drug allergy or anticipated difficult intubation were also excluded.

The patients were asked to restrict oral intake overnight or at least six hours before the surgery. All patients were divided into two groups. All the patients received oral alprazolam 0.25 mg on evening before surgery.

## METHOD OF RANDOMIZATION

To eliminate bias two operator technique was employed and the cases were randomly allocated (sealed envelope technique using computer generated random number) to one of the two groups by a investigator selected to prepare the study drug solutions and further monitoring was done by a investigator blinded to group allocated.

Patients of group 1 were given Injection Dilitiazem 0.3 mg/Kg body weight 90 seconds prior to laryngoscopy and intubation and patients of group 2 were given Injection Lignocaine 1.5mg/Kg body weight 90 seconds prior to laryngoscopy and intubation.

Patients were taken inside the operation theatre and monitored for pulse oximetry, NIBP, five lead ECG and baseline values were recorded. Intravenous line established with 18G intravenous cannula. After preoxygenating the patients with facemask using 100% oxygen for 3 minutes, anaesthesia was induced with Injection Propofol 2mg/Kg, Injection Fentanyl 2microgram /Kg. Injection vecuronium was given in dose of 0.1mg/kg. IPPV was done and patients were ventilated with face mask using nitrous oxide in oxygen for 4 minutes. Test drug was given according

to assigned group 90 seconds prior to laryngoscopy. Laryngoscopy was done using Macintosh laryngoscope and atraumatic tracheal intubation done within 30 seconds and capnography and temperature monitoring was initiated. Anaesthesia was maintained with 66% nitrous oxide in oxygen, isoflurane (1.2-1.5%) and vecuronium. Ringer's lactate as intravenous fluid was administered at rate of 15 ml/kg in first hour followed by 7.5ml/kg/hr till end of surgery to all patients. Standard monitoring including inspired O<sub>2</sub> concentration, ECG, pulse oximetry, heart rate and non invasive Blood Pressure was used. Systolic, Diastolic, mean arterial pressure (SAP, DAP & MAP) and heart rate was recorded before and after I/v anesthetic agent, immediately after intubation and at one minute interval till 10 minutes, thereafter surgery was allowed to start.

After the surgery was over, the anaesthesia was reversed by Injection neostigmine (0.05mg/kg) and injection glycopyrrolate (0.08 mg/kg). The patients were shifted to the recovery room after stabilization of the vital parameters

The results were compiled and were analyzed statistically.

## OBSERVATIONS AND RESULTS

Patients in both groups were statistically similar in terms of age, weight and sex (table 1).

Mean heart rate, systolic blood pressure and diastolic blood pressure at preoperative (baseline), after intravenous cannulation, after premedication and after induction were comparable.

The effect of the two drugs on heart rate of the patient was studied by taking mean and standard deviations at different durations, namely 0 minutes, i.e. at the time of administration, 1 minute, 3, 5 and ten minutes intervals. Though at the time of administration the drugs show similar effect, yet after 1 minute there is considerable difference in heart rates. In group 2 (lignocaine) heart rate got accentuated which was stabilized at 10 minutes, while in group 1(dilitiazem) there was a minimal variation (figure 1). The heart rate in group 1 at 1 minute was  $82.47 \pm 13.11$  whereas in group 2 it was  $101.30 \pm 18.58$  which is highly significant statistically.

Systolic blood pressure, diastolic blood pressure and mean blood pressure showed a similar trend of significant rise at 1 minute in group 2 (lignocaine)

which gradually got stabilized at 10 minutes (figure 2,3,4).

Table no 1: Demographic profile

	Group 1	Group 2
Age	39.63±9.17	41.2±8.96
Weight	62.20±4.65	62.90±6.30
M:F Ratio	15:15	15:15

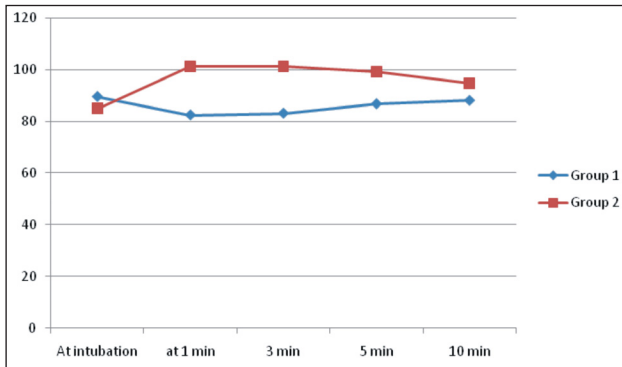


Fig. 1. Effect of two drugs on heart rate

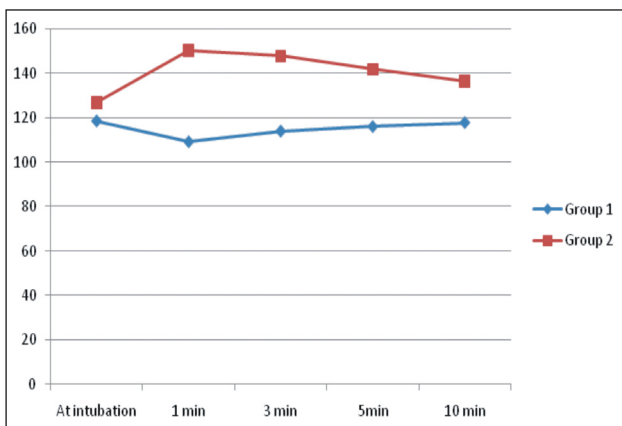


Fig. 2. Effect of two drugs on systolic blood pressure

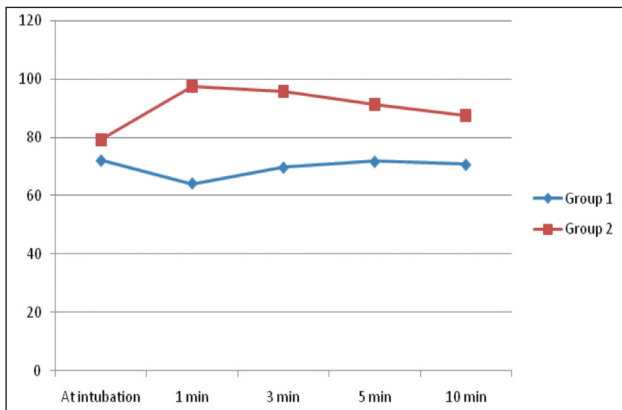


Fig. 3. Effect of two drugs on diastolic blood pressure.

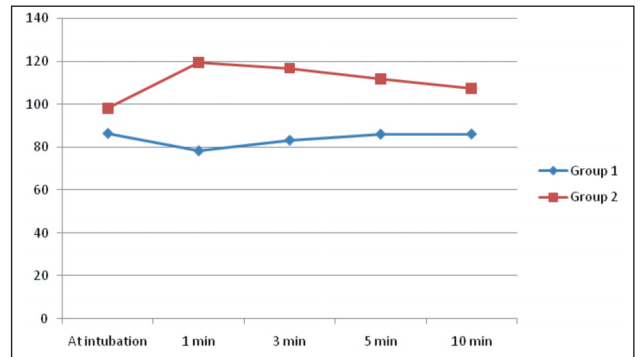


Fig. 4. Effect of two drugs on mean arterial pressure.

## DISCUSSION

The sympathoadrenal responses accompanying laryngoscopy and endotracheal intubation frequently induce a cardiovascular stress response characterized by hypertension, tachycardia, arrhythmias and increased serum concentration of catecholamines<sup>8</sup>. This sympathoadrenal response to laryngoscopy results in increased cardiac workload which in turn may culminate in perioperative myocardial ischaemia and other complications like acute heart failure<sup>9</sup>, intracranial haemorrhage and convulsions. These sympathoadrenal responses although transient are undesirable, especially in patients with pre existing cardiovascular and intracranial diseases<sup>1</sup>.

Strategies to circumvent these changes have been used with variable success. These include minimizing the duration of laryngoscopy to less than fifteen second<sup>10</sup>, the use of intravenous narcotics<sup>11,12</sup>, intravenous or topical lignocaine<sup>13-15</sup>, calcium channel blockers and long acting beta adrenergic blockers. A good correlation has been demonstrated between the cardiovascular responses to intubation and changes in plasma catecholamine concentrations. Calcium ions exert a major role in the release of catecholamines from the adrenal gland and adrenergic nerve endings, which affects plasma concentrations of catecholamines in response of sympathetic stimulation.

The present study was undertaken to evaluate and compare the influence of Diltiazem and Lignocaine on the cardiovascular responses to laryngoscopy and tracheal intubation.

The dose of IV lignocaine 1.5 mg/kg was selected as it has been recommended to be most appropriate dose and time 90 sec. prior to laryngoscopy was

selected as supported by Denlinger et al<sup>16</sup> and Stoelting R. K<sup>11</sup>.

Mohan K et al<sup>17</sup> concluded from their study that diltiazem 0.2 mg/kg is reliably effective in attenuating the heart rate response to tracheal intubation.

Mikhawa K et al<sup>18</sup> suggested that administration of 0.3 mg/kg diltiazem had a greater inhibitory effect on the increase in blood pressure associated with intubation than did 0.2 mg/kg, so dose of diltiazem used in our study was 0.3 mg/Kg

Except for the sinus tachycardia, no other adverse effect was observed in any of the patient in all the both groups.

At the end of study, we concluded that Diltiazem 0.3 mg/kg was better able to attenuate the haemodynamic response i.e. heart rate, systolic blood pressure, diastolic blood pressure and mean arterial pressure associated with laryngoscopy and intubation without any adverse effects.

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