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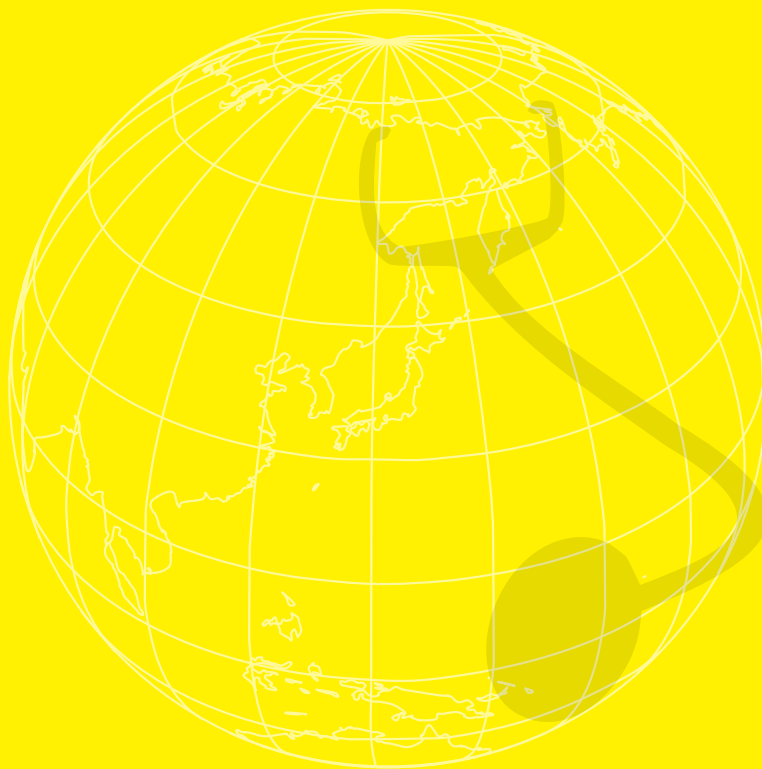
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A Study on Nutritional Profile of Textile Workers and Non Textile Workers of Uttar Pradesh

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Abstract

Background

Man needs a wide range of nutrients to lead a healthy and active life and these are derived through the diet they consume daily. Good nutrition is a basic component of health. The present paper assesses the Nutritional Profile of Textile Workers and Non Textile Workers of Uttar Pradesh.

Methods

Out of total 920 subjects studied, 463 Textile Workers and 457 Non Textile Workers were randomly selected and interviewed for the purpose of study; Tools used were three days home visits and group meetings. Anthropometric measurements taken were height and weight. Dietary data was collected using standardized cups methods.

Results

The findings depict that most of the Textile Workers and Non Textile Workers were basically non-vegetarian and majority of the Textile Workers and their families mostly missed regular pattern of three meals a day. Chronic Energy Deficiency (CED) was found to be more prevalent in Textile Workers as compared to Non Textile Workers but the prevalence of over weight/obesity was seen more in Non Textile Workers.

Conclusions

The nutritional status of the Textile Workers and their families was not an excellent one

Key Words

Textile Workers, Non-Textile Workers, Chronic Energy Deficiency (CED), Nutritional Status.

Introduction

Man needs a wide range of nutrients to lead a healthy and active life and these are derived through the diet they consume daily. The components of their diet must be chosen judiciously to provide all the nutrients needed in

adequate amounts and in proper proportion. The amount of each nutrient that is required by man depends upon his age and physiological status. Adults need nutrients for maintaining constant body weight and ensuring proper body function. Infants and young children who are growing rapidly require nutrients not only for maintenance but also for growth. They require relatively more nutrients (2-3 times) per kg body weight than adults (Malhotra, 1997). In special physiological conditions like pregnancy and lactation, adult woman needs additional nutrients to meet the extra demand for foetal growth and maternal tissue expansion in pregnancy and milk secretion during lactation. These extra intakes of nutrients are essential for the normal growth of an infant in vitro and during the early postnatal life (Gomez, 1997).

Nutritional status refers to the health of an individual as it is affected by the intake and utilization of nutrients. Nutritional health can be described at several levels. Normal nutrition implies a sufficiency of nutrients and energy intake, neither deficiency nor excess, that affords the highest level of well-being.

The relationship between biological and cultural factors is well exhibited by nutritional aspects under the rubric of different ecosystems. The nutritional aspect mainly covers foods, nutrients and related other substances there in their action, interaction and balance in relationship to health and diseases. Nutrition is concerned to a certain extent with social, economic, cultural and physiological implications of food and dietary habits.

A number of studies have been made on dietary aspects and assessment of nutritional status of different populations by different authors, viz Dandekar and Patwardhan, 1971; Gopalan et.al, 1974,1984; Sukhatme, 1977; Chaudhry and Visweswara, 1983; Dasgupta, 1989; Prabhakara et.al, 1993; Rao, 1995; Krishnaswamy and Kumar, 1997; Hiwarkar et.al, 1998; Vijayaraghavan and Rao, 1998; Sharma and Jain, 2004; Barker et.al, 2006; Tungdim and Kapoor, 2008 and many others.

Here, an attempt has been made to assess the Nutritional Profile of Textile Workers and Non Textile Workers of Uttar Pradesh.

Methodology

The present study is conducted among the Textile Workers and Non Textile Workers of Uttar Pradesh. A total

Table 1: Distribution of Textile Workers (TW) and Non Textile Workers (NTW) according to dietary habit

Dietary habit	TW		NTW	
	No.	%	No.	%
Non vegetarian	408	88.12	425	93.00
Vegetarian	55	11.88	32	7.00
Total	463	100.00	457	100.00

of 920 people from 17 different textile industries and 183 household formed the sample size of the study. From this household and industries, a total of 463 Textile Workers (TW) were interviewed and measured, this group has been treated as test group and 457 people residing in the same area but not working in the textile Industries were taken as Non Textile Workers (NTW) and have been referred to as control group. The Workers whose duration of work and exposure was more than 3 months were matched for age, sex and socio economic status.

Anthropometric measurements taken were height and weight using standard techniques of Weiner and Lourie (1981). In order to assess the dietary intake, as accurately as possible, the researcher concerned used a standardized cups methods (weighing method) of diet survey, the intake of an individual in a family is assessed by asking the housewife about the type of preparations made for the family as a whole and the ingredients that are used in each preparation, together with raw amounts. Then the total cooked amount of each preparation as well as the intake of an individual in the family is assessed by exhibiting a set of standardized cups before her, to help her assess amounts properly.

The cups may vary in sizes, with a set of about 10 or 12 in number, and may be standardized for raw rice volume. Standardization of cups in terms of raw rice would help the investigator to assess the cooked intake of an individual directly in terms of raw amounts of rice. This is done mostly because, the type of preparation of rice is almost uniform in most of the families, i.e. boiled, which is the major cereal preparation.

But the preparations, other than rice such as dal, sambhar, vegetables, tea etc., cannot be standardized in terms of raw

amounts since the consistency of each preparation differs from family to family depending on amount of water used. So the cups have to be standardized for volume to assess the total cooked amount, as well as the intake of an individual. In that way, the standardization of cups for volume would also help the investigator to assess the differences in the amounts of same type of preparations from family to family, though the raw amounts used may be the same.

1. Standardization of cups for raw rice
2. Standardization of cups for volume
3. Teaspoons, tablespoons, tea cups, glasses etc. may also be standardized for volume.
4. Standardization of certain foodstuffs such as green leafy vegetables, other vegetables and flesh foods

Because of day to day variation in the diet, at least 3 consecutive days survey was conducted. Using the standard value of National Institute of Nutrition and Indian Council of Medical Research for each food, the calorific value was calculated and hence the nutritional intake of each worker was obtained.

Results

Table 1 reveals information regarding dietary habit among Textile Workers and Non Textile Workers. It can be observed from the table that maximum percent of Textile Workers and Non Textile Workers were non vegetarian (88.12% and 93.00% respectively) and consume the meat of goat, sheep, buffalo and chicken etc.

Table 2 shows distribution of Textile Workers and Non Textile Workers in different BMI categories. 160 (65.84%) male Textile Workers and 134 (60.91%) female Textile Workers had normal BMI. Chronic Energy Deficiency (CED) was seen in 72 (29.63%) male Textile Workers and 71 (32.27%) female Textile Workers. Obesity(Grade I&II) was seen in 15 (6.82%) female Textile Workers and 11 (4.53%) male Textile Workers.

While 156 (66.38%) male Non Textile Workers and 125 (56.31%) female Non Textile Workers had normal BMI. Chronic Energy Deficiency (CED) was seen in 65 (27.66%)

Table 2: Distribution of Textile Workers (TW) and Non Textile Workers (NTW) according to Body Mass Index (BMI) categories

BMI	Males (TW)		Females (TW)		Males (NTW)		Females (NTW)	
	No.	%	No.	%	No.	%	No.	%
<18.5 (Chronic Energy Deficiency)	72	29.63	71	32.27	65	27.66	54	24.32
18.5-25 (Normal)	160	65.84	134	60.91	156	66.38	125	56.31
25-30 (Grade-I Obesity)	10	4.12	13	5.91	12	5.11	34	15.32
>30 (Grade-II Obesity)	1	0.41	2	0.91	2	0.85	9	4.05
Total	243	100.0	220	100	235	100.0	222	100.0

*Source: W.H.O. 2000

Table 3: Energy Consumption and distribution of Textile Workers (TW) and Non Textile Workers (NTW) according to RDA: A comparison

Subjects	Energy(kcal) consumption/day		Less than RDA				*RDA	
	Males	Females	Males		Females		Males	Females
	Mean±SD	Mean±SD	N	%	N	%		
TW	2593±104	1905±114	143	58.85	193	87.73	2875	2225
NTW	2662±126	2048±146	105	44.68	188	84.68	2875	2225

*ICMR (1995).

male Non Textile Workers and 54 (24.32%) female Non Textile Workers. Obesity was seen in 43 (19.37%) female Non Textile Workers and 14 (5.96%) male Non Textile Workers.

Table 3 reflects the mean and standard deviation of daily energy consumption of the subjects. As against the figure of 2875 kcal of energy for males and 2225 kcal for females (RDA values) the energy consumption was 2593± 104 kcal per day among male Textile Workers while 1905±114 kcal per day among female Textile Workers respectively. Higher percentage of females Textile Workers (87.73%) in comparison to males Textile Workers (58.85%) consumed inadequate amount of energy by RDA standards.

The respective values of energy intake among male Non Textile Workers and female Non Textile Workers were 2662±126 kcal and 2048±146 kcal per day. A higher percentage of females Textile Workers (84.68%) consumed inadequate amount of energy when compared to males Textile Workers (44.68%).

Table 4 reflects the consumption of various Food items by the subjects. A higher percentage of males Textile Workers (34.2%) in comparison to females (32.77%) consumed inadequate amount of cereals and millets by RDA standards, similar observation was made for pulse consumption also.

A higher percentage of females Textile Workers (41.34%) in comparison to males (34.0%) consumed inadequate amount of milk and milk product by RDA standards. Whereas a higher percentage of males (69.84%) when compared to females (67.7%) consumed inadequate amount of vegetables by RDA standards.

Higher percentage of males Textile Workers (28.53%) when compared to females (10.2%) consumed inadequate amount of sugar and jaggery RDA standards, both male and female Textile Workers consumed fats and oils more than RDA.

Similarly, higher percentage of females Textile Workers (10.67%) when compared to males (6.0%) consumed adequate amount of meat, fish and eggs RDA standards.

Higher percentage of males Non Textile Workers (32.1%) when compared to females (26.24%) consumed inadequate amount of cereals and millets RDA standards, similar observation was made for pulse consumption also.

Higher percentage of males Non Textile Workers (18.93%) when compared to females (5.84%) consumed inadequate amount of sugar and jaggery RDA standards, both male and female Non Textile Workers consumed fats and oils more than RDA.

Similarly, higher percentage of females Non Textile Workers (7.34%) when compared to males (2.67%) consumed adequate amount of meat, fish and eggs RDA standards.

Discussion

Nutritional survey of the subjects revealed that majority of the Textile Workers missed regular pattern of three meals a day where as most of the Non Textile Workers followed the regular pattern of three meals a day. Majority of Workers in Textile Industry and Non Textile Workers engaged in agricultural activities had heavy breakfast cum lunch and dinner as a meal pattern. Almost all the Textile Workers and Non Textile Workers engaged in agricultural activities began their day's activity by 6 a.m., breakfast cum lunch was consumed outside their homes prepared early in the morning. Dinner was mainly consumed in their homes and was usually prepared by other members of the family.

Most of subjects were non vegetarian with few exceptions (12%) but the consumption of the same was once or twice a week. Their staple cereal was ragi or rice. The general observations were that the Textile Workers used higher amount of mustard oil in their diet. Consumption of vegetables and fruits were low which could be due to their poor socio-economic status.

In the present study, as against the figure of 2875 kcal of energy for males and 2225 kcal for females (RDA standards) the energy consumption was 2593± 104 kcal per day among male Textile Workers while 1905±114 kcal per day among female Textile Workers. More females Textile worker (87.73%) as against their counterpart males (58.85%) consumed inadequate calories than RDA. The inadequacy of food energy consumption among female textile workers was more marked as compared to males. The respective energy intake among male Non Textile Workers and female Non Textile Workers were 2662±126 kcal and 2048±146 kcal per day.

Higher percentage of males Textile Workers (34.2%) when compared to females Textile Workers (32.77%) consumed inadequate amount of cereals and millets as against RDA

Table 4: Consumption of Food items by the Textile Workers and Non Textile Workers: A comparison

Subjects	Food items	RDA*		Amount consumed				% consumed Less than RDA	
		Males	Females	Males		Females		Males	Females
				Mean	%	Mean	%		
Textile Workers	Cereals & Millets	480	360	315.8	65.79	242.7	67.22	34.21	32.78
	Pulses	90	75	59.35	65.94	28.32	37.77	34.06	62.23
	Milk & milk Products (ml)	300	300	198	66	176	58.66	34.0	41.34
	Vegetables	400	300	120.6	30.16	96.88	32.29	69.84	67.71
	Fruits	100	100	26.4	26.4	22.8	22.8	73.6	77.2
	Sugar & Jaggery	40	25	28.59	71.47	22.45	89.8	28.53	10.2
	Fats & Oils	35	30	48.8	139.4	42.5	141.6	More than RDA	
	Meat, fish, Eggs	30	30	28.2	94	26.8	89.33	6	10.67
Non Textile Workers	Cereals & Millets	480	360	325.9	67.9	265.5	73.76	32.1	26.24
	Pulses	90	75	68.45	70.05	42.35	56.46	23.95	43.54
	Milk & milk Products (ml)	300	300	204	68	188	62.66	32	37.34
	Vegetables	400	300	185.4	46.35	116.7	38.90	53.65	61.10
	Fruits	100	100	38.8	38.8	36.4	36.4	61.2	63.6
	Sugar & Jaggery	40	25	32.43	81.07	23.54	94.16	18.93	5.84
	Fats & Oils	35	30	48.5	138.6	42.5	141.6	More than RDA	
	Meat, fish, Eggs	30	30	29.2	97.33	27.8	92.66	2.67	7.34

*ICMR (1998).

standards. They also consumed inadequate amount of milk and milk product similar observation was made for pulse consumption also. A higher percentage of males (69.84%) as against females (67.7%) consumed inadequate amount of vegetables, sugar and jaggery in comparison to the RDA, both male and female Textile Workers consumed fats and oils more than RDA. Similarly, higher percentage of females Textile Workers (10.67%) as compared to males (6.0%) consumed less amount of meat, fish and eggs than RDA. Similar results were observed in the case of Non Textile Workers but their percentages were lesser.

As a whole it has been found that both Textile Workers and Non Textile Workers of both the sexes were consuming most of the important nutritive substances much below the average Recommended Dietary Allowances (RDA).

Body mass index was used to assess the nutritional status of Textile Workers and Non Textile Workers as it is most commonly used index of obesity or overweight, underweight and normal weight. The BMI increased with age in females but showed an irregular trend in males. The inconsistency of any particular trend may be attributed to cross sectional nature of data, variation in nutritional status, physical activity level or energy expenditure.

Chronic Energy Deficiency (CED) was seen in 29.63% of male Textile Workers and 32.27% of female Textile Workers. Obesity was seen in 6.82% of female Textile Workers and 4.53% of male Textile Workers. More or less similar result was also found among Non Textile workers but of lesser

magnitude. Chronic Energy Deficiency (CED) was found to be more prevalent in Textile Workers than Non Textile Workers.

Among present Textile Workers and Non Textile Workers of both the groups, more than 60% males and 55% females had normal BMI as per the classification of WHO (2000).

It is evident that differences between Textile Workers and Non Textile Workers in anthropometric measurements and indices are due to variations in socio-economic and nutritional status and the differences were statistically nonsignificant.

The prevalence of undernutrition and overweight or obesity as studied with the help of BMI differed among Textile Workers and Non Textile Workers but was not statistically significant.

The variations in nutritional status due to income and education are well studied (Chaudhry and Visweswara, 1983; Gopalan, 1987; Rao, 1995). Tungdim and Kapoor, (2008) showed the relationship between nutritional status and tuberculosis treatment. There is hardly any study on the variations in nutritional status among subjects in different sectors of work, different populations and gender.

Prabhakara et.al, (1993) while studying food consumption in urban slums workers found calorie consumption was 94 percent of RDA. Vijayaraghavan

and Rao, (1998) studying diet and nutrition in rural India, found 48.3 per cent of the population of Karnataka to be inadequate for calorie and protein. Their diets were also deficient in iron, calcium and vitamins. In their diet survey of a rural population, found 83.33 per cent of families were consuming diets less in proteins and calories (Hiwarkar et.al, 1998).

Barker et.al, (2006) found women to have a significantly lower BMI than their male peers. Women were thinner in joint land-owning families, where the main occupation was farming, than those in non farming families. Women were more likely to work full time in farming than men, to carry the burden of all household chores, to have less sleep, and to eat less food away from home than men.

Thus the study reveal that inspite of poor economic conditions they manage their food items from their available income. Still, their nutritional status is not an excellent one. It has been observed that poor nutritional status is one of the most serious health problems, especially among female. The problem of poor nutritional status is severely influenced by poverty, illiteracy and unawareness regarding basic nutrients. To eliminate the problem of poor nutritional status, source of income generation should be enhanced, educational standard must be uplifted along with awareness regarding nutrients, daily allowances of low budget and local resources based balanced diet.

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References

1. Barker, M., Chorghade, G. P., Kanade, S., Fall, C. H. D.. Why are Rural Indian Women so Thin? Findings from a Village in Maharashtra. *Public Health Nutr.*, 2006, 9:9-18.
2. Chaudhary, M., Visweswara, R. K.. Nutritional Status of Pre-School Children and the Associated Factors. *Ind. J. Nutr. Dietetics*, 1983, 20:18-29.
3. Dandekar, A., Patwardhan, V. N.. Dietary Allowances for Indians: Calories and Proteins. *Ind. Counl. Med. Res.*, 1971, 35:17-22.
4. Dasgupta, R.. Studies in Economic Development and Planning. *Nutritional Planning in India*, 1989, 23-56.
5. Gomez, R.. Nutrition and Megaloblastic Anemia of Infancy. *Brit. J. Haematol.*, 1997, 19:245-260.
6. Gopalan, C.. Heights of Population - An Index of their Nutrition and Socio-Economic Development Nutrition Foundation of India Bulletin, 1987, 8: 1-5.
7. Gopalan, C., Ramasastri, B. V., Balasubramanian S. C.. Nutritive Value of Indian Foods, National Institute of Nutrition. *Ind. Counl. Med. Res.*, 1974, 60-178.
8. Gopalan, C., Sastri, B. V. R., Balasubramanian, S. C.. Non-nutritive Factors in Determining Nutritional Status, National Institute of Nutrition. *Ind. Counl. Med. Res.*, 1984, 16:156-193..
9. Hiwarkar, P. A., Aswas, N. R. and Agarwal, V. K.. A Study of Health Status of Rural Population of Mohagaon Village. *Ind. J. Comm. Med.*, 1998, 23: 81-86.
10. Krishnaswamy, S., Kumar, H. Labour Management, Misconducts, Charge Sheets and Enquiries. *Metropolition Book Company*, 1997, 14-23.
11. Malhotra, G. N. Nutritional Relation in Changing India. *Brit. J. Ind. Med.*, 1997, 56:787-790.
12. Prabhakara, G. N., Aswath. P.V., Shivaram, C., Viswanath, A. N.. A Study on the Food Consumption Pattern in Slums of Bangalore. *Karnataka. J. Community Health*, 1993, 9:14-22.
13. Sharma, A.N., Jain, M. The Denotified (Ex-Criminal) Kuchbandiyas of Shahgarh. *Sarup and Sons, New Delhi.*, 23-64.
14. Rao, N. B. S.. Studies on Nutritional Requirements of Indians. *Ind. J. Med. Res.*, 1995, 57:16-42.
15. Sukhatme, P.V. Diet and Nutritional Status of labour. *Am. J. clin. Nutr.*, 1977, 35: 335-365.
16. Tungdim, M. G., Kapoor, S.. Tuberculosis Treatment and Nutritional Status among the Tribals of Northeastern India. *Acta. Biologica. Szegediensis*. 2008, (in press).
17. Vijayaraghavan, K., Rao, D.. Diet and Nutrition Situation in Rural India. *Ind. J. Med. Res.*, 1998, 108: 243-253.
18. Weiner, J. S., Lourie, J. A.. *Human Biology: A Guide to Field Methods*. International Biological Programme, IBP No.9. Marylebone London NW. 1981.
19. World Health Organization.. *Physical Status: The Use and Interpretation of Anthropometry*. Technical Report Series. 1948, Geneva, 894.

Study of Demographics of the Patients Diagnosed of Colorectal Carcinoma and the Influence of it on Incident Rates of Various Forms of Colorectal Carcinomas: A histopathological study at tertiary care hospital

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Abstract

Objectives

Present study has been designed to study the histopathology of colorectal carcinomas and to classify them with reference to their Histopathological findings using WHO classification. Further to study the demographics of the patients diagnosed of colorectal carcinomas and to evaluate its impact on incident rate of various forms of colorectal carcinomas and to compare these findings with earlier studies.

Methods

Biopsies or resected specimens showing presence of colorectal carcinoma were included in the present study. The slides received for review of opinion, were also included in the present study. For this study information about history and investigations done was obtained from the clinical charts.

Results

In present study total 64 cases were investigated i.e. 34.37% biopsies, 7.81% slides for review of opinion and 57.82% resected colorectal specimens. In this study it was observed that risk of developing colorectal carcinomas is more in males (M:F ratio is 1.5:1) and it goes on increasing with age. Incidence of adenocarcinomas (82.81%) and carcinomas arising from rectum (59.37%) was considerably high compared to other forms of carcinomas.

Conclusions

Demographics of the patients diagnosed of colorectal carcinoma have major impact on incident rates of various forms of colorectal carcinomas.

Key Words

Colorectal carcinoma Adenocarcinoma signet ring.

Running Title

Histopathology of colorectal carcinomas.

Introduction

Adenocarcinoma is the most common malignant tumor of rectum and colon. It is a disease of western world life style and it is the second most visceral malignancy in United States. Colorectal cancer is common in most countries of North America, Europe and is rare in Asia¹. The incidence of large bowel cancer is lower in India and rectal cancer is more common than colon cancer². The incidence of colon cancer in 8th population registry varies from 3.7 to 0.7 per lakh among men and 3 to 0.4 per lakh among women and for rectal cancer it is 5.5 to 1.6 per lakh among men and 2.8 to 0 per lakh among women².

Previous studies stated that incidence rates for large bowel cancers in rural population are half of the urban and is less common in North India, as the diet was rich in roughage and vegetable fibers, which was completely lacking in south Indian diet where cancer was more common²⁻³.

Environmental factors play determinative role in the etiology of colonic cancer. Diet alone may be largely responsible for most people being afflicted with this common malignancy. The macronutrients in the food supply namely fat and fiber act as risk factors and preventive agents respectively. The colorectal cancer inhibition by micronutrients including vitamins, anticarcinogens derived from fruits, vegetables and minerals act as factors in prevention of colon cancer⁴. Dietary fibers play a major role in the regulation of normal intestinal function and in the maintenance of a healthy intestinal mucosa; dietary fibers prevent the development of colon cancer with protective effect in 61.9% of reports⁵.

Clinical Features

Patients with colorectal carcinoma clinically present with abdominal pain, abdominal lump, altered bowel habits, loose motions with blood and mucus, per rectal bleeding, weight loss, and weakness.

Pain in the abdomen, altered bowel habits and rectal bleeding are the commonest symptoms reported.⁶⁻⁷

Macroscopic Appearance

Grossly the colorectal carcinomas show an ulcerative, annular (string), cauliflower and linitis plastica like growth. Most of the cancers of colon and rectum are ulcerating tumors with raised everted edges.

The annular (string) carcinoma is a type of which surrounds the lumen producing an effect of a string tied tightly around the bowel⁸. These small annular growths cause stenosis and proximal dilatation. The symptoms of obstruction are usually late because string carcinomas are commonest in the proximal colon where feces are normally fluid. Thus the feces pass easily through the constriction which would have otherwise obstructed the passage of solid stools⁹.

Prognosis of the uncommon linitis plastica type of the carcinoma colon is unfavorable which is seen in case of signet carcinoma in which tumor infiltrates the submucosa and muscularis and peritoneal surface¹⁰.

Classification

According to W.H.O. colorectal carcinomas are classified as

1. Adenocarcinoma in situ /severe dysplasia.
2. Adenocarcinoma which contain tubular, acinar, papillary structures.
3. Mucinous (colloid) adenocarcinoma in which substantial amount of mucin is retained within the tumor
4. Signet ring carcinoma in which there is prominent component of isolated cells distended with mucus.
5. Squamous cell (epidermoid) carcinoma.
6. Adenosquamous cell carcinoma.
7. Small cell carcinoma
8. Undifferentiated carcinoma.¹¹⁻¹²

Aim and Objectives

Present study was designed to study histopathology of colorectal carcinomas and to investigate the influence of demographics on incidence rate of various forms of colorectal carcinomas; and to compare the findings of these studies with earlier studies.

Material and Methods

The present study was carried out in the Department of Pathology, K.I.M.S., KARAD over a period of five years. The study was approved by ethics review committee.

Table 1: Demographic of 64 cases of colorectal carcinoma.

Age in years	Male	Female	Total n (%)
11-20	1	-	1(1.56)
21-30	4	2	6(9.37)
31-40	2	5	7(10.93)
41-50	8	4	12(18.75)
51-60	6	6	12(18.75)
61-70	11	8	19(29.68)
71-80	4	1	5(7.81)
81-90	2	-	2(3.12)
Total n (%)	38 (59.37%)	26 (40.63%)	64 (100)

Table 2: Sites of colorectal carcinoma

Site	Number	Percentage (%)
1. Caecum	2	3.12
2. Ascending colon	8	12.5
3. Hepatic flexure	1	1.56
4. Transverse colon	1	1.56
5. Splenic flexure	3	4.68
6. Descending colon	3	4.68
7. Sigmoid colon	10	15.63
8. Rectum	36	56.25
Total	64	100

Biopsies or resected specimens showing presence of colorectal carcinoma were included in the present study. The slides received for review of opinion, were also included in the present study. For this study information about history and investigations done was obtained from the clinical charts.

Table 4: Comparison of sex distribution of colorectal carcinoma with other studies:

Sex	Swinton et.al. (1959) %	Glenn F. (1966) %	Present study %
Male	54.44	60.72	59.37
Female	45.56	39.38	40.63

Table 3: Sitewise distribution of colorectal carcinoma

Type microscopy Site	Adenocarcinoma n (%)	Mucin secreting adenocarcinoma n (%)	Signet ring cell carcinoma n (%)	Squamous cell carcinoma n (%)
1. Caecum	2(3.77)	-	-	-
2. Ascending colon	5(9.43)	3(33.33)	-	-
3. Hepatic Flexure	1(1.88)	-	-	-
4. Transverse colon	-	1(11.11)	-	-
5. Splenic Flexure	2(3.77)	1(11.11)	-	-
6. Descending colon	2(3.77)	1(11.11)	-	-
7. Sigmoid colon	7(13.21)	2(22.22)	-	1(100)
8. Rectum	34(64.15)	1(11.11)	1(100)	-
Total n(%)	53(100)	9(100)	1(100)	1(100)

Table 5: Comparison of site distribution of colorectal carcinoma, adenocarcinomas and mucin secreting adenocarcinoma with other studies

Sites	Colorectal carcinomas			Adenocarcinomas		Mucin secreting adenocarcinoma	
	Swinton et. al. ¹⁴ (1959)%	Welch et.al. ¹⁵ (1962)%	Present study%	Gilbertsen ¹⁶ V,A.(1959)%	Present study %	Sundbland A.S. ¹⁷ (1982)%	Present study %
Caecum	6.7	9.5	3.12	12.9	3.77	10	-
Ascending colon	4.1	6.2	12.5	3.4	9.43	5	33.33
Hepatic flexure	2.7	2.0	1.56	1.4	1.88	-	-
Transverse colon	6.0	5.7	1.56	4.9	-	7	11.11
Splenic flexure	2.8	2.6	4.68	1.4	3.77	-	11.11
Descending colon	3.3	5.0	4.68	3.7	3.77	9	11.11
Sigmoid colon	27.7	27.1	15.63	18.9	13.21	25	22.22
Rectum	30.9	40.9	56.25	53.4	64.15	44	11.11
Unclear	0.9	1.0	-				

The colorectal biopsies and specimens were fixed 10% formaline and then processed and embedded in paraffin. The sections were cut 4-5 micron in thickness and were stained with hematoxylin and eosin¹³.

Results and Discussion

In present study we could investigate total 64 cases i.e. 34.37 % (22) biopsies, 7.81 % (5) slides for review of opinion and 57.82% (37) resected colorectal specimens. In this study it was observed that mean age of presentation with colorectal carcinoma was 54.07 years with higher degree incidence in males (1.5:1 was the M: F ratio) with age group between 61-70 yrs (Table-1)

Out of 64 cases maximum number were found in rectum 59.37% (36) followed by sigmoid colon 15.63% (10) and ascending colon 12.5% (8) and majority of them were adenocarcinomas 82.81% (53). Incidence of signet ring carcinoma 1.56% (1) and squamous cell carcinoma 1.56% (1) was very low compared to adenocarcinomas (Table-2-3).

When the findings of our studies were compared with the earlier studies by Swinton et. al. and Welch et. al it was found that our findings are in agreement with earlier studies. However incident rate of carcinomas arising from sigmoid colon was found to be higher in these studies compared to our study i.e.27.7% and 27.1% respectively at the same time it was observed that rate of rectal carcinoma is lower i.e.30.9% in study by Swinton et. al. (Table-4-5)

Sites of distribution of adenocarcinomas and mucin secreting adenocarcinomas were also compared with findings of study by Gilbertsen V,A.and Sundbland A.S.respectively. The percentage distribution of adenocarcinomas was found higher in caecum and lower in ascending colon in the study by Gilbertsen V,A at the same time in transverse colon it was 4.9% which was

0% in our study. (Table-5). In our study mucin secreting adenocarcinomas were mainly found in ascending colon in contrast to study by Sundbland A.S. where it was mainly found distributed in rectum. (Table-5).

Authors' Contributions

All authors read and approved the final manuscript. AB as an investigator in the study drafted the manuscript and has made a substantial contribution to acquisition of data. UK contributed in data acquisition and analysis.

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References

- Boyle P, Zardze D.G., Sman M., Descriptive epidemiology of colorectal cancer, *Int. J. Cancer*-1985,36, 9-18.
- Mohandas B.C., Epidemiology of digestive tract cancer in India Vs A LARGE AND SMALL BOWEL. *Indian J. Gastroenterol*, 1999, 18(3), 118-121.
- Malhotra S. L., Geographical distribution of gastrointestinal cancers in India with special reference to cusation, *Gut*, 1967, 8,361-371.
- Wargowich M. J., Baer A.R., Hu P. et.al., Dietary factors and colorectal cancer in Gastroenterology clinics of North America, 1988,17,727-710.
- Jacobs L.R. Fiber and colon cancer in, colorectal cancer in Gastroenterology clinics of North America, 1988, 17,773-792.
- Silverman A.L., Desai T.K., Dhar R. et.al., Clinical features, evaluation and detection of colorectal cancer, colorectal cancer in Gastroenterology clinics of North America, 1988,17,713-726.
- Swinton N. W., Moskowski E., Snow J.C.,et.al., Cancer of colon and rectum, *S.Clinics North America*,1959, 39, 745-752.
- Jass J. R., The large intestine in systemic pathology volume 3, *Alimentary tract*, 3rd edition, edited by Mirsun B.C., General editor Symmer,s W.Stc., Churchill Livingstone, New York, 1987,365-377.
- Morson B. C., Dawson I.M., Malignant epithelial tumors in

- Morson and Dawson, *Gasrointestinal Pathology*, 3rd edition, Blackwell Scientific publication, Oxford, 1990, 597-623.
10. Compton C.C., Henson D.E., Hutter R.V.P., Sobin L. H., Bowman H.E., Updated protocol for the examination of specimens of removed from patients with colorectal carcinoma, *Arch. Pathol. Lab. Med.* 1997, 121, 1247-1254.
 11. Laufman H., Safir L.H., Primary linitis plastica type type of carcinoma of colon, *Archives of surgery*, 1957, 62, 79-91.
 12. Jass J. R. Sobin L. H., *Histopathological typing of intestinal tumors*, World Health Organisation, Ed. New York. N. Y., Springer-Verlag N. Y. Inc., 1989.
 13. Bancroft J. D., and Allen Stevans, *The haematoxylin in Theory and Practice of Histological Techniques*, 3rd edition, Churchill Livingstone, London, 1982, 107-118.
 14. Welch C.E., Burke J. F. Carcinoma of colon and rectum, *The New England Journal of Medicine*, 1963, 266, 5, 211-219.
 15. Glenn F., Mcsherry C.K., Carcinoma of distal large bowel, *Annals. Of surgery*, 1966, 163, 6838-863.
 16. Gilbertson V.A., Adenocarcinoma of the large bowel, *Surgery*, 1959, 46, 6, 1027-1042.
 17. Sundbland A.S., Paz R.A. Mucinous Carcinoma of the colon and rectum and their relation to polyps, *Cancer* 1982, 50, 2504-2509.

Prediction of Total Body Muscle Mass by using Anthropometric Measurements in Pre – School Children

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Abstract

Objective

This study was conducted to predict total body muscle mass (TBMM) by using anthropometric measurements in pre-school children which gives better assessment of growth in healthy as well as in diseased. The simple and multiple linear equations were derived to predict TBMM by using simple, noninvasive tools i.e. anthropometric measurements.

Methods

Ninety pre-school (1-6yrs) apparently normal children were subjected to estimate total body muscle mass (TBMM) by 24 hours urinary creatinine excretion as one variant which reflects the cellular growth. Six anthropometric measurements viz. weight, length/height, head circumference, chest circumference, mid-arm circumference and maximum-calf circumference were recorded in each child as physical growth variant.

Result

TBMM showed a gradual upward trend with age but no significant difference was found between the different age groups. Correlation and regression studies were done between two independent variables and it was found that length/height ($P < 0.01$) was the best correlated anthropometric measurement to total body muscle mass and the second best being the body weight ($P < 0.01$). TBMM was predicted by using the multiple linear regression equation ($R^2 = 96.67\%$).

Conclusion

The best prediction (96.67%) of TBMM can be done by using all the studied anthropometric measurements in the conclusive equation.

Keywords

Anthropometric measurements, Urinary creatinine excretion, Total body muscle mass

Introduction

Physical anthropometry has been the most common, simple, practical and valid parameter to assess the pattern of the growth process¹. The major tissue of the body, namely muscle can be called as one functional unit. The total body skeletal muscle mass plays a significant role in both health and disease states. Accurate measurement or prediction of muscle mass is useful in physiology, nutrition and clinical medicine¹⁰. The unit comprises the fat free mass of the body which reflects to some extent the dimensions of the cellular growth in the other tissues². The direct estimation of total body muscle mass, thought more accurate, is an impracticable and costly procedure. Therefore, it was estimated by 24 hrs urinary creatinine method³. In view of these facts this study was designed to predict TBMM by using anthropometric measurements in pre-school children^{4,5,11,13,15}. The correlation and regression studies was done to know the correlation between the two independent variables and to derive an equation to predict the total body muscle mass which would be beneficial even in the outdoor settings.

Material and Methods

Ninety apparently normal children (1-6yrs), whose weight were more than 85% of 50th percentile of NCH standard, were screened from well Baby Clinic of Saraswathi Institute of Medical Sciences, Hapur, Ghaziabad after obtaining the permission from Ethical Committee of the hospital.

Children who triggered the suspicion of any disease, were not included in the study. Six anthropometric measurements viz. weight (Wt), length/height (Ht/Lth), head circumference (HC), chest circumference (CC), mid-arm circumference (MAC) and maximum-calf

Table I: Age and Sex distribution

Age (Months)	Male	Female
13-24	10	-
25-36	15	5
37-48	15	5
49-60	14	6
61-72	14	6
Total	68	22

N=90

circumference (MCC) were recorded in each child by using the standard techniques¹. Weight was measured to the nearest 0.1Kg by using a Seca weighing machine (Seca Weighing and Measuring Systems, Hamburg, Germany). Length / height was measured to the nearest 0.1cm by using Harpenden infantometer / stadiometer (Harpenden; Holtain Ltd., Crymych, UK). HC, CC, MAC and 5 MCC were measured to the nearest 0.1cm by using a fibre glass measuring tape. The total body muscle mass in kilograms was calculated by multiplying 24 hours creatinine excretion in grams by 20, the Cheek's factor³ It was endeavored to estimate 24 hours urinary creatinine excretion on two or more than two consecutive days in each child while they were on low creatinine diet¹⁴. Urine collection was started after the voiding of bladder upon rising in the morning and all the urine passed for the next 24 hours was collected¹². Urinary creatinine estimation was done by Alkaline Picrate Method¹¹. A written consent was taken from the parents in each case.

Results

Study was conducted on 90 apparently healthy children between 13 to 72 months of age. There were 10 children in the age group of 13 to 24 months and 20 children in each age group of 25 to 36 months, 37 to 48 months, 49 to 60 months and 61 to 72 months. Out of 90 children, 68 were boys and 22 girls. The average age was 43.95±16.39 months (Table –I). Table II depicts the mean (±SD) values of anthropometric measurements in different age groups. The mean (± SD) values of anthropometric measurements ie Wt, Ht/Lth, HC, CC, MAC and MCC were

12± 0.24kg, 92.97± 0.67cm, 46.0± 1.12cm, 47.7± 0.72cm, 14.0± 0.32cm and 17.23± 0.24cm respectively.

Table III shows the values of TBMM in different age groups. The difference was not statistically significant in the age groups of 37-48 months, 49-60 months and 61-72 months (p>0.05), while it was statistically significant in the age group of 25-36 months (p<0.05). Table IV reflects the correlation of TBMM to various anthropometric measurements. The 't-test' revealed significant correlation (p=<0.001) between TBMM and different anthropometric measurements except CC.

Table V represents the simple regression equations of TBMM and different anthropometric measurements and the percent variance explained for each variable. The percent variance explained for Ht/Lth, Wt, MAC, MCC, HC and CC was 94.09, 79.21, 67.24, 38.44, 25.00 and 2.89 respectively.

When multiple linear regression equation was derived, the values and equation of TBMM on all anthropometric measurements was found as follows:

$$\text{TBMM (kg)} = -8.52 + 0.12\text{Ht. (cm)} + 0.02\text{Wt (Kg)} + 0.16\text{MAC (cm)} - 0.07$$

$$\text{MCC (cm)} + 0.002\text{HC (cm)} + 0.07\text{CC (cm)}$$

$$\text{Coefficient of determination 'R}^2 = 96.067\%$$

Discussion

TBMM showed a gradual upward trend in both boys and girls. No statistically significant difference was found

Table II: The anthropometric measurements in different age groups

Age (Months)	Wt (Kg) Mean ± SD	Ht / Lth (cm) Mean ± SD	HC (cm) Mean ± SD	CC (cm) Mean ± SD	MAC (cm) Mean ± SD	MCC (cm) Mean ± SD
13-24	8.85 ± 1.68	78.37 ± 4.06	44.59 ± 4.06	45.58 ± 3.32	12.60 ± 0.50	15.27 ± 1.31
25-36	9.92 ± 1.55	86.40 ± 6.61	45.77 ± 1.55	47.13 ± 1.71	13.67 ± 0.66	16.95 ± 0.70
37-48	12.06 ± 1.93	96.56 ± 6.39	45.45 ± 1.55	46.93 ± 2.48	14.23 ± 0.43	17.13 ± 0.74
49-60	13.02 ± 1.44	96.59 ± 5.62	46.86 ± 1.33	49.63 ± 2.23	14.53 ± 0.93	18.48 ± 1.19
61-72	16.15 ± 1.28	107.03 ± 5.63	47.80 ± 0.86	49.29 ± 1.18	14.97 ± 0.77	18.34 ± 0.99
Pooled Mean	12 ± 0.22	92.97 ± 0.67	46.00 ± 1.12	47.7 ± 0.72	14.0 ± 0.32	17.23 ± 0.24

Table III: Total body Muscle Mass in different Age groups

Age (months)	Total Body Muscle Mass (Kg)		
	Mean ± SD		
	M (68)	F(22)	TOTAL (90)
13-24	2.7 ± 0.48	-	2.73 ± 0.48
25-36	3.78 ± 0.71*	2.98 ± 0.48*	3.58 ± 0.74
37-48	5.06 ± 0.80**	4.59 ± 1.06**	4.94 ± 0.87
49.60	4.99 ± 1.08**	4.71 ± 0.90**	4.91 ± 1.01
61-72	6.53 ± 1.05**	6.47 ± 0.15**	6.51 ± 0.87

* The difference is statically significant (P<0.05).

** The difference is not statistically significant (P>0.05).

Table V: Simple regression equations of TBMM (y) On different anthropometric variables Equation: $y = a + b x$

Anthropometric Variants (x)	Constants (a)	Regression Coefficient (b)	% variance explained
Ht / Lth (cm)	-11.88	+0.18*	94.09
Wt (Kg)	-0.84	+0.45*	79.21
MAC (cm)	-14.70	+1.37*	67.24
MCC (cm)	-26.59	+1.79*	38.44
HC (cm)	-12.89	+0.38*	25.00
CC (cm)	-9.40	+0.29*	2.89

* ($p < 0.01$) Highly significant

Table IV: Correlation Coefficient between TBMM Anthropometric Variables

Anthropometric variants of children aged 13-72 months of age	TBMM
<input type="checkbox"/> Ht / Lth	+0.97*
<input type="checkbox"/> Wt	+0.89*
<input type="checkbox"/> MAC	+0.82*
<input type="checkbox"/> MCC	+0.62*
<input type="checkbox"/> HC	+0.50*
<input type="checkbox"/> CC	+ 0.17**

* Highly significant ($p < 0.001$)

** Not significant

between the different age groups (mean = 4.73 ± 0.15 kg). Seth et.al.¹⁰ found TBMM to be 4.5 ± 1.56 kg as an average for pre-school children of the same age group. Among all anthropometric measurements studied, length/height was the best correlated to TBMM as it explained 74.09% of variance, and the next being weight (which explained 79.21% variance) on deriving the simple linear regression equation. This is in confirmation with results of Cheek et. al.³ and to some extent to those of Seth et. al.¹³, Kurian R et.al.⁶, Lee RC et.al.⁷

and Rebeca et.al.¹¹. In the present study the order of anthropometric measurements with decreasing values of coefficients of correlation was found different from Seth et.al.¹³ and others. This may be due to the different population and age group.

To see if any further improvement could be made in the prediction of TBMM by the use of all anthropometric measurements, the multiple linear regression equation was fitted, which explained 96.67% of accuracy in the out patient department. In cases of acute malnutrition where length / height is the least affected anthropometric measurement, it would give an erroneous result, if TBMM was to be calculated by length / height alone. In presence of oedema with malnutrition the calculation of TBMM with body weight only, would derive the defective values. Hence it is advocated that in such cases we should use the multiple linear regression equation of all anthropometric measurements studied. The prediction of TBMM by using other methods are costly and and impractical to use in field settings¹⁰.

References

1. Cameron N. Anthropometric measurements. In: Cameron N, editor. The measurement of human growth. London: Croom Helm, 1984. p 56-99.
2. Cheek DB Muscle cell growth in normal children. In: Cheek DB, editor. Human growth: Philadelphia : Lea and Febiger; 1968. p337-351.
3. Graystone JE. Creatinine excretion during growth. In : Cheek DB, editor. Human growth: Philadelphia : Lea and Febiger; 1969.p 182-197.
4. Harshpal SS, Caroline HD, Osmond C, Lakshmy R, Biswas SK. Leary SD, Reddy KS. Et. Al. Anthropometric indicators of body composition in young adults: relation to size at birth and serial measurements of body mass index in childhood in the New Delhi birth cohort. Am J Clin Nutr 2005; 82: 456-466.
5. Heymsfield SB, McManus C, Smith J, Sevens V, Nixon DW. Anthropometric measurement of muscle massL revised equations for calculating bone-free arm muscle area. Am J Clin Nutr 1982;36:680-690.
6. Kuriyan R, Kurpad AV. Prediction of total body muscle mass from simple anthropometric measurements in young Indian males. Indian J Med Res 2004 Mar;119(3):121-8.
7. Lee RC, Wang Z, Heo M, Ross R et.al. Total-body skeletal muscle mass: development and cross-validation of anthropometric prediction models. Am J Clin Nutr 2001 May;73(5):995.
8. Malhotra VK. Urinary creatinine. In: Malhotra VK, editor. Practical biochemistry for students. 4th ed. New Delhi: Jay Pee Brothers Medical Publishers (P) LTD; 2003. P. 63-65.
9. Neubert A, Remer T. The impact of dietary protein intake on urinary creatinine excretion in a healthy pediatric population. Pediatric 1998;9:133-655.
10. Poortmans JR, Boisseau N, Moraine JJ et.al. Estimation of total-body skeletal muscle mass in children and adolescents. Med Sci Sports Exerc. 2005 Feb;37(2):316-22.
11. Rebecca K, Kurpad AV. Prediction of total body muscle mass from simple anthropometric measurements in young Indian males. Indian J Med Res 2004;119:121-128.
12. Remer T. Anthropometry based reference values for 24 hrs urinary creatinine excretion. Am UJ Clin Nutr 2002;75:561-569.
13. Seth V, Sundram KP, Vasuki K. Use of anthropometric measurements in estimation of muscle mass. Ind J Med Res 1981; 74:50-55.
14. Souci SW, Fachmann W, Kraut H. Food composition and nutrition tables. 5th ed. Stuttgart, Germany: Medpharm Scientific Publishers; 1994.
15. Wang ZM, Gallagher D, Nelson ME, Maithews DE, Heymsfield SB. Total body skeletal mass: evaluation of 24 hrs urinary creatinine excretion by computerized axial tomography. Am J Clin Nutr 1996;63:863-869.

Odontogenic Myxoma - Case Reports and Review of Literature

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Abstract

The odontogenic myxoma of the jaw bone is a rarely occurring, benign, slow growing, nonencapsulated neoplasm which is of ectomesenchymal origin. This neoplasm occurs almost exclusively in the jaw bones. The odontogenic myxoma may show a wide spectrum of radiographic appearances, unilocular, multilocular radiolucency and a distinct or diffuse border, making the differential diagnosis difficult. Therefore, histopathological examination is mandatory. Odontogenic myxomas have a high rate of recurrence, which ranges from 10-33% with an average of 25% and majority of recurrences occur within the first two years. Here, we are presenting two case reports of maxillary and mandibular odontogenic myxoma along with their review of literature.

Keywords

Odontogenic tumor, Fibromyxoma, Odontogenic myxoma.

Introduction

The term "myxoma" was first used by Virchow in 1871, when he described tumors that histologically resembled the mucinous tissue of the umbilical cord.¹ Myxomas are benign, but locally invasive neoplasms that rarely appear in the skeleton. When they do occur in osseous sites, they are found almost exclusively in the jaws. Myxomas of the jaws were first described by Thoma and Goldman in 1947.² According to the World Health Organization (WHO), the odontogenic myxoma is classified as an odontogenic tumor of ectomesenchymal origin.³

Odontogenic myxoma (OM) is a nonencapsulated benign tumour of the jaws that occurs rarely. It is a slow growing tumour consisting of an accumulation of mucoïd ground substance with little collagen, the amount of which determines whether it can be called a myxofibroma.⁴ Myxomas represent 3% to 6% of odontogenic tumors. They occur more often in the second and third decades of life.⁵ The majority of studies show that the tumor is slightly more common among females. The mandible appears to be more frequently affected than the maxilla especially in the posterior region.^{4,6}

The initial treatment of the lesion should be very efficient, but complete surgical removal can be difficult as the lesion

is not encapsulated and because the myxomatous tissue infiltrates adjacent bone tissue. These characteristics may explain the high rate of recurrence of myxomas, which ranges from 10 to 33% with an average of 25%.³

Case Reports

Case 1

A 27 year old female patient reported to the outpatient department of Sardar Patel Post Graduate Institute of Dental & Medical Sciences, Lucknow, with the complain of painless swelling in the left posterior mandibular region since 2 years.

The present swelling was initially small in size and showed a gradual increase over a period of two years to its present dimensions. The swelling extended from mandibular left second premolar region to left third molar region and it obliterated the buccal vestibule (fig. 1). Extra oral examination showed a diffuse swelling in left mandibular body region. The skin over the swelling was normal, and there was no local rise of temperature. On palpation the swelling was firm in consistency. Buccal and lingual cortical plates were expanded, and there was no history of paraesthesia.

Radiographic examination demonstrated well demarcated, multilocular radiolucent lesion with fine trabeculae that had expanded the buccal and lingual cortex of left side of mandible in posterior region. It

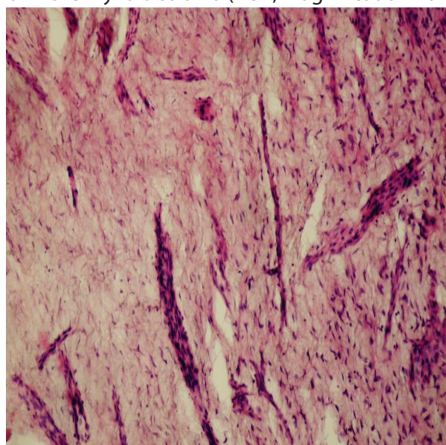
Fig. 1: Intraoral photograph showing swelling extending from left mandibular second premolar to third molar region, obliterating the vestibule



Fig. 2: OPG showing well demarcated, multilocular radiolucent lesion involving left mandibular posterior region



Fig. 3: Microphotograph showing strands of odontogenic epithelium present within the myxoid stroma (H&E, magnification 20X)



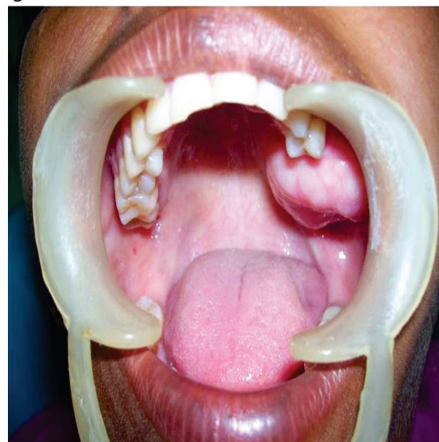
extended from second premolar region to the ramus of mandible sparing the coronoid and condylar process (fig 2). Differential diagnosis included ameloblastoma and odontogenic myxoma. The lesion was surgically excised.

On gross examination, the lesion appeared 4cm X 5cm in size, white in colour with soft gelatinous texture. Histopathological examination of Hematoxylin & Eosin (H&E) stained soft tissue sections showed tumor mass without encapsulation. It showed spindle- and stellate-shaped cells in a loose, abundantly myxoid connective tissue stroma. Some areas showed moderately dense collagen fibres. Strands of inactive odontogenic epithelium were seen within the connective tissue stroma (fig. 3). Overall histological appearance of the lesion revealed more amount of myxoid stroma in a less fibrous and acellular background. The presence of myxomatous tissue, along with areas of moderately dense collagen fibres, led to the final diagnosis of odontogenic myxoma.

Case 2

A 32 year old female patient reported to the outpatient department of Sardar Patel Post Graduate Institute of Dental & Medical Sciences, Lucknow, with the complain of painless swelling in the left posterior maxillary region since 18 months.

Fig. 4: Intraoral picture showing swelling extending from first premolar region anteriorly to maxillary tuberosity posteriorly, obliterating the vestibule



Initially the swelling was small in size and showed a gradual increase to its present dimensions. The swelling extended from left second premolar region to left third molar region and it obliterated the buccal vestibule (fig 4). Extra oral examination showed a diffuse swelling in the left infra orbital region. On palpation the swelling was firm in consistency. Buccal and lingual cortical plates were expanded, and there was no history of paraesthesia.

Radiographic examination demonstrated well demarcated, multilocular radiolucent lesion with fine trabeculae that had expanded the buccal and lingual cortex of left side of maxilla in posterior region (fig. 5). The lesion was surgically excised.

On gross examination, the lesion appeared whitish yellow in colour with soft gelatinous texture. Histopathological examination of Hematoxylin & Eosin (H&E) stained soft tissue sections showed spindle- and stellate- shaped cells in a loose, abundantly myxoid connective tissue stroma. Some areas showed moderately dense collagen fibres. Strands of inactive odontogenic epithelium were seen within the connective tissue stroma (fig. 6). Thus, histopathological examination confirmed the final diagnosis of odontogenic myxoma.

Discussion

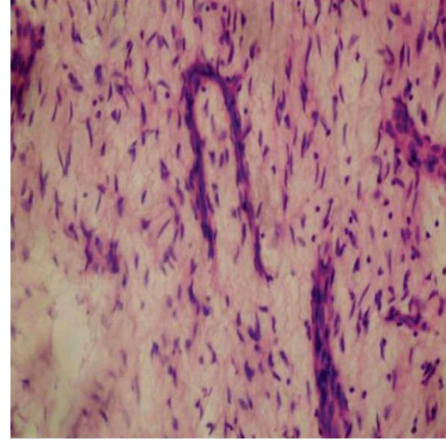
Odontogenic myxomas are tumors derived from embryonic mesenchymal elements of dental analage.⁸ It appears to originate from the dental papilla, follicle or periodontal ligament.³ The odontogenic nature of the myxomas may be proven through the following facts: the almost unique occurrence of the osseous lesion in the jaws, it has a histological similarity with the dental mesenchyme; it is associated with unerupted or absent teeth; and there is a sporadic presence of epithelial islands or odontogenic tissue inside the myxomatous stroma.⁷

Although it is a benign neoplasm, it may be infiltrative, aggressive and may recur. The studies indicate the tumor occurs across an age group that varies from 22.7 to 36.9

Fig. 5: Radiograph showing multilocular radiolucency involving the left maxillary region



Fig. 6: Microphotograph showing strands of odontogenic epithelium with fibrous tissue in myxoid stroma (H&E, magnification 20X)



years. It is rarely seen in patients younger than ten years of age or older than 50.³

Noffke *et al.* (2007) in their study observed that the lesion occurred more commonly in females than in males with male to female ratio of 1:2.3. They also observed that the lesion occurred more commonly in mandible than in maxilla, especially in premolar-molar area. Similar results were also observed by Simon *et al.* (2004).^{4,6}

The odontogenic myxomas are asymptomatic, causing pain, paraesthesia or asymmetries only when they take on larger sizes. Their growth is usually slow, however they are locally aggressive. Their growth can cause expansion of cortical plates. They may cause divergence or root resorption, tooth shifting or movement. Ulceration of overlying oral mucosa can occur when tumor interferes with dental occlusion. Odontogenic myxoma of mandible is more frequent than that of maxilla. Tumor rarely crosses midline.⁶

Myxomas of the jaw bones (odontogenic myxoma) present a variety of radiographic features. Generally, they are seen as unilocular or multilocular radiolucencies containing delicate or sclerotic trabeculations, with a "honey comb", "soap bubble" or "tennis racket" appearance.⁹ There have been reports of a sun ray aspect also.² The margins of odontogenic myxomas are usually well delineated, but in some instances they may present poor definition on plain radiographs. Dental displacement is a relatively common finding, although root resorption is rarely seen.⁹ When unilocular and without trabeculae, tumor closely resembles periapical, lateral, periodontal and traumatic bone cyst. When multilocular, it must be distinguished from ameloblastoma, central hemangioma, aneurysmal bone cyst, metastatic tumors.⁴

OM is a benign neoplasm without encapsulation. Microscopically, the tumor consists of rounded, spindled, and stellate cells arranged in a loose, myxoid stroma with few collagen fibrils. Small islands of apparently inactive epithelial odontogenic rests may be scattered through the myxoid substance. A microscopic resemblance can be

noticed between odontogenic myxoma and odontogenic fibroma. Handlers *et al.* observed, in the latter, the presence of a spectrum of fibrous connective tissue stroma varying from myxoid to densely hyalinized and from acellular to cellular. Ultrastructural findings indicate odontogenic myxoma and central odontogenic fibroma share many common morphologic features and have an apparently similar histogenesis.³

The differential diagnoses include any lesion with myxoid change. Most important, myxoma of the bone must be distinguished from myxoid chondrosarcoma and rhabdomyosarcoma (embryonal, botryoid type). Other differential diagnoses include chondroblastoma, chondromyxoid fibroma, osteochochondromyxoma, and neurofibroma with myxoid change.⁵ There is also a microscopic resemblance between OM & dental papilla.³

OM is an infiltrative and aggressive disease. The tumor is not radiosensitive and surgery is the treatment of choice. The surgical treatment for myxoma of bone includes enucleation and curettage, peripheral resection with removal of the lesion with 1 to 10 mm bony margins.⁵

In spite of being a benign tumor, OM presents a high recurrence rate of around 25% and majority of these recurrences occur within the first two years. Some authors relate this phenomenon to an incomplete encapsulation of the lesion, or due to the capacity of the tumor cells to penetrate through bone trabeculae. Little is known about the relationship between tumor cells and extracellular matrix or the capacity of these cells to penetrate through the bone trabeculae facilitating tumor growth. Proteolytic enzymes such as matrix metalloproteinases (MMP) are frequently involved in this process. Miyagi *et al.* (2008) studied the role of MMP-2, 9 in OM. They suggested that both MMP-2 and 9 could play a role in invasiveness of OM in surrounding tissue.¹⁰

Post-operative preservation of patients with OM is indefinite, especially in the early stage which is the period of the greatest recurrence rate. One important aspect that should be taken into account is the possibility that

the patients may skip control visits. Thus, a possible recurrence will be seen only later on and treatment will be impaired. For all these reasons, a resection with broad margins is the most indicated treatment.⁷

Conclusion

Clinical and radiological aspects of odontogenic myxomas are not conclusive, it is necessary to have a histopathological examination for the final diagnosis. Because of its high rate of recurrence, especially due to its gelatinous and mucous aspect, surgical treatment through bone resection is the most indicated treatment modality and the patient must be followed up closely for years.

References

1. Andrews T, Kountakis SE, Maihard AAJ. Myxomas of the head & neck. *Am J Otolaryngol* 2000; 21: 184-189.
2. Li TJ, Sun LS, Luo HY. Odontogenic myxoma: a clinicopathological study of 25 cases. *Arch pathol Lab Med* 2006; 130: 1799-1806.
3. Dezotti MSG, Azevedo LR, Fontao FNGK, Capelozza ALA, Sant'ana E. Odontogenic Myxoma – a case report and clinicoradiographic study of seven tumors. *J Contemp Dent Pract* 2006; (7)1:117-124.
4. Simon ENM, Merckx MAW, Vuhahula E, Ngassapa D, Stoelinga PJW. Odontogenic myxoma: a clinicopathological study of 33 cases. *Int J Oral Maxillofac Surg* 2004; 33: 333-337.
5. Landa LE, Hedrick MH, Nepomuceno-Perez MC. Recurrent myxoma of the zygoma: a case report. *J Oral Maxillofac Surg* 2002; 60: 704-708.
6. Noffke CEE, Raubenheimer EJ, Chabikuli NJ, Bouckert MMR. Odontogenic Myxoma: Review of Literature and Report of 30 cases from South Africa. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2007; 104: 101-109.
7. de Melo AUC, de Farias Martorelli SB, de Holanda Cavalcanti PH, Gueiros LA, de Oliveira Martorelli F. Maxillary odontogenic myxoma involving the maxillary sinus-Case report. *Rev Bras Otorrinolaringol* 2008; 74(3): 472-475.
8. Lu Y, Xuan M, Takata T, *et al.* Odontogenic tumors: a demographic study of 759 cases in a Chinese population. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1998; 86: 707-714.
9. Tadahiko K, Shumei M, Hideyoshi N, Mitsunobu K, Masayoshi S, Hajime F. Diagnostic imaging for a case of maxillary myxoma with a review of the magnetic resonance images of myxoid lesions. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 1997; 84(4): 449-454.
10. Miyagi SPH, Hiraki KR, Martins MD, Marques MM. Expression of matrix metalloproteinases 2 and 9 in odontogenic myxoma in vivo and in vitro. *J of Oral Science* 2008; 50(2): 187-192.

Anabolic- Androgenic Steroids: The antidoping perspective

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Abstract

Since ancient times, unethical athletes have attempted to gain an unfair competitive advantage through the use of doping substances. Doping with endocrine drugs is quite prevalent in amateur and professional athletes. The World Anti-Doping Agency (WADA) has a list of banned drugs for athletes who compete and a strategy to detect such drugs. A substance or method might be included in the List if it fulfills at least two of the following criteria: enhances sports performance; represents a risk to the athlete's health; or violates the spirit of sports. This list, constantly updated to reflect new developments in the pharmaceutical industry as well as doping trends, enumerates the drug types and methods prohibited in and out of competition. From all these, Anabolic- Androgenic steroids (AAS) constitute by far the highest number of adverse analytical findings reported by antidoping laboratories. The use of different derivatives of AAS is growing among adolescent athletes through out the world. In India the detection of these substances is quite intricate due to the cost of testing and non availability of many accredited labs. This article will overview the use of AAS as doping substances in sports, focusing mainly on the different depravities AAS available in Indian market, schedules of AAS administration, possible side effects of AAS, physical symptoms of AAS in user and counseling strategies to the current fight against doping.

Introduction

The creed of the Olympics states: "The important thing in the games is not winning but taking part. The essential thing is not conquering, but fighting well". As noble a goal as this is, it has little to do with the reality of the modern sports world. Will the Olympic ideal survive, or will it be lost in a sea of hormone, steroid and stimulant abuse?

Sports success is dependent primarily on genetic endowment in athletes with morphologic, psychologic, physiologic and metabolic traits specific to performance characteristics vital to their sport. Such genetically endowed athletes must also receive optimal training to increase physical power, enhance mental strength, and provide a mechanical advantage. However, athletes often attempt to go beyond training and use Pharmacological agents in attempts to gain a competitive advantage. There are literally hundreds of known doping substances

and an equal number of designer, veterinary, and yet to be identified drugs and techniques abused in sports today.

Doping is now a global problem that follows international sporting events worldwide. International sports federations, led by the International Olympic Committee, Governments and Non Governments agencies of different countries have for the past half century attempted to stop the spread of this problem, with little effect. In fact, new, professional athletes now abuse more powerful and undetectable doping techniques and substances assisted by sophisticated networks of distribution have developed.

Professional athletes are often the role models of adolescent and young adult populations, who often mimic their behaviors, including the abuse of drugs. This is primarily due to the amount of money associated with winning in today's sports industry. Multimillion-dollar contracts, appearance fees, international endorsement and sports merchandising represent a billion dollar industry that offers today's athletes, their sponsors and entourage previously unheard of financial gains. In addition, male and female adolescents are now abusing these drugs for cosmetic purposes in an attempt to achieve the "cut" and sexy look promoted by the media.

Today performance-enhancing programs and drugs are not the exclusive province of elite athletes, but have spread to health clubs, high schools and other at-risk populations, creating an over \$ 4 billion US dollar industry that is growing daily as new compounds are synthesized and marketed¹. The serious side effects of steroids described in the medical literature include liver function abnormalities, liver and kidney tumors, endocrine and reproductive dysfunctions, testicular atrophy, lipid and cardiac effects and psychiatric symptoms².

What are Anabolic- Androgenic steroids?

"Anabolic Steroids" are any drug(s) (other than estrogens, progestins, and corticosteroids) or hormonal substance(s), chemically related to testosterone, a male hormone that promotes the growth of skeletal muscle (anabolic effects) and the development of male sexual characteristics (androgenic effects) in both males and females. Today, there are more than 100 varieties of anabolic steroids that have been developed, but only a limited number have been approved for human or veterinary use³.

Testosterone is produced naturally in both men and women, particularly by the male testicles and other organs and tissues in females. The circulating blood level of testosterone in females is 10% that of their male counterparts. Testosterone circulates throughout the body and interacts with specific receptors on cells to initiate the proper development of the male sexual characteristics (male features, hair, genitalia) as well as the proper function of many other tissues and organs in the body⁴. Because of their chemical similarity to testosterone, all anabolic steroids interact with the same cell receptors and produce effects in all organs and tissues, including the brain, heart, liver, skin, muscles, bone, bone marrow, blood vessels, skin, hair, the genitals and reproductive organs⁵.

AAS were developed in the late 1930s primarily to treat hypogonadism, a condition in which the testes do not produce sufficient testosterone for normal growth, development, and sexual functioning. During the 1930s, scientists discovered that anabolic steroids could facilitate the growth of skeletal muscle in laboratory animals, which led to abuse of the compounds first by bodybuilders and weightlifters and then by athletes in other sports⁴. Illicit steroids are often sold at gyms, competitions, and through mail order operations after being smuggled from countries that do not require a prescription for the purchase of steroids¹.

What are steroidal supplements?

Steroidal supplements can be converted into testosterone or a similar compound in the body. Androgens *Testosterone* is secreted by the interstitial (Leydig) cells of the tests under the influence of Luteinising Hormone from pituitary gland. Testosterone is responsible for all the changes that occur in the body at puberty. Anabolic steroids are synthetic androgens with higher anabolic and low androgenic activity. Anabolic steroids were developed with the idea of avoiding virilizing side effects of androgens while retaining the anabolic effects. They tend to increase retention of nitrogen, calcium, sodium, potassium, chloride and phosphate, leading to an increase in skeletal weight, water retention and increased growth of bone.

Commonly Abused Anabolic Androgenic Steroids in India⁷

Androgens (Testosterone) Injectable

Trade Name	Salt	Prepared by (Company)
Aquaviron	Free Testosterone & Thiomersal	Nicholas
Sustanon	(Testosterone Proinate + Testosterone Phenylpropionate+ Testosterone Isocaproate+ Testosterone Decanoate)	Infar
Testanon (25 & 50mg)	Testosterone Proinate	Infar
Testoviron	Testosterone Proinate	German Remedies

Anabolic Oral Steroids

Adroyo	Oxymetholone	Parke-Davis
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Menabol	Stanozolol	CF Pharma
Neurabol	Stanozolol	Cadila
Orabolin	Ethylestrenol	Infar

Anabolic Injectable Steroids

Biodebol	Nandrolone Decanoate	Biochem
Decadurabolin (25,50 & 100mg)	Nandrolone Decanoate	Infar
Docabolon	(Nandrolone Phenylpopionate + Desoxy Corticosterone Phenylpopionate)	Infar
Evabolin	Nandrolone Phenylpopionate	Concept
Metadec (25 & 50 mg)	Nandrolone Decanote	Jagsonpal

How are AAS abused?

There are about more than 40 different derivatives of testosterone that make up the list of available AAS⁹. Basically anabolic androgenic steroids come in three forms:

- C-17 alkyl derivatives of testosterone
- Esters (or derivatives) of 19 – nortestosterone
- Esters of testosterone

The C-17 alkyl derivatives of testosterone are water soluble and can be taken orally. Their clearance time (time athlete needs to pass traces of these drugs from the body) are usually 3 to 4 weeks but the recent advancement in the detection techniques has made it possible to detect for longer period (4-6 weeks). Where as esters of 19 – nortestosterone are oil-based, fat soluble and active when injected into the body. They are absorbed by the body's fat deposits, where long term energy is been stored. The most popular Anabolic Androgenic Steroid is Nandrolone and which is stored in the fat tissue of the body and released over a longer period, it can some time take 12-18 months to clear the athlete's system³.

Schedule of Abuse

Steroids are often abused in patterns called "cycling," which involve taking multiple doses of steroids over a specific period of time from 4 to 18 weeks, stopping for a period, and starting again. Users also frequently combine several different types of steroids in a process known as "stacking." Steroid abusers typically "stack" the drugs, meaning that they take two or more different anabolic steroids, mixing oral and/or injectable types, and sometimes even including compounds that are designed for veterinary use. Abusers think that the different steroids interact to produce an effect on muscle size that is greater than the effects of each drug individually, a theory that has not been tested scientifically⁸.

Another mode of steroid abuse is referred to as "pyramiding." This is a process in which users slowly escalate steroid abuse (increasing the number of steroids or the dose and frequency of one or more steroids used at one time), reaching a peak amount at mid-cycle and gradually tapering the dose toward the end of the cycle. Often, steroid abusers pyramid their doses in cycles of 6 to 12 weeks. At the beginning of a cycle, the person starts with low doses of the drugs being stacked and then slowly increases the doses. In the second half of the cycle, the doses are slowly decreased to zero. This is sometimes followed by a second cycle in which the person continues to train but without drugs. Abusers

believe that pyramiding allows the body time to adjust to the high doses, and the drug-free cycle allows the body's hormonal system time to recuperate. Doses taken by abusers can be 10 to 100 times higher than the doses used for medical conditions^{1,3}.

Possible Health Consequences of Anabolic Steroid Abuse

From the case reports, the incidence of life threatening effects appears to be low, but serious adverse effects may be under recognized or underreported, especially since they may occur many years later¹⁰. Data from animal studies seem to support this possibility.

Hormonal System

Steroid abuse disrupts the normal production of hormones in the body, causing both reversible and irreversible changes. Changes that can be reversed include reduced sperm production and shrinking of the testicles (testicular atrophy). Irreversible changes include male-pattern baldness, breast development (gynecomastia), Loss of sexual drive, decreased hormone levels, and increased risk for prostate cancer in men^{12,13,17}.

In the female body, anabolic steroids cause masculinization, decreased breast size, loss of body fat¹², skin becomes coarse, clitoris enlarges, irregular menstruation and the voice deepens. Women may experience excessive growth of body hair but lose scalp hair (hirsutism). Steroids can affect fetal development during pregnancy. With continued administration of steroids, some of these effects become irreversible^{13,17}.

Musculoskeletal System

Rising levels of testosterone and other sex hormones normally trigger the growth spurt that occurs during puberty and adolescence and provide the signals to stop growth as well. When a child or adolescent takes anabolic steroids, the resulting artificially high sex hormone levels can prematurely signal the bones to stop growing and cause accelerated maturation in adolescents¹⁴. Increased risk of musculotendons injury has been reported in athletes.

Cardiovascular System

Steroid abuse has been associated with cardiovascular diseases (CVD), including heart attacks and strokes, even in athletes younger than 30¹⁵. Steroids contribute to the development of CVD, partly by changing the levels of lipoproteins that carry cholesterol in the blood. Steroids, particularly oral steroids, increase the level of low-density lipoprotein (LDL) and decrease the level of high-density lipoprotein (HDL). High LDL and low HDL levels increase the risk of atherosclerosis, a condition in which fatty substances are deposited inside arteries and disrupt blood

flow¹⁶. If blood is prevented from reaching the heart, the result can be a heart attack. If blood is prevented from reaching the brain, the result can be a stroke. Steroids also increase the risk that blood clots will form in blood vessels, potentially disrupting blood flow and damaging the heart muscle so that it does not pump blood effectively.

Liver

Steroid abuse has been associated with liver tumors and a rare condition called peliosis hepatis, in which blood-filled cysts form in the liver. Both the tumors and the cysts can rupture, causing internal bleeding. Elevations in levels of liver enzymes (aspartate aminotransferase, alanine aminotransferase, and lactate dehydrogenase) are common, and cholestatic jaundice has been reported in some studies^{12,18,22}.

Skin

Steroid abuse can cause acne, cysts, and oily hair and skin¹⁰.

Infections

Many abusers who inject anabolic steroids may use nonsterile injection techniques or share contaminated needles with other abusers. In addition, some steroid preparations are manufactured illegally under nonsterile conditions. These factors put abusers at risk for acquiring life threatening viral infections, such as HIV and hepatitis B and C. Abusers also can develop endocarditis, a bacterial infection that causes a potentially fatal inflammation of the inner lining of the heart¹⁶. Bacterial infections also can cause pain and abscess formation at injection sites.

Effects on Behavior

Androgenic anabolic steroids, when used in high doses, increase irritability, mood swings (including manic-like symptoms leading to violence), Depression, delusions, Nervousness, Impaired judgment (stemming from feelings of invincibility), Hostility and aggression. Studies suggest that the mood and behavioral effects seen during anabolic-androgenic steroid abuse may result from secondary hormonal changes^{20,26}. A number of negative psychological effects, including "roid rage" (unprovoked aggression), have been observed in some users of AAS. Increased aggressiveness may be beneficial for athletic training, but may also lead to overt violence outside the gym or the track. There are reports of violent, criminal behavior in individuals taking AS²⁴. Other side effects of AS are euphoria, confusion, sleeping disorders, pathological anxiety, paranoia, and hallucinations.

Social Problems

The AAS users always have a fear in their mind of

disqualification from competition and disapproval by parents/coaches/peers²³.

Identifying Androgenic Anabolic steroids users

The cost of laboratory testing for the anabolic steroid use may prohibit testing a large population of athletes. Detection may involve the use of radioimmunoassay, gas chromatography, or mass spectrometry to identify metabolites of the AAS in the athlete's urine. Because of the complexities involved, each test costs approximately \$100 to 200²⁵. Coaches and physical education teachers can identify the AAS users through physical and psychological signs. The physical and psychological changes in individual resulting from anabolic steroid use are a function the duration of use, dosages consumed, and whether the individual is actively participating in a resistance exercise.

Physical Signs of AAS use

Physical Signs of Anabolic Steroid Use do not indicate steroid abuse when observed alone, however, when several of the signs of table - 2 are present, they may alert you for a possible abuse.

Table 2: Physical Signs of Anabolic Steroid Use

1. Rapid weight gain ⁶
2. Increased blood pressure and cholesterol levels ¹⁶
3. Insomnia
4. Headaches
5. Jaundice ¹⁸
6. Frequent Injures of ligament, tendons and muscle
7. Marked muscular hypertrophy with alterations in body composition
8. Severe acne
9. Gynecomastia (breast development)
10. Atrophid breasts and deepening of voice in females
11. Swelling of feet and ankles
12. Improved healing
13. Improved appetite
14. Blood clotting difficulties
15. Premature heart attacks and strokes ¹⁵
16. Hirsutism (abnormal development of facial and body hair)
17. Clotting disorders
18. Reduced sexual functioning
19. Stunted growth in adolescents
20. Disproportionate development of the upper torso
21. Needle marks on large muscle groups

Prevention Programme

Informational programs that focus solely on the adverse side effects of steroids or use scare tactics have not proven especially effective¹⁹. Instead, programs that

raise awareness of the risks, decrease social anxiety, and increase self-esteem and positive self-body image have yielded positive results²¹.

Conclusion

The most important aspect to curtailing abuse is to educate teachers, coaches, parents, and students about the dangerous and harmful side effects, and symptoms of anabolic steroids use. Athletes and others must understand that they can excel in sports and have a great body without steroids. They should focus on getting proper diet, rest, and good overall mental and physical health. Millions of people have excelled in sports and look great without steroids. Create an atmosphere of openness, team cooperation, and ethical responsibility in sporting activities, rather than cutthroat competition that may lead some students to use these desperate means. You can get stronger, faster, jump higher, and improve you physical appearance naturally. This has real benefits. By earning the results, one can develop good work habits, self-confidence and a true sense of achievement that will cross-over and lead to success in other areas of one's life, including personal, athletic, educational and professional.

References

- Castillo EM, Comstock RD. Prevalence of use of performance-enhancing substances among United States adolescents. *Pediatr Clin N Amer.* 2007;54:66–75.
- Irving, L. M., Wall, M., Neumark S. D., & Story, M. (2002). Steroid use among adolescents: Findings from Project EAT. *Journal of Adolescent Health, 30*, 243–252.
- Bahrke, M.S., Yesalis, C.E. & Wright, (1996). J.E. Psychological and behavioral effects of endogenous testosterone and anabolic-androgenic steroids: an update. *Sports Medicine* 22(6): 367-390.
- Blue, J.G. & Lombardo, J.A. (1999). Steroids and steroid-like compounds. *Clinics in Sports Medicine* 18(3): 667-689.
- Hickson, R.C., Ball, K.L. & Falduto M.T. (1989). Adverse effects of anabolic steroids. *Med Toxicol Adverse Drug Exp*, 4, 254-271.
- Wagner JC. (1989). Abuse of drugs used to enhance athletic performance. *Am J Hosp Pharm.* 46:2059-2067.
- Drugs Today, 2009. *Indian Drugs Review.* Pub. Ind. Pharmaceutical, Drugs & Chemist Association July.
- Kibble MW & Ross MB. (1987) Adverse effects of anabolic steroids in athletes. *Clin Pharm.* 6:686-692.
- Hoberman, J.M. & Yesalis, C.E. (1995). The history of synthetic testosterone. *Scientific American* 272(2): 76-81.
- Johnson MD, Jay MS, Shoup B. & Rickert V. (1989). Anabolic steroid use by male adolescents. *Pediatrics.* 83:921-924.
- Choi, P.Y.L., Parrott, A.C., & Cowan, D. (1990). High dose anabolic steroids in strength athletes: Effects upon hostility and aggression. *Human Psychopharmacology*, 5, 349-356.
- Malarkey, W.B., Strauss, R.H., Leizman, D.J., Liggett, M. & Demers, L.M. (1991) Endocrine effects in female weight lifters who self-administer testosterone and anabolic steroids. *Amer. J. fObste. Gyne.*, 165, 1385-1390
- Wu, F.C. (1997). Endocrine aspects of anabolic steroids. *Clinical Chemistry*, 43, 1289-1292.
- Rogol AD. Growth hormone and the adolescent athlete: What are the data for its safety and efficacy as an ergogenic agent? *Growth Hormone and IGF Res.* 2009;19:294–299.

15. Sullivan, M.L., Martinez, C.M., Gennis, P. & Gallagher, E.J. (1998). The cardiac toxicity of anabolic steroids. *Progress in Cardiovascular Diseases* 41(1): 1-15.
16. Hughes, T.K. Jr., Rady, P.L. & Smith, E.M. (1998) Potential for the effects of anabolic steroid abuse in the immune and neuroendocrine axis. *Journal of Neuroimmunol*, 83, 162-167.
17. Purdy, M. (1991). Alzado cancer might be just the first in long string of steroid-related ills. *Sporting News*, 212, 6.
18. Forbes, G.B. (1985). The effect of anabolic steroids on lean body mass: the dose response curve. *Metabolism*, 34, 571-573.
19. Goldberg, L., Bents, R., Bosworth, E., Trevisan, L., & Elliot, D. (1991). Anabolic steroid education and adolescent: Do scare tactics work? *Pediatrics*, 87(3), 283–286.
20. Pope, H.G., Jr., Kouri, E.M. & Hudson, M.D. (2000). Effects of supraphysiologic doses of testosterone on mood and aggression in normal men. *Arch. Gen. Psyc.* 57(2): 133-140.
21. Nilsson, S., Allebeck, P., Marklund, B., Baigi, A. & Fridlund, B. (2004). Evaluation of a health promotion programme to prevent the misuse of androgenic anabolic steroids among Swedish adolescents. *Health Promotion International*, 19(1), 61–67.
22. Lamb D R. (1984). Anabolic steroids in athletics: how well do they work and how dangerous are they? *Am J Sports Med.*; 12:31-38.
23. Pope HG & Katz DL. (1988). Affective and psychotic symptoms associated with anabolic steroid use. *Am J Psychiatry* 145(4):487–490.
24. Fultz, O. (1991). "Roid rage. *American Health*, 10, 60-64.
25. Windsor RE, & Dumitru D. (1988) Anabolic steroid use by athletes: how serious are the health hazards? *Postgrad Med.* 84:37-38, 41-43, 47-49.
26. Pope HG Jr, Kouri EM, & Hudson MD. (2000). Effects of supraphysiologic doses of testosterone on mood and aggression in normal men: a randomized controlled trial. *Arch Gen Psychiatry* 57(2):133–140.

Malignant Melanoma – A case report

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Abstract

Malignant melanoma is fatal skin cancer when detected and treated early prognosis will be good. Recent reports indicate rising incidence globally. This case study indicates how the people neglect the problems so much. A female patient aged 65 years presented with a painful non healing ulcer with pigmented margins of eighteen months duration on plantar aspect of the right heel. Three lymph nodes were present in the right inguinal region aspirated and obtained tarry coloured fluid revealed malignant melanoma cells with melanin pigment. Biopsy report confirmed the diagnosis that nodular aggregates of infiltrating melanoma cells with melanin pigment in the background of necrosis. Malignant melanoma remains one of the most challenging malignant neoplasm, particularly in developing countries where majority of patients present with late stage disease. Size of the ulcer indicates negligence of the patient. Health education may lead to future decline in morbidity and mortality.

Key Words

Ulcer foot, Pigmented margins, Malignant melanoma.

Introduction

Melanoma is most dangerous type of skin cancer arising from melanocytes which produce a skin pigment called melanin. Melanin is responsible for colour of hair and skin. Melanocytes predominantly present in skin and also in bowel & eye. Melanoma is one of the less common types of skin cancer but causes majority of skin cancer deaths. Melanoma can appear on normal skin or may arise from a birth mole. It is also called malignant melanoma because it spreads to other areas of the body as it grows beneath the surface of the skin. The development of melanoma related to long term exposure of strong sun light or ultra violet radiation particularly in fair skinned people.

There are 4 types of melanoma

- Superficial spreading melanoma: is most common type, 70% of melanomas. Usually flat irregular in shape and colour, with different shades of black and brown. It may occur at any age and body site and most common in caucasians.
- Nodular melanoma: constitutes 15% of melanomas usually starts as a raised area with bluish blue or

bluish red or may be amelanotic.

- Lentigo maligna melanoma: Constitute 10% of melanomas and usually occurs in the elderly. Commonly seen in sun damaged skin of face, neck & arms. Usually large flat and tan in colour.
- Acral lentiginous melanoma: least common form of melanoma 5%. Common in African Americans and occurs on the palms & soles.

Rarely melanomas may appear in mouth, iris of the eye or retina. It may be noticed at the time of dental or eye examination. It can also develop in vagina oesophagus anus, urinary tract & small intestine.

Primary symptoms are mole, sore, lump or growth on the skin.

ABCD system for easy remembering of symptoms

- Asymmetry - in the affected area.
- Borders - irregular edges.
- Colour changes - shades of tan, brown or black.
- Diameter - usually larger than 6 mm.

Biopsy may confirm the diagnosis. Prognosis depends on the early diagnosis and treatment⁶.

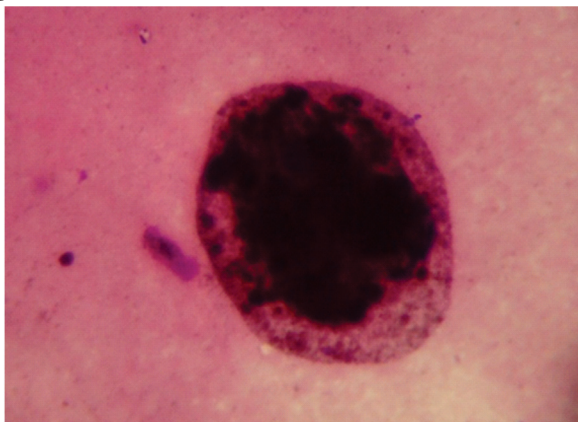
Case Report

A 65 years old female presented with painful ulcer over the plantar aspect of the right heel for 18 months duration of size 7.5 x 5cms. Slowly growing ulcer with pigmented margins[Fig.1]. Not a known diabetic. No history of pre existing naevus or ulcer. Patient complaining of loss of appetite, loss of weight and swelling in the inguinal region. Three lymph nodes found were aspirated and

Fig. 1: Ulcer heel with pigmented margins.



Fig. 2: Melanoma cell in FNAC [H&E X800].

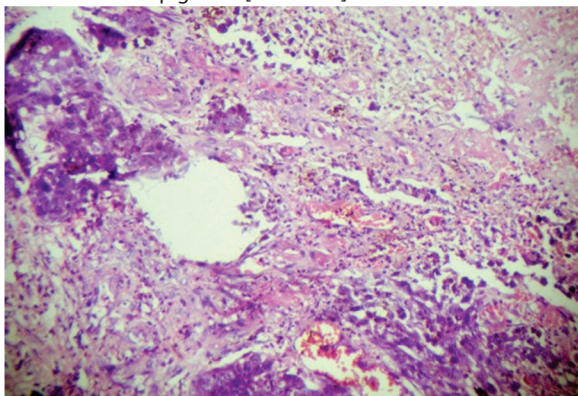


obtained bluish tarry coloured fluid which shows melanoma cells with melanin pigment suggestive of malignant melanoma[Fig.2]. An incisional biopsy was taken from the foot lesion confirmed the diagnosis, that nodular aggregates of infiltrating melanoma cells with melanin pigment in the background of necrosis[Fig.3&4]. Immunohistochemical stains S 100 & HMB-45 not done as it is well differentiated malignant melanoma¹. CT scan revealed no metastasis of chest and abdomen. As per TNM staging it was labeled Stage III C. No similar history in the family members.

Discussion

Worldwide incidence of melanoma is increasing at a faster rate than any other neoplasm. Around 60 thousand new cases of invasive malignant melanoma are diagnosed in U.S each year. As per WHO 48 thousand melanoma related deaths registered worldwide per year that is approximately 1% of all cancer deaths. Queensland, Australia & Israel has highest incidence of melanoma in the world⁴. Increased incidence of uveal melanoma is seen in France, Italy and Japan. It is interesting that when Jews residing in various parts of the world were studied those in Asia & Africa had the lowest incidence. India is one of the low incidence regions of the world. Indian ethnic migrants to Great Britain also enjoy low mortality in relation to melanoma¹.

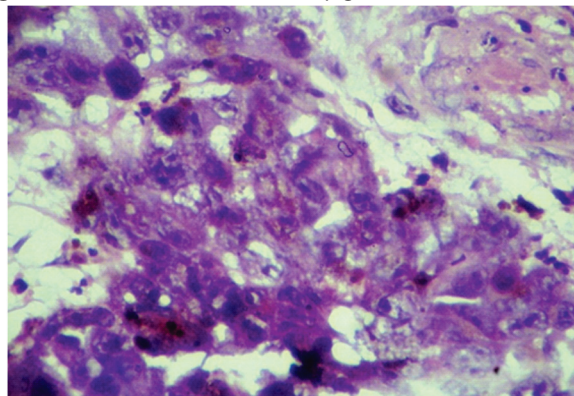
Fig. 3: Nodular aggregates of melanoma cells in the background of necrosis & melanin pigment [H&E x400].



Melanoma may occur at any age. The risk of developing melanoma increases with age, highest among those in their eighties. It is one of the more common cancers in young adults and otherwise healthy people. People who begin using tanning devices [UV radiation] before 30 years of age are 75% more likely to develop melanoma. The rarity of the tumour before puberty indicates hormonal influence². Melanoma more common in whites than blacks and Asians. It is the 5th most common malignancy in men and 6th most common in women. Approximately 10% of all patients with melanoma have a family history⁴. Familial melanoma is genetically heterogeneous. Loci for familial melanoma have been identified on the chromosome arms 1p, 9p&12q. Multiple genetic events have been related to the pathogenesis of melanoma. Mutation of the MD M2 SNP 309 gene is associated with increased risk of melanoma in younger women. Mutations that cause the skin condition Xeroderma Pigmentosum also seriously predispose one to melanoma⁵.

Acral lentiginous melanoma, first described by Rene, is the most common melanoma type that presents on the plantar aspect of the foot and is frequently misdiagnosed due to its less common location and because it does not fit the 'changing mole' pattern. This type is commonly amelanotic. Plantar melanomas are more commonly ulcerated than melanomas on the leg. Ulcerated and amelanotic melanomas still present a considerable clinical challenge. Aggressive tumors grow quickly and can ulcerate early. It does not exhibit the classic signs of malignant melanoma associated with the mnemonic acid³. The Bombay cancer group found sole of foot and internal mucous membranes as major anatomic sites in Indians. Plantar acral melanomas constituted ¼ of all melanomas in a study from Manipal. In Hong Kong & China cutaneous malignant melanoma is found predominantly at an older age with the acral lentiginous type, located mainly on the feet¹. Its thickness at the time of diagnosis is crucial to the prognosis but there is no significant difference between the mean thickness of melanomas on plantar surface. Ulceration is equivalent to having a thicker, more advanced tumour. Past history of melanoma must be elicited as there is increased risk of second melanoma⁴.

Fig. 4: Melanoma cells with melanin pigment [H&EX800].



Melanoma is one of the most notorious tumors both for metastasis at unusual locations or after a long latent period¹. Brain is a common site of metastasis associated with poor prognosis⁴. Incidence of inguinal lymph node metastasis reported in 4% of cases without primary lesion may be due to spontaneous regression of primary lesion².

Although Immunohistochemical stains usually are not necessary for diagnosis, they are generally performed for completeness. S-100 & HMB 45 stains are positive in melanoma. S-100 is highly sensitive, but not specific for melanoma. HMB 45 is highly specific but moderately sensitive for melanoma. These stains are useful for poorly differentiated melanomas.

Acral melanoma has been mistaken for plantar warts, fungal infections, hyperkeratotic lesions and non-healing ulcers. Non healing diabetic foot ulcers should be biopsied to rule out melanoma. A black malignant melanoma can also be mistaken for gangrene. Squamous cell carcinoma ulceration is extremely rare on skin, which was not previously damaged by radiation, burns or chronic inflammation.

Early detection of malignant melanoma greatly enhances the prognosis which depends on age, sex, site, mitotic divisions & ulceration. Younger patients have better prognosis & Male have worse. Primary melanoma of the foot has been associated with a poorer survival rate than

secondary type. Head & neck melanomas have worse prognosis than limbs⁵.

Melanoma that occurs in the foot or ankle often goes unnoticed during its earliest stage, when it would be more easily treated. By the time melanoma of the foot or ankle is diagnosed, it frequently has progressed to an advanced stage, accounting for a higher mortality rate. The existence of malignant melanoma though uncommon in our country, needs to be recognized and considered in the diagnosis of poorly differentiated lesions at any site.

References

1. Col. R. Lakhtakia, Col. A. Mahta, Maj. Gen. S. K. Nema. Melanoma: A frequently missed diagnosis. MJAFI. 2009. 65. 292-294.
2. A Z Mohammed, A.N Manasseh, B.M. Mandong and S.T. Edino. Histopathological study of malignant melanoma in high Landers. The Nigerian journal of surgical research. 2003. Jan-June. vol. 5, No. 1-2.
3. Lee C. Rogers, David G. Armstrong, Andrew J.M. Boulton, Anthony J. Freemont and Rayz A. Malik. Malignant Melanoma Misdiagnosed as a Diabetic Foot Ulcer. Diabetes Care. 2007. February, vol. 30, No.2, 444-445.
4. Winston W Tan. Malignant Melanoma. E medicine: Web MD. 2010. Sep.10.
5. Vinay Kumar, Abul K. Abbas, Nelson Fausto. Robbins and Cotran Pathologic Basis of Disease. Saunders - Elsevier. 2010. 7th edition. Chapter 25, pp 1234-1236.
6. Harsh Mohan. Text Book of Pathology. Jaypee. 2010. 6th edition. Chapter 26, pp 787-789.

Rehabilitation with a Prosthetic Ear: A case report

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Abstract

Prosthetic ears are needed when the natural ones are missing or lost. They are indicated when surgical procedures cannot be performed or when patient does not desire for future surgery. This case report describes successful rehabilitation of an acquired auricular defect with a silicone prosthesis using conventional retention procedure.

Key Words

Auricular Prosthesis, Basal Cell Carcinoma, RTV Silicone Adhesive.

Introduction

Auricular defects resulting from skin cancer surgery present reconstructive challenges. Smaller defects may be repaired by primary closure, wedge repair, skin grafts, advancement or transposition flaps, or the chondrocutaneous helical rim advancement flap¹. Larger defects involving significant loss of cartilage often require staged island pedicle or interpolation pedicle flaps². Complete loss of the auricle may be reconstructed with the use of an autogenous rib cartilage graft in a multistage procedure. However, some patients prefer not to undergo additional surgical procedures once the cancer has been extirpated. In addition, some patients may require a long delay before reconstruction because of an underlying medical condition or the need to monitor the area for recurrence of an aggressive skin malignancy, in these situations, creation of a silicone auricular prosthesis is an alternative approach towards rehabilitation.

Case Report

A 38 year old male patient was referred to the Department for fabrication of an auricular prosthesis. He underwent surgery, due to basal cell carcinoma. (Fig.1) As reconstruction by plastic surgery was ruled out to periodically examine for recurrence of tumor, it was decided that a silicone prosthesis retained by adhesives would be made. Severe undercuts, convolutions and translucency of the natural ear make its replication very challenging. Surgical reconstruction of the ear is the management of choice but may not be indicated

because of complex procedure and several other factors. The following case report details such a case, which was successfully rehabilitated using a silicone auricular prosthesis.

Procedure

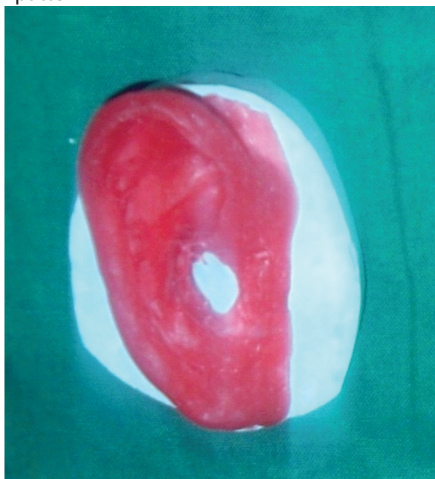
A towel was fastened around the head at the hairline and facial hairs were protected by a light application of petroleum jelly [Vaseline, Hindustan Unilever Ltd.]. A ring of boxing wax was built around the auricular area to confine the alginate, [Zelgan 2002, Dentsply India Pvt. Ltd. Gurgaon, Haryana, India] which was mixed with 1.25 times the normal amount of water, to adjust its flow properties. After pouring the hydrocolloid in a smooth layer over the area, gauze pieces were embedded in it to provide retention for the rigid plaster backing required for tear free removal of the impression. The plaster (Type II) [Dentex, Prevest Denpro Ltd., Jammu, India] mix was spread over the gauze and its setting was verified by tapping sound. After inspection of the impression for any defects, it was poured with vacuum spatulated dental stone (Type IV) [Kalabhai, karsor Pvt. Ltd. Mumbai, India] in two stages to avoid distortion by the weight of stone, making at least a 1cm thick base at the deepest part of the mold.

For orientation, markings were made superiorly, inferiorly, anteriorly and posteriorly, on the resultant stone cast. A wax base [Supermal Modelling Wax, RLD Co., Lucknow, India] was adapted and a pattern was constructed to duplicate the patients other ear as closely as possible, (also making an ear hole in the pinna, Fig. 2) followed by a try in

Fig. 1: Pre-rehabilitation view



Fig. 2: Wax pattern



appointment to check for fit of the prosthesis, horizontal alignment with normal ear, its projection in relation to side of the head and integrity of the margins during simple jaw moments from all positions. After obtaining satisfactory results the pattern was invested to create a mold in three parts to allow removal of the prosthesis without tearing and to produce life like characterization. Following dewaxing, the mold cavity was initially coated with a thin layer of catalyzed uncolored silicone material [Cosmesil M5-11] for translucency. A previously matched base color mixture of silicone was prepared to fill the mold cavity using silicone pigments to provide skin color and opacity to the mixture. The colored, catalyzed, bubble free silicone was placed into the mold cavity, taking care to allow the liquid to flow into all thin areas followed by assembling the separately characterized mold parts. Excess silicone was expressed using light pressure, processed, and finished following manufacturer's instructions. Extrinsic coloration was done after separating from mold (Fig. 3) in required areas and the patient was trained to correctly place the ear using adhesive [PSA 1b silicone adhesive (G603)]. Instructions were given on prosthesis hygiene and maintenance and recall checkups. The patient was also advised to camouflage the prosthesis by growing his hair to divert attention (Fig. 4).

Discussion

Ear prostheses restore part or whole of an ear lost

Fig. 3: Ear prosthesis before final characterization

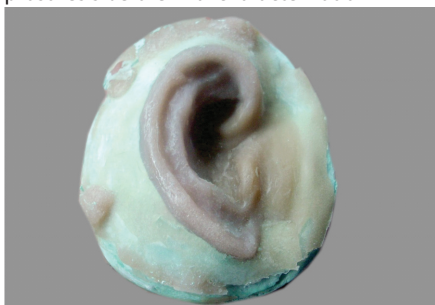


Fig. 4: Post-rehabilitation



due to cancer surgery, amputation, burns and/or congenital defects. Cancers of the head and neck region can profoundly affect patients quality of life and are emotionally debilitating to patients and their families^{3,4,5,6}. The delicate structures remaining after surgery for ear carcinoma are covered by thin, highly sensitive skin, and must be kept free from irritation and debris from the environment. Apart from psychological, aesthetic and protective benefits, the function of the prosthetic ear is also to direct sound waves into the auditory canal and to maintain a proper environment for the inner ear membranes, which can improve hearing by about 20%. Such an ear can also retain eye glasses, and a hearing aid if necessary.

Auricular Prosthetic replacement has several advantages over surgical reconstruction, in terms of being inexpensive, allowing for periodic evaluation and cleaning of the surgical site, and providing an alternative to candidates unsuitable for surgery⁷. The fabrication process is relatively short, and the maxillofacial clinician has control of color, shape, and position of the prosthesis. Further, reconstructive surgery is not reversible in contrast to prosthetic restoration. Its disadvantages include a skin-prosthesis margin which is hard to hide, difficulty in matching skin color which changes throughout the year, need for regular replacement and/or repair, and extra precautions required to avoid removal whenever the individual is involved in rigorous activity.

The properties of the ideal material for ear prostheses have been enumerated and include biocompatibility, flexibility, lightness, low thermal conductivity, durability, moldability, easy cleansing, patient comfort, and chemical and physical inertness^{8,9,10}. The currently available facial prosthetic materials include methacrylate or acrylic resins, polyurethane elastomers, and silicone elastomers¹¹. Silicone prostheses offer a cost-effective, cosmetically elegant means to camouflage large auricular defects⁷.

Several skin adhesives are compatible with silicones, adhere well under moist conditions, and are simple to use. Adhesives require patience on part of wearer to obtain correct placement of the prosthesis which may be

very difficult for older patients. Water-based adhesives are milder but are not moisture resistant and therefore do not adhere as long as silicone-based adhesives^{11,12,13}. RTV Silicone adhesive was used in this case as it utilizes moisture in the atmosphere to react with chemical cross links and enables the formation of an elastomer. Once the adhesive is applied, the solvent evaporates and a tacky adhesive results, which can bond with skin. These adhesives require solvents for cleaning the prosthesis, which accelerate deterioration of the prosthetic margins. Allergic contact dermatitis is also known to occur with skin adhesives⁷.

Conclusion

Though the patient and the clinician were satisfied with the aesthetics and function provided by the auricular prosthesis, obtaining long term compliances from the patient would be challenging, considering the limitations.

References

1. Mellette JR. Ear reconstruction with local flaps. *J Dermatol Surg Oncol* 1991;17:176-82.
2. Johnson TM, Fader DJ. The staged retroauricular to auricular direct pedicle (interpolation) flap for helical ear reconstruction. *J Am Acad Dermatol* 1997;37:975-8.
3. Gritz ER, Hoffman A. Behavioural and psychological issues in head and neck cancer. In: Beumer J, Curtis TA, Marunick MT, editors. *Maxillofacial rehabilitation: prosthodontic and surgical considerations*. St Louis: Ishiyaku Euro-America; 1996:1-14.
4. Gotay C, Moore T. Assessing quality of life in head and neck cancer. *Qual Life Res* 1992;1:5.
5. Gotay C, Korn E, McCabe M. Quality of life in cancer treatment protocols: research issues in protocol development. *J Natl Cancer Inst* 1992;84:575.
6. Strauss R. Psychosocial responses to oral and maxillofacial surgery for head and neck cancer. *J Oral Maxillofac Surg* 1989;47:343.
7. Butler DF, Gion GG, Rapini RP. Silicone auricular prosthesis. *J Am Acad Dermatol* 2000;43:687-690.
8. Bulbulian AH. *Facial Prosthesis*. Philadelphia: W. B. Saunders Company; 1945:157.
9. Tchalian V. *Maxillofacial Prosthesis*, Houston: University of Texas, Dental Branch; 1960:1-2.
10. Fonseca EP. The importance of form, characterization, and retention in facial prosthesis. (Translated into English by Dioracy Fonterrada Vieira) *J Prosthet Dent* 1966:338-343.
11. Moore DJ, Glaser ZR, Tabacco MJ. Evaluation of polymeric materials for maxillofacial prosthetics. *J Prosthet Dent* 1977;38:319-326.
12. Parel SM. Diminishing dependence on adhesives for retention of facial prostheses. *J Prosthet Dent* 1980;43:552-560.
13. Kiat-amnuay S, Gettleman L, Khan Z, Goldsmith LJ. Effect of adhesive retention on maxillofacial prosthetics. Part 1: skin dressings and solvent removers. *J Prosthet Dent* 2000;84:335-340.

Study of lipid profile changes in patients with carcinoma stomach

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Abstract

In the normal circumstances the proliferation of body cells is under strict control. The cells differentiate, divide and die on a sequential manner in a healthy organism. Cancer is characterized by loss of control of cellular growth and development leading to excessive proliferation and spread of cells. Cancer derived from a Latin word meaning crab. It is presumed that the word cancer originated from the character of cancerous cells which can migrate and adhere and cause pain (like a crab) to any part of the body.

Keywords

Carcinoma, Age factor, Lipid profile.

Aim of study

- Compare lipid profile changes on patients suffering from stomach cancer with age matched healthy controls.
- Compare the changes in relation to age i.e. by dividing the study group into younger age group (<45 yrs) and older age group (>45yrs).
- Compare the changes in relation to sex i.e. in males and females with sex-matched controls.

Materials and methods

Sixteen diagnosed carcinoma stomach patients attending medical oncology outpatient clinic of S.V. Institute of Medical Sciences, Tirupati were recruited in to the study (patient group) along with 25 healthy individuals (control group). The control groups were recruited from the people attending master health check up programme of the hospital and staff of the department. All of them had normal blood chemistry, ECG, Chest X-ray, Blood counts apart from a normal clinical examination. All the patients included in the study had so confirm histological diagnosis and where fresh untreated stage III / stage IV cases

Conclusions

- The levels of cholesterol, Triglycerides, low density

lipoproteins, Very low density lipoproteins and albumin were found to be significantly decreased in case as compared to controls, where as the Lipid peroxide concentration was significantly increased. There was no significant change in high density lipoproteins between the two groups.

- In younger age group i.e. Below 45 years no significant change in cholesterol, Triglycerides, low density lipoproteins, Very low density lipoproteins, high density lipoproteins, where as the albumin concentration was significantly decreased and the lipid peroxide concentration was significantly increased as compared to age matched controls.
- Whereas the older age group i.e. above 45 years the levels of cholesterol, low density lipoproteins and albumin were found to be significantly decreased in cases, as compared to controls. And the lipid peroxide concentration was found to significantly increase. There was no significant change in triglyceride, low density lipoproteins and high density lipoproteins concentrations between the two groups.
- Total cholesterol, low density lipoproteins and albumin concentrations between were found to be significantly decreased in male cases, as compared to controls, where as the Lipid peroxide concentration was significantly increased. There was no significant change in triglyceride, Very low density lipoproteins and high density lipoprotein concentration between the two groups.
- While in females no significant changes was observed in cholesterol, triglycerides, low density lipoproteins, very low density lipoproteins, high density lipoproteins. While the albumin concentration was significantly.
- No correlation was observed between triglyceride and lipid peroxide levels.

Study findings thus show an inverse relationship between plasma lipids and cancer.

This along with the increase lipid peroxide levels in stomach cancer patients.

Discussion

In the present study, we have examined lipid profile in patients having carcinoma stomach and normal healthy age matched controls. Analysis of data revealed that total Cholesterol, HDL Cholesterol and Triglycerides levels are inversely associated with incidence of Cancer..

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In the present study data analysis revealed that total cholesterol, low density lipoprotein cholesterol levels were lower in cases when compared to controls, similarly decrease was marked in younger age (< 45 years) group and in males. While in charge was observed in old age (> 45 years) group as well as in females.

References

1. Dr.Satyanarayana U editor Biochemistry 1st Ed Calcutta: Arunabhasen Books and allied (P) LTD 2001:605.
2. Chatterjea M.N and Rana shinde, editors, Textbook of Medical – Biochemistry 4th edition, New Delhi: Jaypee brothers Medical Publications (P) LTD 2000:737-752/
3. Raste As and Naik P.P Clinical significance of lipid profile in cancer patients. Indian Journal of Medical sciences 2000 Oct: 4(10): 435-41,
4. Mainous AG 3rd, Wells BJ Koopaman RJ, everst CJ and Gill JM, Iron , Lipids and risk of cancer, American Journal of epidemiology 2005: 161 (12) : 1115 – 1122.

Prevalence and risk factors of hypertension in above 40 years age group urban population of Kadapa

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Abstract

Introduction

Hypertension is a chronic condition of concern due to its role in the causation of coronary heart disease, stroke and other vascular complications. It is one of the major risk factor for the cardiovascular mortality and morbidity, which accounts for 20-50 percent of all deaths.

Research question

What is the prevalence of hypertension and risk factors of Hypertension?

Objectives

1. To study the prevalence of Hypertension in an urban population of Kadapa.
2. To find the risk factors of Hypertension among adults aged 40 years & above residing in an urban area of Kadapa .

Methodology

A cross sectional community based study was conducted during the period from June 2008 to November 2008 at urban field practice area of Rajiv Gandhi Institute of Medical Sciences, Kadapa. Systematic random samples of 200 individuals were participated and house to house survey conducted and followed by blood pressure measurement done with sphygmo manometer . Hypertension diagnosis was made according to the Joint National Committee VII.

Results

Out of 200 persons screened, the prevalence of Hypertension above 40 yrs of age group was 48%.Hypertension increasing with age and statistically significant association was observed with different age groups ($p < 0.05$).The prevalence of hypertension was more in females than in males. Statistically significant association

was observed with high salt intake (>5 grams / day), Body mass index ($BMI > 25$) and male smokers ($p < 0.05$).

Conclusions

Prevalence of hypertension was found with many of the proven risk factors studied. Prevalence of Hypertension increases with age and distribution of Hypertension not significantly associated with and male alcoholics. Significant association was observed between Hypertension and age, high salt intake, BMI and Male smokers ($P < 0.05$). Based on the above findings, simple life style modifications and early detection of hypertension will bring considerable change in postponement of the hypertension as well as reduction of complications in the future.

Study variables

Age, Sex, family history, intake of salt, smoking, alcohol intake and BMI.

Background

Hypertension, an important public health challenge of both developed and developing nations, is also the most important modifiable risk factors for cardiovascular disease, stroke, end stage renal disease and peripheral vascular disease¹. Hypertension is considered to be the result of interaction between a genetic predisposition and environmental factors. It is often associated to one or several other cardiovascular risk factors such as overweight, hypercholesterolemia and particularly diabetes. There is increasing evidence that certain environmental factors such as an excessive calorie intake, dietary salt, alcohol, obesity and lack of physical exercise are some of the key determinants of high blood pressure. Changes in lifestyles, urbanization and stress have created new dimensions in health of the people. One such disease is hypertension².

High blood pressure is an arbitrary term use for clinical convenience to delineate a dividing line above which the benefit-risk ratio from intervention becomes acceptable³. Our country is also in a stage of epidemiologic transition, with increase in morbidity and mortality due to non-communicable diseases including hypertension. It can be predicted that we, in this country, are soon going to face an epidemic of cardiovascular diseases⁴.

Hypertension is a major chronic life style disease and an

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important public health problem worldwide. A recent report indicates that nearly one billion adults had hypertension in 2000, and this is predicted to increase to 1.56 billion by 2025⁶. This leads to several numerous micro/macro vascular complications and subjects with hypertension are known to have a two fold higher risk of developing coronary artery disease, four times higher risk of congestive heart failure and seven times higher risk of cerebrovascular disease compared to normotensive subjects. Hence, it is important to maintain blood pressure within normal range⁷.

Materials and methods

The Urban Health and Training Center, Akkayapalli, Kadapa is an urban field practice area attached to the Department of Community Medicine, Rajiv Gandhi Institute of Medical Sciences, Kadapa. The population coverage of Urban Health Centre is about 27,568. The present Cross sectional community based study was conducted at Akkayapalli area using the systematic random sampling method. A total of 200 individuals were participated and house to house survey conducted and followed by blood pressure measurement done with sphygmo manometer. Hypertension diagnosis was made according to the Joint National Committee VII. Initially, a pilot study was conducted to pretest the proforma and to have a rough estimate of the prevalence of hypertension, the prevalence was found to be 46%. In this pilot study, prevalence was shown to be 46%. Based on Meta analysis of previous studies on hypertension in the urban areas taken into the consideration and the average prevalence was taken as 50%, allowable error taken as 15% and formulae used here is $4PQ / L^2$.

Where, P = prevalence of hypertension (50%)

Q = 100 – P

L = Allowable error (15%)

The formulae was used, the sample actually was 179 and additionally taken another 21 cases. Finally sample size in this study was 200, of which 100 males and 100 females were included. Nearly 06 cases were not participated in this study. A pilot study was conducted and tested and the actual study was started after making necessary corrections and advises in it. The study was approved by the ethical committee of the Rajiv Gandhi Institute of Medical Sciences, Kadapa. After obtaining written

informed consent from the head of the household, information about the socio-demographic characteristics was recorded in the predesigned, pretested proforma. This was followed by a clinical examination of the subjects including height, weight and blood pressure measurement was taken with BP apparatus.

Criteria for Hypertension: As per the Joint National Committee for Detection, Evaluation and Treatment of High Blood Pressure (JNC 7, 2002); published in JAMA, May 21, 2003⁵.

Blood pressure 120/80 – Normal

Blood pressure 120-139 systolic/80-89 diastolic – Pre hypertension

Blood pressure 140-160 systolic/ 90-99 diastolic – Stage 1 Hypertension

Blood Pressure more than 160 systolic/ more than 100 diastolic – Stage 2 hypertension.

Inclusion criteria: All the participants >40years and already diagnosed hypertensive individuals.

Exclusion criteria: All the individuals below 40 years of age were excluded from the study .

Statistical analyses:

The statistical analyses were done using Chi-square test, mean, Proportions etc. The help of a statistician was sought while analyzing the data.

Table 1 depicts that the out of 200 persons screened, the prevalence of Hypertension in above 40 years of age group was 48%. Maximum number of Hypertension cases were seen in > 60 years of age group (p<0.05). In the present study Prevalence of hypertension was more in females (62% in females and 34% in males) and this association was significant (P<0.05).

*significant.

Table 2 reveals that the Hypertension increases with increasing BMI and this association was statistically significant. High prevalence of Hypertension 63.6% was noticed in the BMI 30 above individuals. People who are showing family history of hypertension, the prevalence of hypertension was 50.55 and those who are not having family history of hypertension the prevalence was 47.5% and this association was not statistically significant (P>0.05).

Individuals who were consumed >5 grams day, the

Table 1: Hypertension in relation to Demographic characteristics:

Age *	Hypertension present	Hypertension absent	Total	Statistical Tests
40-49	24 (36.3%)	42 (63.7%)	66	X ² =5.65 ; P 0.01
50-59	16 (42.1%)	22 (57.9%)	38	
>60	56 (58.3%)	40 (41.7%)	96	
Total	96 (48%)	104 (52%)	200	
Sex wise *				
Male	34(34%)	66 (66%)	100	x ² = 4.02 ;P < 0.05
Female	62 (62%)	38 (38%)	100	
Total	96(48%)	104 (52%)	200	

Table 2: Risk factors of Hypertension:

BMI *	Hypertension present	Hypertension absent	Total	Statistical Tests
18.5-24.9	50(40.3%)	74 (59.6%)	124	$\chi^2 =25.24$; $P<0.005$
25-29.9	25-29.9	22 (40.75%)	54	
30-39.9	14 (63.63%)	8 (36.36%)	22	
Total	96(48%)	104(52%)	104(52%)	
Family History				
Mother	8 (44.4%)	10 (55.5%)	18	$\chi^2 =0.5$; $P>0.05$
Father	8(57.1%)	6 (42.8%)	14	
Both	2 (50%)	2 (50%)	4	
No family history	78(47.5%)	86(52.43)%	164	
Total	96(48%)	104 (52%)	200	
Based on salt consumption *				
<5gm/day	46(39.6%)	70 (60.4%)	116	$\chi^2 =4.81$; $P< 0.03$.
>5gm/day	50 (59.5%)	34 (40.5%)	84	
Total	96 (48%)	104(52%)	200	
Based on smoking *		$\chi^2 =8.96$; $P<0.002$		
Yes	22 (50%)	22 (50%)	44	
No	12 (21.4%)	44 (78.6%)	56	
Total	34(34%)	66(66%)	100	
Based on alcohol				
Yes	12 (42.9%)	16(57.1%)	28	$\chi^2 =1.36$; $P <0.24$
No	22(30.6%)	50(69.4%)	72	
Total	34 (34%)	66 (66%)	100	

hypertension was 59.5% and those who are consumed less than 5 grams per day the prevalence of hypertension was 39.6% and this association was statistically significant ($P<0.05$). Among the male smokers, the prevalence of Hypertension was 42.9% and among the non smokers, the prevalence of the hypertension was 21.4% and this association was significant. Based on the alcohol consumption, the prevalence of hypertension in alcoholics was 42.9% and a non alcoholic the prevalence was 30.6% and this association was not significant ($P>0.05$).

Discussion

This study has highlighted the prevalence of hypertension in urban areas of the Kadapa and certain risk factors like BMI, high salt intake and smoking etc are associated with Hypertension.

Out of 200 individuals screened for hypertension about 96 individuals have shown blood pressure of more than 140/90 mm of mercury which reflects 48% prevalence of hypertension in the study population. Prevalence rate of hypertension among urban population ranging from 1.24% in 1949 to 36.4% in 2003 in general population¹⁸. High prevalence of Hypertension in advanced age had been documented in few recently conducted surveys from India such as from Parsi community in western India²⁰ (73% in age group equivalent to 70 years). Among keralite people 51.8%, and from assamese (63.63%) people above 60 years of age group and from North eastern India and among elderly participants from WHO sponsored multicentric study in south east asia was 65%²² . As

compared to an age specific prevalence rate of 58.3% was noticed in sixth and above decade age group population in the present study. This is in line with previous studies^{18,19}.

High prevalence of Hypertension 63.6% was noticed in the BMI 30 and above individuals. 40.3% of hypertensives in the BMI range of < 25. Hypertension increases with increasing BMI and this association was statistically significant ($p<0.005$). Individuals who were consumed >5 grams day, the hypertension was 59.5% and those who are consumed less than 5 grams per day the prevalence of hypertension was 39.6% and this association was statistically significant ($P<0.05$). A reduction in the dietary salt intake as a strategy to tackle hypertension has been tried in various studies. Anand, through his metaanalysis of 23 RCTs showed that a less than 5 grams/day reduction in salt intake was associated with a decline of 5 to 7 mm of Hg (systolic) and 3 mm of Hg (diastolic) in hypertensive subjects²³. Another metaanalysis by He et al reviewed the results of all unconfounded randomized trials aiming to reduce sodium intake in healthy adults over at least six months. This study did not find any correlation between the degree of reduction in sodium in take and change in blood pressure²⁴.

In the present study, among the male smokers, the prevalence of Hypertension was 42.9% and among the non smokers, the prevalence of the hypertension was 21.4% and this association was significant ($p<0.002$). Based on the alcohol consumption, the prevalence of hypertension in alcoholics was 42.9% and a non alcoholic the prevalence

was 30.6% and this association was not significant ($P > 0.05$).

Conclusions and recommendations

The overall prevalence of hypertension in the present study was 48% among 40 years and above age group individuals of urban population of kadapa district, Andhra Pradesh. A statistically significant association was found between the hypertension and Body mass index, male smokers, high salt intake (>5grams/day/person). Hypertension was not significantly associated with family history of hypertension and alcohol consumption. But, there is need to confirmation of other studies and sample size also to be increased for the further confirmation of studies. Hence there is a need to develop strategies for intensive adult education about awareness, life style modifications like less salt consumption and avulsion of habits will bring the reduction of magnitude in the community.

References

1. Ivan G. Chief CVDs Unit, WHO; The Prescriber, Sept. 1993.
2. Chadha SL. Urban – rural differences in prevalence of Coronary heart disease and its risk factors. Current Science 1998; 74: 1069- 1073
3. Kalpan NM. Clinical Hypertension, 7th edition. Baltimore. Waverly International, 1998.
4. Gupta R, Prakesh H, Kaul V et al, Urban rural differences in coronary risk factors and coronary heart disease prevalence in India. South Asian Journal of Preventive Cardiology 1997; 1:27-32.
5. Joint National Committee for Detection, Evaluation and Treatment of High Blood Pressure (JNC 7, 2002); published in JAMA, May 21, 2003.
6. Kearney PM, Whelton M, Reynolds K, Mutner P, Whelton PK, He J. Global burden of Hypertension: Analysis of worldwide data. Lancet 2005;365:217-23.
7. Stamler J Blood pressure & high blood pressure : aspects of risk. Hypertension 1991 ; 18(suppl) : 1.95-1.107.
8. American Society of Hypertension. Recommendations for routine blood pressure measurement by indirect cuff sphygmomanometry. Am J Hypertension 1992; 5:207-209
9. Reddy KS, Yusuf S. Emerging epidemic of cardiovascular diseases in developing countries. Circulation 1998; 97:596-601.
10. WHO TRS 797, Diet, Nutrition and Prevention of Chronic Disease. 1990; 45-50.
11. Rose G and Blackburn H. Cardiovascular survey methods. Geneva. WHO, 1982
12. Module for a surveillance system of CVD risk factors and mortality, INCLIN Multicentric collaborative group. J Clin Epidemiology 1992; 45: 841-847.
13. Gupta SP, Gupta R, Agarwal VS. Correlation of smoking, blood pressure levels and hypertension prevalence in rural subjects. Association of Physican in Indian J, 1997; 45: 919-922
14. Hazarika N C, Biswas D, Naryana K, Kalita H C, Mahanta J. Hypertension and its risk factor in Tea garden workers of Assam, The National Medical Journal of India 2002; 15 (2) : 63-68.
15. Ezzatin M, Lopez AD, Rodgers A, Vander Hoorn S, Murry CJ. Selected major risk factors & global & regional burden of disease. WHO (1996) . Techn .Rep .Ser., No .862.
16. Lancet 2002 ; 360:1347-60.
17. Kearney PM, Whelton M, Reynolds K, Whelton PK , He J. World wide prevalence of Hypertension: a systematic review .J Hypertension 2004;22:11-19.
18. Nissein A, Bethino S, Grenroth H, Lopez AD. Hypertension in developing countries. World Health Stat. 1988, 41: 141-154 (Pub med).
19. Shanthirani CS, Pradeepa R, Deepa R, Premalatha G, Saroja R, Mohan V: Prevalence And risk factors of hypertension in a selected south Indian population; Chennai population study, Journal of Associated Physicians of India.
20. Barucha NE, Kuruvilla T Hypertension in the parsi community of Bombay: A study on prevalence and electro cardiogram correlates, Journal Hum Hypertension 1994, 11: 823-829.
21. Isles CS, Prevalence, epidemiology and pathology of hypertension in warrell DA, Editor Oxford text book of Medicine, 4th Edition-Oxford University Press 2000, Page 1153-1160.
22. Hypertension study group, Prevalence, awareness, treatment and control of hypertension among the elderly in Bangladesh and India. Multicentric study Bull World Health Organization: 2001: 79 , 490-500 (pub med).
23. Anand MP. Non pharmacological management of essential hypertension .Journ Indian Medical Association 1999: 97: 220-5.
24. He Fj, MacGregor GA, Effect of long term modest salt reduction on blood pressure. Cochrane data base syst Rev 2004;3: Cd004937.

Handgrip strength and handgrip endurance in different age group wrestlers

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Abstract

Hand grip strength, a simple index of skeletal muscle function and functional index of nutritional status, is influenced by effort, skeletal muscle bulk and contractility. Hand grip strength has been used as an objective clinical measure in a variety of situations. For example grip strength has been used to asses general strength in order to determine work capacity. Hand strength is very important in certain sports like wrestling. Being quick and important with their hands is important strength for a wrestler. With their hand strength, they can overpower their opponents. Present study was done to determine handgrip strength, handgrip endurance and endurance in 40 mm Hg test in 60 male wrestlers with different age groups and training duration. Study revealed significant increase in handgrip strength and handgrip endurance with increasing age. But there was no significant change in handgrip strength, handgrip endurance and endurance in 40 mm Hg test among these different age group wrestlers when compared by training duration.

Keywords

Handgrip strength, Handgrip endurance, Wrestlers.

Introduction

Many daily functions and sporting events require high activity levels of the flexor musculature of the forearm and hands. These are the muscles involved in gripping strength. From the sports like wrestling, tennis, football, basketball and the baseball to daily activities such as carrying laundry, turning a doorknob and vacuuming, some degree of Grip strength is necessary to be successful. For example, without adequate grip and forearm strength, tennis players may run the developing lateral epicondylitis, otherwise known as tennis elbow. Often overlooked or taken for granted, the strength of one's grip play a key role in injury prevention and overall strength development. The simple method of handgrip dyanamometry has been found to reveal more than an individual's grip strength. From

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nutritional strength to physical functioning , this method of assessment can provide the Practioner with a cost effective, non-invasive screening tool to evaluate client's well being ^{1,2,3,4}.The purpose of this study is to dissect the importance of handgrip strength and handgrip endurance in different age-group wrestlers so that their physical performance can be improved with proper training.

Methods

The study was done on 60 male wrestlers attending a wrestling training school at Youth Services and Sports Centre, Davangere. All these wrestlers were in good healthy state, predominantly right handed individuals, free from any respiratory, cardiovascular or musculoskeletal disorders. Depending on their age and training duration, these wrestlers were divided into three groups. Group I consisted of wrestlers in the age group of 11-15 years who were in different training duration. In group I, wrestlers were again divided into two groups, those with one or less than one year of training duration and those between 2-3 years of training duration [Table I].

Group II consisted of wrestlers in the age group of 16-20 years who were again divided into different groups depending on duration of training [Table II].

Similarly, Group III consisted of wrestlers in the age group of 21-26 with different training duration [Table III].

Hand grip strength was tested by handgrip dynamometer. Maximum voluntary contraction sustained for at least 3 seconds was noted. Tested in 6 trials, 3 for each hand with a gap of 10 seconds.⁵ Subjects were asked to fully extend their arm and forearm during testing.

Hand grip endurance was determined by asking the subject to maintain one third [1/3] of maximal voluntary contraction for as long as he could. Duration in seconds was noted.⁵

Respiratory muscle strength was tested using 40 mm Hg endurance test where in subject is asked to blow forcefully into a mouth piece attached to a manometer and maintain an expiratory pressure of 40 mm Hg, after tidal inspiration. Duration for which he maintains this pressure was noted.⁶ The experimental protocol was approved by Institutional Ethical committee as per the declaration of Helsinki 1975. Statistical analysis was done using one way ANOVA test and Tukey's test.

Results

Table I shows handgrip strength, handgrip endurance and

Table I: Handgrip strength, handgrip endurance and endurance in 40 mm hg test in 11-15 year age group [group i] wrestlers with different duration of training.

Parameters	Training duration				P-value*.
	1 Year [n=11]		2-3 years [n=9]		
	Mean	S.D	Mean	S.D	
Handgrip strength [right hand] Kg.	25.62	7.43	30.56	4.39	0.09 NS
Handgrip strength [left hand] Kg.	23.69	7.39	28.56	3.68	0.08 NS
Handgrip endurance [right hand] in sec.	68.46	30.12	66.78	20.17	0.88 NS
Handgrip endurance [left hand] in sec.	61.54	29.44	65.22	22.54	0.75 NS
Endurance in 40 mm Hg test. In sec.	33.08	20.08	39.78	17.11	0.42 NS

*One way ANOVA test.

Table II: Handgrip strength, handgrip endurance and endurance in 40 mm hg test in 16-20 year age group wrestlers [group ii] with different duration of training.

Parameters	training duration								P value	Signi- ficant pairs*
	1] 1 year[n=2]		2] 2-3 year[n=6]		3] 4-5 year[n=11]		4] > 5 year[n=3]			
	Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D		
Handgrip strength [right hand] in Kg.	34.00	2.83	31.83	6.37	39.27	3.47	38.67	1.15	0.02 S	2&3
Handgrip strength [left hand] in Kg.	31.00	4.24	31.50	8.71	37.27	6.93	38.33	1.15	0.21 NS	-
Handgrip endurance [right hand] in sec.	127.00	87.68	96.17	54.32	100.00	31.92	111.67	16.74	0.81 NS	-
Handgrip endurance [left hand] in sec.	84.00	41.01	85.00	42.04	90.27	15.51	99.00	19.05	0.89 NS	-
Endurance in 40 mm Hg test. In sec.	23.50	3.54	36.33	10.78	43.82	12.79	53.33	16.77	0.07 NS	-

*One way ANOVA test. ** Tukey's test.

Table III: Handgrip strength, handgrip endurance and endurance in 40 mm hg test in 20-25 year age group wrestlers [group iii] with different duration of training.

Parameters	Training duration				P-value*.
	4-5 Years[n=4]		>5 years [n=12]		
	Mean	S.D	Mean	S.D	
Handgrip strength [right hand] Kg.	41.50	2.52	41.67	3.52	0.93 NS
Handgrip strength [left hand] Kg.	40.00	4.90	39.33	4.42	0.80 NS
Handgrip endurance [right hand] in sec.	95.50	19.60	100.50	19.76	0.66 NS
Handgrip endurance [left hand] in sec.	92.50	15.26	91.67	17.07	0.93 NS
Endurance in 40 mm Hg test. In sec.	42.00	16.49	45.08	9.36	0.64 NS

*One way ANOVA test

Table iv: Handgrip strength, handgrip endurance and endurance in 40 mm hg test in different age group wrestlers.

Parameters	age group in years						p-value*	significant pairs**
	1] 11-15 years		2] 16-20 years		3] 21-26			
	Mean	S.D	Mean	S.D	Mean	S.D		
Handgrip strength [right hand] in Kgs .	27.64	6.72	36.68	5.23	41.63	3.22	0.001 HS	1&2, 1&3, 2&3
Handgrip strength [left hand] in Kgs.	25.68	6.51	35.27	7.15	39.50	4.38	0.001 HS	1&2, 1&3, 2&3
Handgrip endurance [right hand] in sec.	67.77	25.96	103.00	40.79	99.25	19.19	0.001 HS	1&2, 1&3
Handgrip endurance [left hand] in sec.	63.05	26.31	89.45	25.92	91.88	16.14	0.001 HS	1&2, 1&3
Endurance in 40 mm Hg test. In sec.	35.82	18.80	41.23	13.93	44.31	10.98	0.225 NS	-----

*One way ANOVA test. ** Tukey's test.

endurance in 40 mm Hg test in the age group of 11-15 years [n=22]. On comparing wrestlers with d" 1 year of training duration [n=13] with wrestlers of 2-3 years training duration [n=9], there was no statistically significant difference in hand grip strength [Both right and left hand], hand grip endurance [Both right and left hand] and endurance in 40 mm Hg test.

Table II shows handgrip strength, handgrip endurance and

endurance in 40 mm Hg test in the age group of 16-20 years [n=22]. Wrestlers were again divided into 4 groups with training duration d" 1 year [n=2], 2-3 years [n=6], 4-5 years [n=11] and e"5 years [n=3]. On comparing these wrestlers with different training duration, there was no statistical difference in hand grip strength [left hand], hand grip endurance [Both right and left hand] and endurance in 40 mm Hg test. There was significant increase in

handgrip strength in right hand among wrestlers with 4-5 year duration when compared to 2-3 year duration. Similarly, no statistical difference was noted among wrestlers in the age group 20-25 years [n=16] on comparing with different duration of training [Table 3] with respect to hand grip strength, hand grip endurance [Both right and left hands] and endurance in 40 mm Hg test. Table IV compares hand grip strength [Both right and left hand], hand grip endurance [Both right and left hand] and endurance in 40 mm Hg test among wrestlers grouped only by age without considering duration of training. There was significant increase in hand grip strength and hand grip endurance [Both right and left hands], when different age group wrestlers were compared. Similarly, there was significant increase in handgrip endurance [Both right and left hand] among different age group wrestlers. But endurance in 40 mm Hg test [respiratory muscle strength] does not showed any significant difference when different age group wrestlers were compared.

Discussion

Hand grip strength has been used as an objective clinical measure in a variety of situations. For example grip strength has been used to assess general strength in order to determine work capacity⁷, or extent of injury and the disease processes and the potential for and progress in rehabilitation⁸. The power grip is the result of forceful flexion of all the finger joints with all the maximum voluntary force that the subject is able to exert under normal biokinetic condition^{9,10}. The grip strength is affected from many conditions and some studies has been designed to identify these factors. Muscle strength is one of these factors. The synergistic action of flexor and extensor muscles and the interplay of muscle group is an important factor for strength of resulting grip⁹. Many factors including age, training duration, fatigue, hand dominance, time of the day, state of nutrition, pain, co-operation of the subject etc influence the strength of the grip.

Present study reveals the influence of age and training duration on handgrip strength, handgrip endurance and respiratory muscles in different age group wrestlers. The study showed significant increase in handgrip strength and handgrip endurance with increasing age. Studies of Tarbizan DJ and Seljevold PJ, [1996], showed increase in grip strength and power measures in elderly wrestlers due to increased muscle mass, when compared to younger wrestlers, which is in agreement with our study¹¹.

The fact that training duration had no significant influence on handgrip strength, handgrip endurance among different age group wrestlers might reveal the inefficiency of training schedule and inadequate nutrition among these wrestlers.

We assumed that when effort is maximal, endurance in 40 mm Hg test is directly related to cardiorespiratory fitness and influenced by respiratory muscle strength⁶. Present study does not show any significant change in respiratory

muscle strength as determined by 40 mm Hg test with respect to age and training duration.

Nurgul arinci Incel et al,¹² [2002], have showed higher grip strength in dominant hand when compared to non-dominated hand in normal healthy individuals. Similar results can be observed in our study as the handgrip strength and endurance were increased in dominant hand [right hand].

Resistance training to improve grip strength may be critical to athletic success in several sports.¹³ Pulling exercises such as dead lifts, bent over rows and pull ups all greatly depend upon athlete's level of grip strength. Poliquin, [2006], states that the quickest way to develop athlete grip is to forego the use of lifting straps when athlete trains his upper body. This method of training will ensure greater isometric strength demand of the gripping muscles to stabilize or hold the resistance. Poliquin reveals when the hand grip improves, less neural drive is needed for forearm and hand muscles to perform other exercises. So, proper resistance training might influence the improvement among these different trained wrestlers.¹⁴ Nutritional status has also been correlated to handgrip strength. Guo et al,¹⁵ [1996], and Kenjele et al,¹⁶ [2005], found grip strength to be stronger predictor of an individuals nutritional status. These findings will draw parallel to the findings of the anthropometric measurement studies or nutritional status leads to specific levels of body mass, which in turn has been found to correlate to grip strength. Present study also warrants further nutritional based studies among these wrestlers. Grip training can be advised for these wrestlers which involves exercising the grip strength 2 or 3 times a week during off season. Rope climbing is one of the best which not only strengthens the hands and the forearm but also shoulders. Grip strength can also be improved by carrying dumbbells or barbells with thick bar by the side for a distance or till the subject do not hold it any more¹³.

References

1. Budoff JE. The prevalence of rotator cuff weakness in patients with injured hands. *J Hand Surg* 2004; 29 (6):1154-59.
2. Fry AC, D Ciroslan, MD Fry, CD Leroux, BK Schilling, LZ Chiu. Anthropometric and performance variables. Discriminating Elite American junior weight lifters. *Journal of strength and conditioning research* 2006;20(4):861-6.
3. Smith T, Smith S, Martin M, Henry R, Weeks S and Bryant A. Grip strength in relation to overall strength and Functional capacity in very old and oldest old females. *The Haworth press Inc* 2006.63-78.
4. Yasuo G, T Diasaku, M Nariyuki, S Junya, O Toshihiko, M Mashahiko and M Yoshiyuki. Relationship between grip strength and surgical results in rotator cuff tears. *Shoulder joint* 2005; 29(3):559-562.
5. Manoj Dash, Shirley Telles 2001. Improvement in hand grip strength in normal volunteers and Rheumatoid

- arthritis patients following yoga training. *Indian J Physiol Pharmacol*; 45 (3): 355-360.
6. Ravishankar P, Madanmohan, Kaviraja Udupa and E. Sankarnarayan Prakash 2005. Correlation between body mass index and blood pressure indices, hand grip strength and hand grip endurance in underweight, normal weight and overweight adolescents. *Indian J Physiol Pharmacol*: 49 (4): 455-461.
 7. Gibert J, Knowlton R. Simple method to determine sincerity of effort during a maximal isometric test of grip strength. *Am J Phy Med* 1983;62:135-144.
 8. Peterson P, Petrick M, Connor H, Conklin D. Grip strength and hand dominance; Challenging the 10% rule. *Am J Occ Ther* 1989;43:444-447.
 9. Richards L, Olsom B, Palmiter-Thomas P. How forearm position affects grip strength. *Am J Occ Ther* 1996; 50:133-39.
 10. Bohannon RW. Reference values for extremity muscle strength obtained by hand-held dynamometer from adults aged 20-79 years. *Arch Phys Med Rehab* 1997; 78:26-32.
 11. Terbizan DJ, Seljevold PJ. Physiological profile of age-group wrestlers. *J Sports Med Phys Fitness* 1996; 36(3):178-85.
 12. Nurgul Arinci Incel, Esma Ceceli, Pinar Bakici, Durukan, H Rana Erdem, Z Rezan Yorgancioglu. Grip strength: Effect of hand dominance. *Singapore Med Journal* 2002; 43(5):234-237.
 13. Ratamess N, A Faigenbaum, G Mangine, J Hoffman, J Kang. Acute muscular strength assessment using free weight bars of different thickness. *Journal of strength and conditional research* 2007; 21(1):240-44.
 14. Poliquin C. The Poliquin International certification programme Theory II Manual. East Greenwich 2006; pp. 2-42.
 15. Guo CB, W Zhang, Dq Ma, Kh Zang and Jq Huang. Hand Grip Strength: an indicator of Nutritional state and mix of post operative complications in patients with Oral and Maxillofacial Cancer. *British Journal of Maxillofac surgery* 1996; 34(4):325-27.
 16. Kenjile K, S Limaye, Ps Ghurge, and Sa Udipi. Grip strength as an index for assessment of nutritional status of children aged 6-10 years. *Journal of Nutritional and Science Vitaminol* 2005;51(2):87-92.

Effect of stress on absolute eosinophil count

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Abstract

A fall in absolute eosinophil count has been shown to occur in man and in various animals during acute infections, after immersion in cold water, and after surgical and electrical shock. Physiological studies have shown that stress can alter blood cell parameters including the absolute eosinophil count in healthy individuals. Present study was done to determine whether the exams in medical schools are stressful enough to produce any such changes on absolute eosinophil count. 125 healthy 1st year MBBS students [41 males and 84 females] were tested for absolute eosinophil count by direct method using the principle of haemocytometry. To study the effect of stress on absolute eosinophil count, the tests were done 3 weeks prior to exams and on the day of exams. The study showed a significant fall in absolute eosinophil count on the day of exams [$P < 0.001$]. The effect is probably mediated through the anterior pituitary and adrenocortical hormones which are increased during stressful situations.

Keywords

Absolute eosinophil count, Stress, Exams, Hormones.

Introduction

Physiological studies have shown that stress from any source can influence on the endocrine, hemopoietic and immune systems. Cytokines and cortisol seem to play an important role in the communication between these systems.^{1,2} Stress refers to conditions that arouse anxiety or fear. Anxiety can be defined as an emotion characterized by feelings of anticipated danger, tension and distress and by tendencies to avoid or escape. The well documented changes that occur are increase in erythrocytes, neutrophils and platelets, where as lymphocytes, eosinophils and monocytes decrease in number.¹ The magnitude of stress induced changes is significantly reduced in adrenalectomised animals. It is suggested that endocrine factors released during stress modulate leucocyte trafficking and result in redistribution of leucocytes between the blood and other immune compartments.³

It is well documented that mental stress associated with serious examination can produce a significant fall in eosinophil count during examination.⁴ All of us are familiar with the stress we undergo during exams which can vary from mild to severe. Exams in medical schools are

particularly stressful as they involve much study and also that the results do affect the future study or training of the student.

Differential count of leucocytes gives the relative number of eosinophils in the leucocyte population. It is possible to find absolute number of eosinophils in circulation by performing direct and indirect absolute counts. The direct method of absolute eosinophil count (AEC) is done by principle of hemocytometry. Indirect AEC is done by calculating the number of eosinophils as percentage of the total leucocytes present in circulation. Therefore, for indirect count two tests should be performed, the differential count and total count of leucocytes. The sources of errors are greater in indirect method as it multiplies the error of both the methods. The direct method on other hand is more accurate. The staining properties of eosinophils make the direct count possible.⁵

The objective of present study therefore is to

1] To review the present state of knowledge concerning the eosinophil cells of blood with particular reference to significance of eosinophil test in studies on physiological stress like examinations.

2] To study the interplay of possible mechanisms involved in decreasing the eosinophil count in stressful situations and to make an appraisal of various methods used in determination of eosinophil count.

Materials and methods

Present study was done on 125 1st year medical students in the age group of 17-19 years. Among these 41 students were males and 81 students were females. All the students selected were in normal healthy state without any history of allergic conditions like rhinitis, asthma, hay fever, food allergy, skin infections etc which can alter eosinophil count. Students selected were free from any parasitic infestations and endocrine disorders.

Absolute eosinophil count was determined by direct method using improved Neubauer's counting chamber and Dungey's fluid using the principle of haemocytometry.⁵ On the day of exams, AEC was also determined by indirect method and the results were compared with direct methods. Since the indirect method multiplies the errors of total leucocyte count and differential count, the chances of errors by indirect method will be more as compared to direct method.

$AEC \text{ [Indirect Method]} = \frac{DLC}{100} \times TLC$.

To compare the effect of mental stress on AEC, AEC by both

direct method was done 3 weeks before their first internal exams just before the announcement of exams. It was compared with results of AEC done on the day of exam. To exclude the seasonal and diurnal variations, all the tests were done on the same day between 8 a.m to 10 a.m.

Results

Table I showed significant reduction in AEC on the day of exams when compared to AEC done 3 weeks prior to the exams [P value < 0.001]. Decrease in the count was significant in both males and females when each of the group were compared separately before and after the exams [Table I].

Table I shows percentage of fall in absolute eosinophil count due to effect of stress during exams. The study showed 34% fall in AEC during exams when compared to the count 3 weeks before exams. Males showed a greater proportion of fall in AEC [37%] as compared to females [33%] during the exams.

Table II shows percentage of fall in AEC below the normal range [Normal range: 40-440 cells/cumm of blood]. During the day of exams, about 8 students [6%] showed fall in AEC below the normal range [<40 cells/cumm]. But none of the students showed fall below the normal range 3 weeks before the exams.

On the day of exams, AEC was also determined by indirect method and the results were compared with direct methods [Table III]. Since the indirect method multiplies the errors of total leucocyte count and differential count, the results of AEC by indirect method showed significant difference as compared to direct method [P<0.01].

Discussion

Absolute count of eosinophils by direct method is not a routine hematologic test. In clinical practice, usually the absolute count of eosinophils is done by the indirect method. However, sometimes it becomes mandatory to determine the number of eosinophils in a particular volume of blood because this gives accurate result.⁵

In 1865, Max Schultze, recognized eosinophil cells as separate entity.⁶The cells are distinguished by certain morphological and histological properties.^{7,8,9}The cellular protein is basic and hence stains with acidic dyes such as eosin,phloxine,etc.They have a diameter of 8-12 μ m and their life span is reported to be 8-12 days as compared with 2-4 days in the case of neutrophil.¹⁰They originate in bone marrow and normally constitute about 1-4% of the total circulating leucocytes.

Eosinophil play an important role in defence function during parasitic infestations and in patients suffering from allergic diseases.These functions are due to granular contents of eosinophil which include Major basic protein(MBP), Eosinophilic cationic protein (ECP),Aryl sulphatase B, Histaminase etc. Eosinophils also have mild phagocytic activity.

Normal absolute eosinophil count is about 40-440 cells per cumm of blood. The causes of increased eosinophil count (Eosinophilia) and decreased eosinophil count (Eosinopenia) are summarized in below.¹¹

Eosinophilia:

- Allergic conditions like bronchial asthma and hay fever.
- Tropical pulmonary Eosinophilia.
- Parasitic infestations, e.g. Intestinal worms like hookworm,round worm,tapeworm.
- Skin diseases like urticaria.
- Scarlet fever.
- Addison's disease.

Eosinopenia:

- ACTH and steroid therapy.
- Stressfull conditions.
- Acute pyogenic infection.

Present study showed significant reduction in AEC on the day of exams when compared to AEC done 3 weeks prior to the exams [P value < 0.001]. Decrease in the count was significant in both males and females when each of the group were compared separately before and after the exams.

Table i: Absolute eosinophil count among ist year mbbs students compared 3 weeks before exams and on the day of exams.

Group	No: of Students	AEC(before exams)	AEC(during exams)	Mean Difference	% of reduction	t value*	P value	Significance
Males	41	229.7±144.9	145.4±102.9	84.2±71.4	37	7.55	<0.01	HS
Females	84	212.1±113.9	142±79	70.1±52.9	33	12.10	<0.01	HS
Total	125	217.8±124.6	143.1±87.2	74.7±59.7	34	13.99	<0.01	HS

*Paired 't' test.

Table II: Absolute eosinophil count compared in males and females 3 weeks before exams and during exams.

Group	No: of Students	AEC(before exams)	AEC(during exams)	t value*	P value	Significance
Males	41	229.7±144.9	145.4±102.9	1.13	0.26	NS
Females	84	212.1±113.9	142±79			

*Paired 't' test.

Table III : Absolute eosinophil count compared by direct and indirect method during exams.

Aec Method	Aec (Mean±Sd)	t-value*	P-value
Direct	350±216.3	5.66	<0.01,Hs
Indirect	216.3±125.1		

*Paired 't' test.

In order to understand now the significance of blood eosinophil count when the body is in state of internal or external stress as seen in exams, it is necessary to explain the mechanism of stress. When the stressor acts upon some part of the body, a stimulus travels through some unknown pathway from injured area to the anterior pituitary which is induced thereby to discharge adrenocorticotrophic hormone (ACTH). To most stressors the first response may possible be the secretion of adrenaline by adrenal medulla. The adrenaline stimulates the pituitary to secrete more ACTH, which inturn acts on adrenal cortex causing an increased secretion of adrenal cortical hormones. It is through these corticoids that different biochemical processes are set in motion to enable the animal to resist the action of wide variety of stressors.

With regard to eosinophil, the most spectacular effect is fall in number of these cells following the action of stressor. In other words the action of cortical hormones on eosinophils is an important point of study if eosinophil count is used as an index of stress.

In the light of present study, it will be equally important to study the factors other than adrenal steroids which can cause eosinopenia.¹² For example adrenalectomized dogs maintained on deoxycorticosterone [DCA] were subjected to stress procedures of various kinds (e.g., muscular exercise, electrical stimulation, injection of anti-adrenergic drug such as regitine, and of anticholinergic drug such as antrenyl) and all showed eosinopenia 2-7 hours following stress. In order to remove doubts regarding the absence of adrenal accessories, a few dogs which had already shown eosinopenia as a result of stress were permitted to develop adrenal insufficiency by withholding DCA.

It may be stated that eosinopenia has been observed with not only with one kind of stress, but with various types such as emotional stress^{13,14} [as during exams], surgical operations,^{15,16} coronary occlusion¹⁷, electroshock¹⁸, heat and cold¹⁹, low oxygen tension²⁰, secretion of adrenaline²¹ etc. Though the exact nature of reaction leading to eosinopenia is not clearly known, the question has been raised whether the eosinopenia may be due to decreased production, sequestration in blood vessels of large organs, movements into tissue bed, or increased destructions.²² The present study which employed real life stress situation of acute nature i.e., examination showed that the stress of examinations in our college was significant enough to produce changes in absolute eosinophil count. Exams emphasize the ability to understand, organize and recall information. The student is expected to show the depth and breadth of his knowledge. All these can be affected

by sheer stress of the situation. Fear of failure or poor performance are quite overwhelming. Students need to adjust themselves to cope with the stress effectively. The teachers, instructors and other staff members have an important role in behavioural therapy to students. High social support appears to attenuate the magnitude of changes in immune cells suggesting a role for social support in protecting against immune decrements during times of stress.²³

References

1. Maes M, Vander Planken M, Van Gastel A, et al. Influence of academic stress on haematological measurements in subjectively healthy volunteers in subjectively healthy volunteers. *Psychiatry Res* 1998;80:201-212.
2. Benoit D, Esa L, Ralph G. The driving test as a stress model. Effects on blood picture, serum cortisol and the production of interleukins in man. *Life Sc* 2001 Feb 23;68(14):1641-1647.
3. Dhabhar FS, Miller AH, Mc Ewen BS, Spencer RL. Effects of stress on immune cell distribution. *Dynamics and Hormonal mechanisms. J Immunol* 1995;154 (10):5511-27.
4. Kerr AC. The effect of mental stress on the absolute eosinophil leukocyte count in man. *Experimental Physiology* 1956; 41(1):18-24.
5. GK Pal and Pravati Pal. Absolute Eosinophil Count. *Text Book of Practical Physiology* 2001; Sangam books Ltd. 1st edn. pp 96-101.
6. Max Schltze. Cited by Bonner CD. *J. Am. Med. Assoc* 1952; 148:634.
7. Whitby SEH and Britton CJC. *Disorders of Blood* 1947; London: J & A Churchill.
8. Wintrobe MM. *Clinical Haematology* .3rd Edn. 1951; London: Henry Kimpton.
9. Cape RDT. *Edinburg Med J* 1952; 59:374.
10. Osgood EE. *J. Am. Med. Assoc* 1937; 109:933.
11. Indu Khurana. *Text Book of Medical Physiology* 2006. White Blood Cells. Elsevier. New Delhi. 1st edn. pp 179-180.
12. Dumm ME and Ralli EP. *Endocrinology* 1954; 54:71.
13. Humphrey RJ and Raab W. *Proc. Soc. Exptl. Biol. Med.* 1950; 74: 302.
14. Renold AE, Quigley T, Kennard HE, Thorn G.W. *New Eng J Med* 1951; 244 :754.
15. Laragh JH, Almy T.P. *Proc. soc. Exptl. Biol. Med.* 1948; 69:499.
16. Roche M, Thorn GW, Hills AG. *New Eng. J. Med* 1950; 242:307.
17. Gabrilove JL. *J. Clin. Endocrinol* ; 10: 637.
18. Altschule MD, Parkhurst BH, Tillotson KJ. *J of Clinical Endocrinol* 1949; 9:440.
19. Brown HE. Master Thesis. Univ. of Utah. Salt Lake City Utah. 70 pp. Quoted by Duggothey. *TF and Duggothey. GJ. Ann. Rev. Phy* 1953; 15 :200.
20. Penneys R, Thomas CB and Lewis RA. *Bull John*

Hopkins 1950.86:102.

21. Dary A. Endocrinology 1950;47: 387.

22. Rosenthal RL ,Wald N,Yager A and Litwins . J. Proc. Soc. Exptl. Biol. Med 1950; 75; 740.

23. Broxmeyer H.Role of cytokines in hemotopoiesis.In. Agarwal (ed) Human cytokines: Their role in disease and Theraphy.Blackwell Science 1995.PP 27-36.

Perception of adolescent boys regarding pubertal changes (physical, emotional and psychological) from urban slum area of Mumbai

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Abstract

Background

All humans are sexual beings from the day of birth to the day of death. Sexuality is an integral part of life and individual's personality. In general terms, adolescence is considered as a phase of transition from childhood to puberty without assuming the roles, privileges and responsibilities of adulthood. Needless to say, sexuality is important for everyone. Yet in India, as in many parts of the world, talking about sexuality is a taboo and it is covered in secrecy. In India at present where adolescent sexuality is denied, reproductive health is ignored and queries go unanswered.

Objectives

1. To assess the knowledge of adolescent boys regarding physical, emotional and psychological changes occurring during puberty.
2. To assess their attitude regarding nocturnal ejaculation and masturbation.

Methodology

This present Community based cross sectional study was conducted in Bhabharekar Nagar, Mumbai. This was resettlement area for those who were migrated from Kandivali (Charkop). Bhabharekar Nagar was having total 728 houses and 8 *gallies during the period from May 2005 to April 2006*. A total of 272 eligible adolescents were present, of which 256 adolescents were actively participated and interviewed with pre structured questionnaire at Community Meeting Centre in the same area.

Results

Among study participants, 58.98% (151/256) said that they

had knowledge regarding puberty. Over all 41.02% (105/256) participants said that they did not know about puberty. Among participants, the mean age of first nocturnal ejaculation was 15.04 years with minimum 14 years and maximum 17 years. About 37.5% (96/256) participants said that nocturnal ejaculation is a normal phenomenon, 32.81% (84/256) participants said that nocturnal ejaculation is harmful to body. About 81.64% (209/256) participants said that they knew about masturbation and Minimum age for first experience of masturbation was 14 years and maximum age of masturbation was 17 years and means age was 15.64 years.

Study variables

Age, literacy, physical changes, emotional changes, nocturnal ejaculation, and Masturbation practice.

Introduction

Adolescence is considered as a phase of transition from childhood to puberty without assuming the roles, privileges and responsibilities of adulthood. Adolescence is viewed in terms of shift in dependency to autonomy, social responses to physical maturity, the management of sexuality, the acquisition of skills and changes in peer groupings. It is a period when life-values are being formed. World Health Organization (W.H.O.) defines adolescence both in terms of age (spanning the ages between 10-19 years) and in terms of life marked by special attributes. Attributes are rapid physical growth and development; physical, social and psychological maturity; sexual maturity and onset of sexual activity; experimentation; development of adult mental process and adult identity and transition from complete socio-economic dependence to relative independence.

Adolescents in South Asia tend to be poorly informed about their bodies and matters related to sexuality and health. The information they have is often incomplete and confused. Adolescents account for one fifth of the world's population and have been on an increasing trend. In India, they account for 22.8% of the population (as on 1st March 2000) according to planning commission. Neglecting adolescent population has major implication for the future, since reproductive and sexual behavior during adolescence have far reaching consequences for people's lives as they develop in to adulthood.

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This is especially relevant in India where reproductive health has been considered synonymous with women's health and hence reproductive health of men has received little attention. Typically boys are neither encouraged to talk about pubertal changes nor offered space to ask question or seek information about these changes. This study was conducted to assess the knowledge of adolescent boys about pubertal changes. Changes at the time of puberty are not only physical but also psychological. Apart from the pubertal changes knowledge and attitude regarding nocturnal ejaculation and masturbation also assessed.

Objectives

1. To assess the knowledge of adolescent boys regarding physical, emotional and psychological changes occur during puberty.
2. To assess their attitude regarding nocturnal ejaculation and masturbation.

Methodology

This present study was conducted in Bhabharekar Nagar, Mumbai. This was resettlement area for those who were migrated from Kandivali (Charkop). Bhabharekar Nagar was having total 728 houses and 8 *gallies*. Exact record of population was not available at health post but estimated population is 4000.

Study design: Cross-sectional community based study

Study period: May 2005 to April 2006

Study population: Adolescent boys in the age group of 14 to 19 years

Study procedure: This study was completed under following steps,

Step I: Planning for study

Selected study area was visited with social workers so as to know about the community. Members of youth club and volunteers working in the area were contacted and explained about the purpose and usefulness of study. Permission of parents was taken to interview their adolescent boys for study during the visit.

A. Qualitative Data Collection

Focus group discussion (FGD) technique was used for an explorative assessment to gain a better understanding of the personal development and experience of adolescent boys in the slums.

B. Quantitative Data Collection

Pilot study: Partially structured questionnaire was prepared to gain more systematic insight in the distribution of knowledge, ideas and experiences of adolescent boys on selected issues emerging from the qualitative study.

Step II: Conduct of Study

Sampling method: Stratified random method was used at

Bhabharekar Nagar is having 728 houses, with 8 *gallies*. Each and every house was visited personally and all adolescents between the age of 14 to 19 years were enumerated. Out of 272 adolescents, 256 willingly participated in the study during the study period. These entire participants were interviewed personally at Community Meeting Center in the same area. Before starting the interview, each respondent was explained in brief about the need and the purpose of study. Confidentiality of their answers was emphasized at the start and the importance of their co-operation was needed for the success of this study.

Table 1: Demographic variables of Study Participants:

Age (Years)	Frequency	Percentage
14	8	3.1
15	64	25.0
16	52	20.3
17	36	14.1
18	44	17.2
19	52	20.3
Literacy Status		
Illiterate	18	7.03
Primary School	18	7.03
Secondary School	166	64.84
Higher Secondary School	54	21.10
Total	256	100

Out of 256 Adolescents, 25% were at the age of 15 years and least 3.1% were at the age of 14 years. Majority of the people about 64.84% were completed secondary school and illiterate were only 7% in the present study.

Table 2: Physical Changes in Boys at Puberty

Physical Changes (Boys)	Total (n = 256)	
	Count	%
Facial Hair	210	82.03
Chest And Body Hair	123	48.05
Pubic Hair	124	48.44
Axillary Hair	118	46.09
Change In Voice	78	30.47
Increase in size of Sex Organs	24	9.38
Increase Height	37	14.45
Increase in Weight	27	10.55
Others	46	17.97
Don't Know	10	3.91

About 82.03 % (210/256) participants said facial hair growth. 48.44% (124/256) participants said pubic hair growth. 48.05% (123/256) participants said hair growth on chest and body. 46.09% (118/256) participants said growth of axillary hair. (*Multiple responses given by the participants)

Table 3 depicts that 58.98% (151/256) participants said attraction towards opposite sex (girls) as emotional change

at puberty. 53.52% (137/256) participants said increase in sex drive. 35.16% (90/256) participants said desires to remain in company of friends. (*Multiple responses given by the participants)

Table 3: Emotional & Psychological Changes in Boys at Puberty

Emotional Changes	Total(n = 256)	
	Count	%
Desire to be with Friends	90	35.16
Increased Confidence	12	4.69
Increased Intelligence	5	1.95
Attraction towards Girls	151	58.98
Aggressiveness	15	5.86
Increased in Sex Drive	137	53.52
Distraction from Studies	19	7.42
Other Emotional Changes	13	5.08
Don't Know	71	27.73

Table 4: Opinion about Nocturnal Ejaculation

Opinion About Nocturnal Ejaculation	Number	%
Harmful	84	32.81
Normal	96	37.50
Don't Know	76	29.69
Total	256	100

About 37.5 % (96/256) participants said nocturnal ejaculation is normal. 32.81 % (84/256) participants said nocturnal ejaculation is harmful. 29.69% (76/256) participants said they don't know whether nocturnal ejaculation is normal or harmful.

Table 5: Practicing Masturbation

Practicing Masturbation	Frequency	Percentage
No	74	28.91
Yes	182	71.09
Total	256	100

71.09% (182/256) participants said that they had knowledge regarding masturbation and they do masturbate. 28.91% (74/256) participants said that they did not masturbate.

Table 6: Reasons for Masturbation

Reasons for Masturbation	Frequency	%	%
			(n = 182)
Fun	36	13.09	19.78
To satisfy Sex Drive	105	38.18	57.69
Peer Suggestion	89	32.36	48.90
Others	18	6.55	9.89
Don't Know	27	9.82	14.84

Out of 256 participants, 182 were practicing masturbation. Each participant gave multiple responses of different reasons of masturbation. About 57.69% (105/182) participants said they masturbate to satisfy sex drive. 48.90% (89/182) participants said that they started masturbating after peers' suggestion. 19.78% (36/182) participants said they masturbate for fun. (*Multiple responses given by the participants)

Table 7: Adverse Effects of Masturbation

Adverse Effects of Masturbation	Frequency	%	% (n = 152)
Weakness	124	35.53	81.58
Weight Loss	102	29.23	67.11
Loss of Vital Fluids	36	10.31	23.68
Decreased Blood Mass	57	16.33	37.50
Other	30	8.60	19.74

Table 7 reveals that about 81.58% (124/152) participants said that weakness as adverse effect of masturbation. 67.11% (102/152) participants said that weight loss as adverse effect of masturbation. 37.50% (57/152) participants said that decrease in blood as adverse effect of masturbation. (*Multiple responses given by the participants)

Discussion

Among study participants 58.98% (151/256) said that they had knowledge regarding puberty. Over all 41.02% (105/256) participants said that they did not know about puberty. Knowledge regarding physical changes in males at puberty (Table 2) 82.03% (210/256) participants said that facial hair growth occurs at puberty. About 48.44% (124/256) said about hair growth in pubic area while 48.05% (123/256) participants said about hair growth on body and chest. Less number of participants told that the increase in height (14.45% participants) and increase in weight (10.55% participants) are physical signs of puberty.

In relation to emotional changes (Table 3), 58.98% (151/256) participants reported attraction towards opposite sex as emotional change. Next response was increase in sex drive in 53.52% (137/256). Some participants 35.16% (90/256) thought that there is a desire to remain in the company of friends. Nearly 95.3% (244/256) participants said that they knew about nocturnal ejaculation and had experienced it. Among participants, the mean age of first nocturnal ejaculation was 15.04 years with minimum 14 years and maximum 17 years. About 37.5% (96/256) participants said that nocturnal ejaculation is a normal phenomenon, 32.81% (84/256) participants said that nocturnal ejaculation is harmful to body and 29.69% (76/256) participants admitted that they did not know whether nocturnal ejaculation is harmful or normal (Table 4).

About 81.64% (209/256) participants said that they knew about masturbation and (Table 5) 71.09% (182/256) participants admitted that they masturbate regularly or

sometimes. Minimum age for first experience of masturbation was 14 years and maximum age of masturbation was 17 years and means age was 15.64 years. As far as reasons for masturbation are concerned (Table 6), 57.69% (105/182) participants said that they masturbate to satisfy sex drive, 48.9% (89/182) participants said that they started masturbating after peer's advice. Nearly 19.78% (36/182) said they masturbate for fun. Majority of participants 77.47% (141/182) said they felt guilty after masturbating. About adverse effect of masturbation, 72.73% (152/209) participants said that masturbation has adverse effects and 18.66% (39/209) said that masturbations do not have any adverse effect and 8.61% (18/209) participants said that they do not know whether masturbation causes any adverse effect. As regard to adverse effects of masturbation (Table 7), 81.58% (124/152) participants thought that masturbation can lead to weakness, followed by weight loss 67.11% (102/152). Some participants 23.68% (36/152) thought that masturbation leads to loss of vital fluid. About 37.50% (57/152) participants assumed blood loss as adverse effect of masturbation.

Conclusions

Adolescence is a crucial phase of life wherein the adolescents are trying to adjust their varied physical, emotional and psychological changes. This study is an attempt to know, knowledge, attitudes and behavior of adolescent boys of 14-19 years living in urban slum area. Many participants were not having complete knowledge regarding puberty. However, they were able to quote physical, emotional and psychological changes among adolescent at puberty.

About 37.50% participants perceived that nocturnal ejaculation is a normal phenomenon. But, 32.81% participants thought it is harmful. In this study, 71.09% participants admitted that they masturbate. But majority of them 77.47% had a feeling of guilt after masturbation. Nearly 81.58% participants felt that masturbation is harmful and may lead to weakness. This suggest that there are still misconceptions and misbelieves regarding nocturnal ejaculation and masturbation. This issue should be tackled comprehensively by imparting formal sex education at proper age.

References

1. Malde S. Addressing sexual and reproductive health needs of adolescents; telephone helpline experience. In: *Enhancing Male Parternership in Sexual and Reproductive Health*; edited by Balaiaha Donta, Kirsten M.Vogelsong, Paul FA Van Look, Chander P. Puri. 2005: 255-63.
2. Department of Health and Family Welfare, Ministry of Health and Family Welfare (MOHFW), Government of India, 2000. National Population Policy, MOHFW Government of India, New Delhi.
3. World Health Organization South East Asia Region (SEAR). *Strategies for Adolescent health and development in SEAR*, New Delhi 1998.
4. World Health Organization (SEAR). *Adolescence: the critical phase, the challenges and the potential* New Delhi, 1997.
5. Pandey J, Yadav SB, Sadhu KK. *Adolescence Education in Schools: Package of Basic Materials*. National Population Education Project, National council of Educational Research and Training (NCERT). New Delhi, 1999.
6. Report of sub group on Adolescents. India for the Tenth Five Year Plan. Government of India Planning Commission, June 2001.
7. Bott S, Jejeebhoy SJ. Adolescent sexual and reproductive health in South Asia: An overview of findings from the 2000, Mumbai conference. In: *Towards adulthood: Exploring the sexual and reproductive health of adolescents in South Asia*, edited by Sarah Bott, Shireen Jejeebhoy, Iqbal Shah, Chander Puri. Geneva, Switzerland, World Health Organization [WHO], Department of Reproductive Health and Research, 2003: 3-28.
8. Hota P. Foreword. In: *Enhancing Male Parternership in Sexual and Reproductive Health*; edited by Balaiaha Donta, Kirsten M.Vogelsong, Paul FA Van Look, Chander P. Puri.2005: p i.
9. What about Boys? A literature review on the health and development of adolescent boys. Department of Child and Adolescent Health and Development. World Health Organization 2000. WHO/FCH/CAH/00.7.
10. Green CP. Young men: the forgotten factor in health. Draft. [Unpublished] 1997. 16 [5], 30 P.
11. Pollack W. *Real Boys: Rescuing Our Sons from the Myths of Manhood*, New York, Random House 1998.
12. Brown A, Jejeebhoy SJ, Shah I, Yount KM. *Sexual Relations Among Young People In Developing Countries: Evidence From WHO Case Studies*, Geneva, Switzerland World Health Organization. Special Programme of Research, Development and Research Training in Human Reproduction, 2001.50 [11] p. WHO/RHR 01.8.
13. Ranjha SM and Hussain. Sexual health services for adolescents at sex clinics in Rawalpindi, Pakistan. In: *Towards adulthood: exploring the sexual and reproductive health of adolescents in South Asia*, edited by Sarah Bott, Shireen Jejeebhoy, Iqbal Shah, Chander Puri. Geneva, Switzerland, World Health Organization [WHO], Department of Reproductive Health and Research, 2003: 148-150.
14. Lee SM, el-Tawila S, Sallam S, el-Sahn F, el-Gibalay O, Ibrahim B, et al. Transition to adulthood: A national survey of adolescents in Egypt. Cairo Egypt, Population Council, Regional office for West Asia and North Africa, 1999. 8 p.
15. Lundengren R. Research protocol to study sexual and reproductive health of male adolescents and young

- adults in Latin America.[Unpublished] 2000 Jan. Prepared for Division of Health Promotion and Protection, Family Health and Population Programme, Pan American Health organization (PAHO). 100 p.
16. Joshi BN, Chauhan SL, Bhadoria V, Tryambake V, Gaikwad N, Ghule M. Reproductive health morbidities among urban school going adolescent boys in Mumbai. In: Enhancing Male Partnership in Sexual and Reproductive Health; edited by Balaiaha Donta, Kirsten M.Vogelsong, Paul FA Van Look, Chander P. Puri.2005: 265-73.

Evaluation of the health awareness package for the improvement of knowledge, Attitudes and practices (KAP) of secondary school students at rural areas of Paschim Medinipur, West Bengal

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Abstract

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

Keywords

Health Awareness, School Children, Communicable diseases, KAP.

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Introduction

Today's children are the citizens of tomorrow's world. Their survival, protection and development are the prerequisite for the future up-gradation of community. Empowerment of the younger generation with knowledge about healthcare is helpful to grow their health friendly life style. Their development and social contributions will change our society (WHO, 1996). The health supervision of children in the age group of 5 to 15 years is extremely important, because at this period they are exposed to the school environment with its possibilities for infection to communicable diseases (Jain, 1968). Prevention of the disease through knowledge and awareness is the appropriate way to keep disease away and to lead a long and healthy life (Tyagi, 2005). Promotion of health care for prevention of diseases should be initiated from school going stage. Value based learning in organized form can be acquired much more effectively in schools (Gol, 1961). In addition, schools are central place in the community for disseminating health message through children by providing a safe and supportive environment, access to information about health care that affect their lives which contributing to social change (WHO, 1999). The National Health Policy of India intends to target school children for promoting healthy behaviors among the general population (Ministry of Health and Family Welfare, 2002). It has been suggested that well-developed school health awareness programme is effective in encouraging children to adopt health-enhancing knowledge and attitudes and in reducing health-compromising behaviors (Vir, 1987). According to Hiroshi Nakajima "Educating children at school on health should be given the highest priority, not for their health per se, but also from the perspective of education, since if they are to learn they need to be in good health".

India has one of the largest group of school going children. Communicable diseases like malaria, tuberculosis, diarrhoea, dysentery, cholera etc are major health problems in remotes areas of India. The majority of schoolers in India are affected by these communicable diseases (Ministry of Health, Gol; 1961). The knowledge, attitude and practice on above mentioned diseases are not satisfactory among high school students especially at rural areas (Vir, 1987). Many study showed that school health

education act as the vehicle for the improvement of health knowledge, attitude and practice in the students. A study by S Meena (2009) noted that health knowledge, attitude and practice of the rural students significantly improved after education. Which is supported by the study of Biswas et al. (1990).

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

Objectives

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

Methodology

Study settings

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

Pre-awareness phase

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

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

Dissemination of awareness package

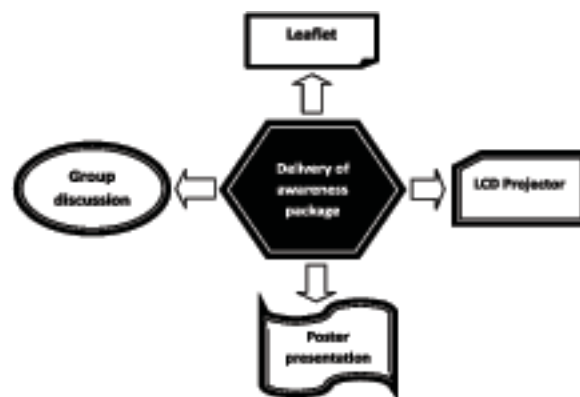
The informations obtained in the pre-awareness phase

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



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

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



Post-awareness phase

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

Analysis of data

The obtained data was statistically analyzed to see the effect of awareness programme. Mean and standard error

of mean were calculated. Comparison of the pre-awareness and post-awareness evaluation was done by paired t test of significance (pd" 0.05).

Results

General information

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

Source of health information

The fig. 3 showed that the children got about health information from various sources like family members of

their own, friends, television, radio, news paper etc. Most of the children got health information through friends (34%), school teacher (20.9%) and mass media (Radio 13.7%, television 11.7%, and news paper 10.7%). But only 8.7% children obtained health message through their family members.

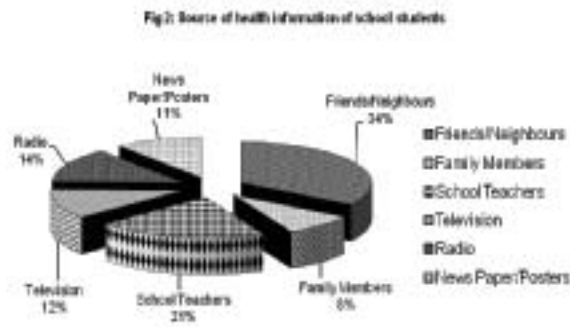


Table 1: General information of participants in this programme

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

Changes on knowledge, attitudes and practices of school students

Health awareness is one of the major tools which influence the students' knowledge, attitude and safe practice about health problems. During the pre-awareness phase, very less percentage of students had knowledge about malaria. Regarding malaria 1054 schoolers got correct answer but 4001 schoolers failed to right answer at pre-awareness

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

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

Mean correct answer at pre-awareness 1.27 t = 6.84

Mean correct answer at post-awareness 3.03 p d" 0.05

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

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

Mean correct answer at pre-awareness 1.09 t = 9.59

Mean correct answer at post-awareness 3.0 p d" 0.05

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

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

Mean correct answer at pre-awareness 1.31, t = 7.27

Mean correct answer at post-awareness 3.31, p d" 0.05

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

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

Mean correct answer at pre-awareness 1.18, t = 8.17

Mean correct answer at post-awareness 3.08, p d" 0.05

stage. Where only 32.2% of children had known the cause of malaria and 27.9% of children had idea about modes of infection. About 25.2% children were aware about malaria preventive method while 74.7% children got incorrect answer (Table 2). In a study by *Goel* (2007), reported that 68.5% of students were aware about malaria.

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

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

It has been observed in our study that children had slightly higher level of concept about diarrhoea than other diseases (Table 4). At pre-awareness stage about 27.9% of students knew the modes of infection of diarrhoea. Only

25.27% of students had idea about prevention and control of diarrhoea, where they had no knowledge the best treatment for dehydration is oral rehydration therapy by oral rehydration salt (ORS) solution. This is consistent to the report of *Nath et al* (1997). But after imparting awareness package, knowledge level improved significantly in all aspect.

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

Discussion

This study enlightened health promotion to rural children by implementing a awareness program. This awareness program based on the preventive approach of communicable diseases which have been more effective in changing the knowledge, attitude and practice of rural schoolers. Special care is needed about their health and well being. They need to be well informed about preventive aspect of communicable diseases such as malaria, tuberculosis, diarrhoea, cholera etc. Because majority of the rural schoolers have been suffering from these types of diseases. But it was observed from the present study that very less percentage of students had

knowledge, attitude and practice about said diseases at the pre-awareness stage. For information collection it has been noted that only 32.2% students knew about cause of malaria, 21.5% students answered about modes of infection of tuberculosis and 27.9% students had knowledge about transmission of diarrhoea. As well as majority of the students did not know about preventive aspects of diseases. Regarding malaria 74.7%, tuberculosis 76.2%, diarrhoea 74.7% and cholera 77.1% students had no proper knowledge about preventive aspects. The school children in the present study were found less health aware than the study of Goel (2007). Before imparting awareness package, majority of the study participants got health related information through their friends (34%) and class teacher (20.9%). Similar observations were collected by Sangole et al (2003). It was very interesting to note that in spite of the students studying in class VII, VIII, and IX they did not have knowledge about cause, signs and symptoms, modes of infection and prevention of common diseases. This may be due to the rural students are less exposed to different health awareness programme which improve their health knowledge, attitudes and practices. It is important to increase their knowledge and awareness level on the concern subject using school environment. After delivering the awareness package, knowledge, attitude and practice levels of schoolers were increased significantly in connection with sound health. There was a statistically significant change in the level of knowledge in all domains such as cause, signs and symptoms, mode of transmission, prevention and role of children on above mentioned diseases which indicated the role of awareness package. The study showed that the efficacy of awareness package which significantly changed the way of students perceived about the diseases and its prevention. Health awareness programme plays a pivotal role in motivating the students to favorable attitude about preventive knowledge and practices of diseases. The students play a key role in rural sectors that has been supported by M Siwach (2009). Participatory learning through the use of active learning methods, such as visual impression, small group discussions and interactive sessions, which can go beyond the classroom and can help the children to explore and practice positive health behaviors. Such active learning allows schoolers as a potent agent to change the community (WHO, 1991). The importance of providing health education to the schoolers cannot be over emphasized and this has been included as one of the important activities under school health schemes. In our country where universalization of elementary education is top priority, using school infrastructure to disseminate messages of health in the community through the school children has tremendous scope (Dongre, 2006). Better outcome in the present study suggests that school-based health awareness strategy would have greater impact in rural areas. The school health awareness programs is one approach to community health education that is effective in change knowledge, attitudes

and practices towards prevent communicable diseases as well as lead healthy lifestyle. The present study provided health awareness approaches which could be useful to governmental and non-governmental organizations working in rural school settings of developing countries. It would be a real investment in health and development of future citizens.

Acknowledgement

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References

- Biswas AB, Roy AK, Sen AK, Biswas R 1990. A Study of the Impact of Health Education Imparted to School Children on their Knowledge, Attitude and Practices in regard to Personal Hygiene. *Ind. J. Pub. Health*, 34(2):87-92.
- Dongre AR, Deshmukh PR, Garg BS 2006. The Impact of School Health Education Programme on Personal Hygiene and related Morbidities in Tribal School Children of Wardha District, *Ind. J. Commu. Med.*, 31:2.
- Goel S, Sing A 2007. Health Awareness of High School Students. *Ind. J. Commu. Med.*, 32:192-194.
- Gopichandran V, Roy P, Sitaram A, Karthic, John KR 2010. Impact of a Simple Educational Intervention on the Knowledge and Awareness of Tuberculosis among High School Children in Vellore, India. *Ind. J. Commu. Med.*, 35(1):174-175.
- Govt. of India 1961. School Health Committee, New Delhi; Ministry of Health.
- Harrabi I, Maatoug J, Gaha M, Kebaili R, Gaha R, Ghannem H 2010. School-based Intervention to Promote Healthy Lifestyles in Sousse, Tunisia. *Ind J Commu Med*, 35(1):94-99.
- Jain AM 1968. Planning and Organization of Child Health Services in Rural India, II School Health Services. *Ind. J. Pediatr.*, 35(3):150-155.
- Ministry of Health and Family Welfare 2002. National Health Policy of India Retrieved September 27, 2007, from: <http://www.mohfw.nic/2002.htm>.
- Ministry of Health, Govt. of India, 1961-1960. Report of the School Health Committee Part-I & II, New Delhi; Govt. of India.
- Nath SR, Mohsin M, Chowdhury AM 1997. Health Knowledge of Children in Bangladesh: An Exploratory Study. *Public Health*, 111:311-5.
- Sangole S. Tandale BV, Bagde PS, Thorat DM 2003.

- Evaluation of Impact of Health Education regarding HIV/AIDS on Knowledge and Attitude among Persons Living with HIV. *Ind. J. Commu. Med.*, 28(1):30-33.
- Siwach M 2009. Impact of Health Education Programme on the Knowledge and Practices of School Children regarding Personal Hygiene in Rural Panipat. *Int. J. Edu. Sci.*, 1(2):115-118.
- Tyagi P, Roy A, Malhotra MS 2005. Knowledge, Awareness and Practices towards Malaria in Communities of Rural, Semi-rural and boarding Areas of East Delhi (India). *J. Vect. Borne. Dis.*, 42: 30-35.
- Vir S 1987. School Health Education Programme in India. *Hygiene*, 6: 12-6.
- WHO 1991. Comprehensive School Health Education: WHO/UNESCO/UNISEF Consultation on Strategies for Implementing Comprehensive School Health Education/Promotion Programme, P.11, Nov.25-29; Geneva.
- WHO 1996. Global School Health Initiative: Research to Improve Implementation and Effectiveness of School Health Programme. Prepared by Health Education and Promotion unit, Division of Health promotion, Education and Communication, WHO, P.1, Geneva.
- WHO 1999. Information Series on School Health: Improving Health through Schools National and International Strategies, P.47, Geneva.

An assessment of unmet need of family planning in Etawah district, Uttar Pradesh

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Abstract

While real progress has been made in improving access to family planning globally, the unmet needs continue to grow. So the present study was designed to determine the percentage of unmet needs of family planning in Etawah District and to study the various co-relative factors responsible for the unmet need for family planning. The present study was a Cross Sectional Descriptive study carried out from July 2009 to March 2010. 520 married women were interviewed using a pre designed, pre tested structured proforma. The district was divided into urban and rural areas. The rural area was further divided into eight blocks. From each alternative blocks, one PHC and five Sub Centers under the respective PHC were selected randomly. From each Sub Centre 11 married women were selected. The Urban area was divided into three divisions and from each division five wards were selected randomly. From each ward 20 married women were selected. Proportion, Chi square test and ODDs ratio were applied to interpret the result. The unmet need of family planning in Etawah District was 24.40%. It was higher in rural area and women of the age group of 15-19 years. The unmet needs were also higher among women who did not have any media exposure or did not discuss about family planning with their husbands. The present study concludes that Family Planning services should be specifically directed toward the married women of the age group of 20 years or less.

Keywords

Unmet needs, Family Planning, Contraceptive Methods

Introduction

While real progress has been made in improving access to family planning globally, the unmet needs of family planning – that is, the number of individuals who would like to use family planning methods but do not have access to a full range of modern contraceptives and information – continues to grow.

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In the developing world limited access to family planning results in high rate of unintended pregnancies, millions of unsafe abortions & thousands of maternal deaths. Limited access to family planning is also a leading cause of infant death in developing countries.

In developing countries as a whole, excluding China, about 20 per cent of married women of reproductive age have unmet need for family planning. In total, more than 100 million sexually active women in developing countries would like to adopt some measures of family planning.⁽¹⁾ Because of the large population of Asia, however, by far the greatest number of women with unmet needs live in this region. India has the most unmet need for family planning, at about 31 million.⁽¹⁾

The findings of National Family Health Survey (NFHS)⁽²⁾ I and II carried out in 1992-93 and 1998-99 respectively have revealed that for a large proportion of our population, the need for family planning services is not met with despite the existence of National Policy of Family Planning since 1983. However, the analysis of recent findings of NFHS -III does reveal that the unmet need of family planning has declined from 15.8% in NFHS -II to 13.2% in NFHS -III.

Unmet needs for family planning signify the gap between the reproductive intentions of couples and their actual contraceptive behaviours. If measured accurately, it can indicate the potential demand for family planning services and its likely impact on fertility, if the demand is met effectively.

According to NFHS -III (2006-07), 21.2% of currently married women in Uttar Pradesh have an unmet need for family planning, however DLHF survey –III (2007-08)⁽³⁾ has quoted it to be very high at 33.7% for Uttar Pradesh. The level of unmet need in Uttar Pradesh is higher than the National level. A comprehensive study of unmet need in the state is highly desirable in order to develop a locally relevant and suitable strategy to overcome the problems of unmet need on priority basis.

The present study was undertaken with the following objectives:

- To determine the percentage of unmet need for family planning in Gwalior district.
- To study the various co-relative factors responsible for the unmet need of family planning.

Materials and methods

The present study was a Cross-Sectional Descriptive study carried out from July 2009 to March 2010 by the staff and

students of the Deptt. of Community Medicine, UP Rural Institute of Medical Sciences & Research, Saifai, Etawah. The study was carried on married women of reproductive age group (age 15 to 49 years) in Etawah district. A sample of 520 was calculated using 21.2% prevalence of unmet need for family planning among married women in Uttar Pradesh (NFHS-III, 2005-06) and a allowable error of 5% with 95% confidence interval. The study was carried out in both rural and urban area of Etawah distt. Multistage stratified sampling method was used to select the requisite sample. In the first step, Etawah distt was divided into urban & rural area. In the second step, urban area was divided into 3 divisions. Similarly, the rural area was divided into 8 blocks. In the third step, five wards from each division of urban area and one PHC from each alternative block of rural area were selected randomly. From each PHC five sub-centres were selected. From each urban ward 20 married women and from each sub-centre 11 married women of the age group 15-49 years were selected and interviewed through house to house survey method. Thus a total of

300 urban women and 220 rural women were selected for interview. To ensure active support & participation of the subject, the aims of the study were explained to them and verbal consent was sought out. The data was collected regarding socio-demographic profile, age of marriage and consummation, number of children ever born, child loss etc. The subjects were also interviewed about their knowledge of contraceptive methods, past and current use of contraceptives and their intention to use contraceptives in future. The data collected was analyzed using suitable statistical software. Proportion, chi-square test and ODDs ratio were applied to interpret the result.

Results

Out of total 520 participants 300 participants belonged to urban area and 220 participants belonged to rural areas. Majority of the study participant were in the age group of 20-40 years and were literate upto 12th stadbard. The unmet need was calculated to be around 24.4% (Table-I)

Table I: Shows the socio- demographic profile and unmet need of study participants.

Socio- demographic parameters	Urban Total	Rural Unmet needs	Total Total	Unmet needs	Total	Unmet needs
Age of participant-						
15-19 years-	12	6	21	18	33	24
20-24 years-	61	8	53	14	114	22
25-29 years-	59	6	49	11	108	17
30-34 years-	68	11	41	10	109	21
35-39 years-	51	8	29	10	80	18
40-44 years-	40	8	17	6	57	14
45-49 years	21	5	10	6	31	11
Total	300	52	220	75	520	127
Educational Qualification-						
Illiterate-	36	17	79	37	115	54
Up to 5 th std.-	61	13	64	19	125	32
Up to 12 th std.-	89	10	42	11	131	21
Graduate-	73	09	33	7	106	16
Post Graduate	41	3	2	1	43	4
Total	300	52	220	75	520	127
Occupation-						
Housewife-	221	45	217	75	438	120
Working	79	7	3	0	82	7
Total	300	52	220	75	520	127
Religion-						
Hindu-	159	21	148	41	307	62
Muslim-	92	27	59	31	151	58
Sikh-	46	4	13	3	59	7
Others	3	0	0	0	3	0
Total	300	52	220	75	520	127
Socio- Economic Class-						
Class-I-	81	20	93	36	174	56
Class-II-	69	14	57	22	126	36
Class-III-	59	10	38	10	97	20
Class-IV-	63	6	19	6	82	12
Class-V	28	2	13	1	41	3
Total	300	52	220	75	520	127

Table-II: Shows the relationship between the unmet needs and number of child born and child loss

Number of children	Child living		Child loss	
	Total number	Unmet needs	Total number	Unmet needs
0-	41	13	415	89
1-2-	286	58	71	24
3-4-	146	36	3313	
>4	47	20	2	1
Total	520	127	520	127
P value	P=0.078 df=3 X ² =6.79		P=0.127 df=3 X ² = 5.69	

There was no statistically significant difference in the demand for family planning among women who had a child loss compared to the women who did not had a child loss. (Table-II).

However there was a statistically significant difference in the demand for family planning among women who did not have media exposure compared to those who had it.(Table-III)

Table-III: Showing the distribution of participant according to media exposure

Responses	Total number	Unmet needs	P Value
Yes	425	86	0.0005 df=1 X ² =12.08
No	95	41	
Total	520	127	
Odds ratio	2.132(1.38 to 3.28 at 95% CI)		

Majority of women had discussed about family planning with their husbands and were aware of their husband's views on family planning (Table-IV and Table-V).

Table-IV: Showing the distribution of women who had discussion on family planning with their husband.

Responses	Total number	Unmet needs	Total
Yes	416 (84.05%)	79(15.95%)	495(100%)
No	104(68.4%)	48(31.6%)	152(100%)
ODDs ratio	2.43(1.59 to 3.69 at 95% CI)		

Table-V: Showing the distribution of women according to the views of their husband on family planning.

Responses	Total number	Unmet needs	Total
Approves	383 (83.4%)	76(16.6)	459(100%)
Disapproves	86 (71.07%)	35(28.93%)	121(100%)
Do not know	51 (75%)	16(25%)	67(100%)

Discussion

The present study had calculated the total unmet needs for family planning in Etawah district to be 24.4% which is similar to the value found by Andurkar SP et al (20.54%).⁽⁴⁾ However the rates are higher than the national average of 13.2%(NFHS-III) but its some was similar to the rate reported for Uttar Pradesh in NFHS –III (21.7%) but its lower than the rates reported in DLHF- III(33.7%). It was found in the present study that unmet needs for family planning

were more among residents of rural area (34.1%) than urban area (17.3%). This can be attributed to the fact that there are difficulties in accessing to the family planning services and that there are some misconception regarding the side effect of these contraceptive among the rural population. Similar views were also expressed by S Kumar et al⁽⁵⁾ in their study.

The highest percentage of unmet needs for family planning was noted in the age group 15-19 years (66.66%). Various researchers like Kumari C⁽⁶⁾ & Chandhick N et al⁽⁷⁾ also noted that the use of contraceptive measure was least among the similar age group. This can be due to the fact that the young couples do not have sufficient knowledge of various contraceptive methods available or they have fear of the side effects of the contraceptive methods. Also, it was noted in the study that Muslim population had least usage of contraceptive methods than any other religion and thus had maximum unmet need for family planning. Studies carried out in different parts of the country by various researchers like Diwedi SN et al⁽⁸⁾ also reported that the use of any contraceptive method is least among Muslims than any other religion. This is probably due to religious beliefs prevailing among Muslim community.

It was found in the present study that women with 4 or more living children are more susceptible for adoption of any contraceptive measures than any other women. A longitudinal study carried out in Central India by Roy TK et al⁽⁹⁾ also noted similar findings. Similarly women with the loss of 3-4 children are also prone to adopt any contraceptive measure. Roy TK et al⁽⁹⁾ found it to be a key factor for women intending to use any contraceptive methods.

The present study noted that women who had exposure to any form of mass media communications had less unmet needs of family planning than women who had no media exposure or very little media exposure (OR-2.0074, 95%, CI-1.27 to 3.169). Mass media plays a vital role in creating aware on various available contraceptive options available to a couple and in removing the misconception related to family planning services. Epidemiological studies carried out by Diwedi SN et al⁽⁸⁾ also found similar results.

The present study noted that women who had discussion with their husbands on family planning were more likely to use any contraceptive methods than women who did not discuss (OR-2.27, 95%, CI-1.46 to 3.58). K Yadav et al⁽¹⁰⁾ had also made similar observation in their study on rural

population in Ballabgarh. Similarly, it was noted in the present study that women whose husbands approved the use of contraceptive methods were having less unmet needs for family planning than women whose husbands disapproved or were unaware of their husband's view. This difference was statistically significant. This is again similar to the finding of K Yadav et al⁽¹⁰⁾.

Conclusion

The present study concluded that the percentage of unmet need for family planning is maximum in the young sexually active women below the age of 20 years that are residing in rural India. Family Planning measures should be specifically directed toward this group of women if India has to make any progress in controlling its population. The study also concludes that women who have completed their families are more susceptible to adoption of permanent contraceptive methods and this facility should be provided to them.

References

1. Kishore J. National Health Programs of India, 7th edition, Century Publication New Delhi; 2007: p93-197.
2. NFHS-3 National Report. Available on http://www.nfhsindia.org/nfhs3_national_report.shtml accessed on 23/10/2010.
3. DLHF Survey-3 Available on <http://www.rchiips.org/PRCH-3.html> accessed on 23/10/2010.
4. Andurkar SP, Yadav VB, Dalvi SD. Study of unmet need for family planning among married women of reproductive age in urban health central field practice area of Govt. Medical College, Aurangabad. *Indian J Public Health*. 2006; 50:45-6.
5. Kumar S, Priyadarshni A, Kant S, Anand K, Yadav BK. Attitude of women towards family planning methods and its use—study from a slum of Delhi. *Kathmandu Univ Med J (KUMJ)*. 2005 Jul-Sep;3(3):259-62.
6. Kumari C. Contraceptive practices of women living in rural areas of Bihar. *Br J Fam Plann*. 1998 ;24:75-7.
7. Chandhick N, Dhillon BS, Kambo I, Saxena NC. Contraceptive knowledge, practices and utilization of services in the rural areas of India (an ICMR task force study). *Indian J Med Sci*. 2003;57:303-10.
8. Dwivedi SN, Sundaram KR. Epidemiological models and related simulation results for understanding of contraceptive adoption in India. *Int J Epidemiol*. 2000 ;29:300-7.
9. Roy TK, Ram F, Nangia P, Saha U, Khan N. Can women's childbearing and contraceptive intentions predict contraceptive demand? Findings from a longitudinal study in Central India. *Int Fam Plan Perspect*. 2003;29:25-31
10. Yadav K, Singh B, Goswami K. Agreement and Concordance Regarding Reproductive Intentions and Contraception Between Husband and Wives in Rural Ballabgarh, India. *IJCM*, 2010;(1):p19-23

A Study on menstruation and menstrual hygiene among Pre-University girls in Davangere District, Karnataka

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Abstract

Background

Disturbances of menstruation, either actual or perceived, are the commonest presenting complaint in the adolescent age group. Though menstruation is a physiological process, this could be associated with certain conditions which need prompt diagnosis and management. If it is neglected it can pose a great problems. And unhygienic practices during menstruation can lead to untoward consequences like Pelvic inflammatory Diseases, Infertility Etc.

Objectives

1. To know the menstrual problems among Pre-University(PU) girls.
2. To know about the hygienic practices and level of menstrual hygiene among them

Methods

A cross sectional study was conducted in Pre-university colleges present in Davangere city. A total of 362 students were included, of which 114 students were from Government colleges and 248 students from private colleges. The sample selected is proportional to the total number of students in the colleges. Later the data was collected regarding the menstrual problems and their practices during menstruation with the help of prestructured proforma and analyzed.

Statistical analysis

Done by using SPSS 15.0. Chi square test.

Results

68% of them attained menarche by 12 years of age and the 97% of them with normal menstrual flow. About 97% of them complained of dysmenorrhoea and 80% of them

had taken treatment from doctors for the same. About 3% of them had abnormal white discharge. It is encouraging to know that about 60% of them used sanitary napkins during menstruation and knew the correct method of disposal.

Conclusion

In this study among PU girls, though they had experienced menstruation for about 4-5 years, their level of menstrual hygiene was not good. Realising the needs and interest to use sanitary pads, it should be made available to all segments of society by social marketing.

Key words

Menstruation, Menstrual hygiene, Adolescent girls.

Introduction

The WHO defines 'Adolescence' as the age group between 10-19 years, a time of transition from childhood to adulthood¹. The adolescent is subjected to profound biological, morphological and psychological changes which all lead to full maturity and eventual fertility.

Normally after going through pubertal changes, the girl menstruates between 10-16 years of age. Disturbances of menstruation, either actual or perceived, are the commonest presenting complaint in the adolescent age group. Though menstruation is a physiological process, this could be associated with certain conditions which need prompt diagnosis and management. If it is neglected it can pose a great problems. And unhygienic practices during menstruation can lead to untoward consequences like Pelvic inflammatory diseases, infertility, ectopic pregnancy, pregnancy wastage, low birth weight etc.

Menstrual hygiene and management is an issue that is insufficiently acknowledged and has not received adequate attention even in reproductive and preventive health programmes like RCH and more over they focus mainly on the reproductive functions of married women, and this may have its relationship with and impact on achieving many millennium development goals.

Against this background the present study was conducted among Pre-University girls to know about their menstrual hygienic practices and problems of menstruation.

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Material and methods

Type of study

Cross-sectional, Descriptive study.

Study design

Interview method using pre-structured questionnaire.

Study area

Pre-University colleges in Davangere District. Karnataka.

Study period

Dec 2007 to March 2008.

Sample size

362 girls who are studying in Pre-University college in Davangere city.

Selection of study subjects and methodology

The study was conducted in 6 PU colleges, among which 2 government and 4 are private colleges. Verbal Informed consent was taken from the girls who had agreed for participation in the study.

The information was collected from each student includes the demographic details, age at menarche, menstrual cycles, duration, amount of flow, problems during menstruation, care seeking behaviour for menstrual problems. Hygienic practices during menstruation was collected using pre-structured questionnaire.

Results

229(63.3%) of girls were in the age group of 16 yrs. 279(77%) of them from nuclear family. 148(40.8%) of girls were from middle class according to modified B.G.Prasad

Table 1: Demographic characteristics of study subjects.

Age	Number	Percentage
15	26	7.2
16	229	63.3
17	84	23.2
18	23	6.3
Type of family		
Nuclear	279	77
Joint	63	17.4
Extended family	20	5.6
Socio economic status		
Upper(I&II)	39	11
Middle(III)	148	40.8
Lower(IV&V)	175	48.2
Type of college/ Government Private	113249	31.268.8
Combination of subjects CommerceArtsSciences	13813391	38.136.725.2
Total	362	100

classification. 249(68.8%) were from private college and 133(31.2%) from government college. 38.1% and 36.7% are from commerce and arts respectively, 25.5% from science.

Mean age at menarche 11-12yrs of age in the study group. About 68.5% of them had the duration of cycle of 28-35 days. 97.8% had the duration of flow for 2-7 days. About 2.2% of them gave the history of passage of clots suggestive of menorrhagia. 96.4% of them complained the pain during menstruation. 79.6% of them took treatment from allopathic doctors for dysmenorrhea and 3.5% had taken self treatment. 13.4% did not take any assistance for dysmenorrhea.

It's encouraging to know that 60.5% used disposable sanitary napkin and remaining 39.5% used clean cloth as the absorbent material. Among 219 napkin users, 59.8% of them used to throw in public dust bin indiscriminately. About 3.3% of them had abnormal white discharge, which is large in quantity and 3 of them had itching and skin lesions in genital area. So it is important to emphasize on the genital hygiene and frequent change of pads during menstruation.

Discussion

In the present study, the mean age at menarche was 11-12 years, which is similar to the observation made in the studies made by many authors^{2,3,4,5}. Our observation was made among those who had experienced the menstruation for at least 4 years. Studies have shown that there was acceptance of menstruation as the girls grew and as they moved to higher studies.

Dysmenorrhea (96.4%) was the main complaint in them, which was the main cause for restriction of work, similar

Table 2: Distribution of girls according to age at menarche and menstrual cycle

Age	Number	Percentage
10	1	0.3
11	122	33.7
12	12.5	34.5
13	92	25.4
14	21	5.8
15	1	0.3
Duration (in days)		
< 20	3	0.8
21-28	99	27.3
28-35	248	68.5
> 35	12	3.4
Duration (in days)		
< 2	3	0.8
2-7	354	97.8
> 7	5	1.4
Absorbent material		
Clean cloth	143	39.5
Sanitary napkin	219	60.5
Total	362	100

Table 3: Distribution of girls according to the problems during menstruation

Passing clots in menstrual blood flow	Number	%
Present	8	2.2
Absent	354	97.8
Dysmenorrhea		
Present	349	96.4
Absent	13	3.6
Characteristic of white discharge		
White in colour	297	82.0
Scanty	48	13.3
Large quantity	12	3.3
Whitish to yellow in colour	2	0.5
Associated with itching	4	1.1
Associated with skin lesion	3	0.8
Total	362	100

to the study conducted by Andorch and Owen et al. Observed that 72.4% of them had dysmenorrhea^{7,8}. Durga P.M⁴ noted that only 20% of them had dysmenorrheal among rural girls. Here it indicates that the need for study to compare the dysmenorrheal among rural and urban girls.

In the present study, 79.65% of them took treatment from doctor. 13.4% of them took self medication. Chambar et al⁹ noted that 95.9% of them took analgesics and self medication was wide spread.

In our study 60.5% used sanitary napkin as the absorbent material and 24.6% of them used to dispose off indiscriminately in public garbage. They should be educated for the proper disposal of napkin after it is used. Only 13.6 of them knew the correct method of disposal.

In our study 12 girls had a abnormally large quantity of white discharge with foul smell and lesions over genitalia in 3 girls. Hence it is very important to teach them the genital hygiene, frequent change of napkins.

References

1. World health organization. The reproductive health of adolescence, Strategy for action. A joint WHO/UNFA/

Table 4: Distribution of girls according to care seeking behaviour in dysmenorrhea

Care seeking behaviour	Number	%
Doctor	278	79.6
Local traditional practitioner	12	3.5
Self medication	12	3.5
None	47	13.4

Table 5: Distribution of study group according to the method of disposal among napkin users.

Method of disposal	Number	%
Dust bin	131	59.8
Burn	30	13.6
Commode / lavatory	4	1.8
Throw it into public garbage	54	24.6
Total	219	100

- UNFPA/UNICEF statement. WHO Geneva. 1989:1p.
2. Desgupta A, Sarkar M. Menstrual hygiene, How hygienic is the adolescent girl. IJCM. April 2008;33(2):77-80
3. Gowri B, Raghavan S S, Rajaram P. Gynaecological problems in adolescent. Ind.J Obstet Gynecol, 1993;43(4):599-604.
4. Durga PM, Urmila Waredpanda. Impact assessment of health education in adolescent girls. Ind.J Obstet Gynecol. 1993;43(5):768-772.
5. Wills S, Melethy K, Pramila S. Menstrual and gynaecological disorders in 500 school girls in Madras city. Ind.J Obstet Gynecol;43(6):950-955.
6. Rama Rao A. A study on menstruation in adolescents. Journal of Indian medical association. 1963;40(1):15-19.
7. Bjorn A, Ian M. Dysmenorrhoea. Am J Obstet &Gynaecol. 1982;(144):655.
8. Patricia OPR. Dysmenorrhoea. Am J Obstet &Gynaecol. 1984;(148):96.
9. Chambers et al. Dysmenorrhea in adolescent. Pediatric Adolesc.Med 1997:15(5):449.

Prevalence of anaemia in pregnancy in Rural Western U.P : A prospective study

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Introduction

Anaemia is the most common nutritional deficiency disorder in the world. WHO has estimated that prevalence of anaemia in developed and developing countries in pregnant women is 14% and 51% respectively. In India it is 65-75%¹. About one third of global population are anaemic (2 billion)². Prevalence of anaemia in South Asian countries is among the highest in the world. WHO estimates that even among the South Asian countries, India has the highest prevalence of anaemia. What is even important is the fact that about half of the global maternal deaths due to anaemia that occur in South Asian countries, India contributes to about 80%³. Anaemia begins in childhood, worsens during adolescence in girls and gets aggravated during pregnancy. In India the prevalence of anaemia is high because of poor dietary intake especially iron and folic acid, poor bioavailability of iron in phytate and fiber rich iron in Indian diet, chronic blood loss due to infection such as malaria and Hookworm infestation.^{4,5}

Material and method

This is a prospective consecutive study conducted in the department of Obstetrics and Gynaecology at Saraswathi Institute of Medical Sciences, Hapur, Ghaziabad, India. This study was initiated only after taking permission from the institutional ethical committee. This study was conducted with the aim to know the prevalence of anaemia, type and causes of anaemia in pregnant patients of rural areas, correlation with patient's socio-economic status, and correlation with age, parity and gestation. This study was done from 1st dec 2009 to Mar 2010. All the antenatal patients coming in obstetric OPD were included in this study. Detailed clinical history and examination was done. Patients were sent for Haemoglobin estimation, peripheral smear examination and stool examination. Haemoglobin estimation was done by Cynemethaemoglobin method. Peripheral smear examination is another simple method for diagnosis of anaemia. Iron deficiency anaemia can be diagnosed by the presence of hypochromia (large central vacuoles) and microcytosis (small deformed cells) in peripheral blood smear film. In cases of megaloblastic anaemia there should be macrocytosis, hypersegmentation of neutrophils and fully haemoglobinised RBCs. In haemolytic anaemias there would be polychromatic stripped and target cells. Degree of anaemia was classified as mild (10—d"11 gm %), moderate (7-d"10 gm %) and

severe (<7gm %).

Causes of anaemia in pregnancy can be-

(A) Physiological

(B) Pathological- * Nutritional- Iron deficiency 60%, macrocytic

10%, Diamorphic 30%, Protein deficiency.

* Haemolytic- due to acute blood loss

* Haemorrhagic- due to chronic blood loss eg. Hookworm infestation.

Observations

In our study we included 250 patients who came in anti-natal clinic ranging from primigravida to gravida7. In our study, the maximum number of patients were in gravida3 or more followed by primigravida, gravida2. Maximum no. of patients came attended in our hospital were in second trimester followed by third trimester and first trimester. These patients were aged between 17- 36 years with the peak presentation at 20-30 years (Table1).

Table1: Distribution of patients according to gravida, trimester & age

GRAVIDA	No. of Patients	Percentage
Primigravida	84	33.6
Gravida 2	58	23.2
Gravida 3 or more	108	43.2
TRIMESTER		
I Trimester	20	8
II Trimester	173	69.2
III Trimester	57	22.8
AGE		
< 20 years	27	10.8
20-30 years	185	74
> 30 years	38	15.2

Maximum no. of patients were Hindus and with predominantly belonging to low socio-economic status (Table2).

The values of Hb were observed from 3.9gm% to 12.7gm% in all the 250 patients in our study. 235 patients were anaemic out of 250 at the time of booking (94%). In multigravida group, most of the patients were belonged to moderate anaemia(7-9.9gm%), followed by mild anaemia (10-10.9gm%). 6.4% of the total patients were severely anaemic(Hb <7gm%). In gravida2 patients maximum no. patients were moderately anaemic, followed

Table 2: Distribution of the patients according to religion and socio-economic status

RELEGIION	No. of patients	Percentage
Hindu	165	66
Muslim	80	32
Others	5	2
SOCIOECONOMIC STATUS		
Low	220	88
Middle	30	12
High		

by mildly anaemic. In primigravida maximum no. of patients were moderatly anaemic followed with mild anaemia. No patient was found severely anaemic in primigravida and gravida2 patients (Table3). Maximum number of patients belonged to moderated anaemia group in second trimester at the time of booking

Fig 1: Distribution of Haemoglobin of the patients according to Gravida

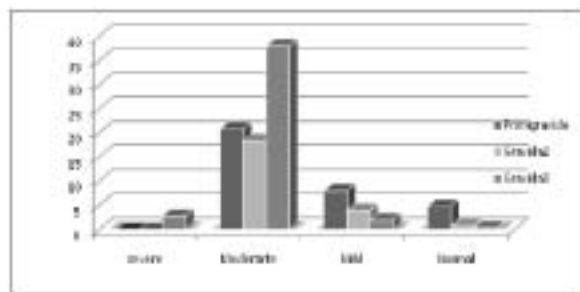


Table 3: Distribution of Haemoglobin of the patients according to Gravida

Degree of aneamia Gravida	No of . pts	% of pts	Severe Hb <7gm%	Moderate Hb 7-9.9 gm% (total %)	Mild Hb 10-10.9 gm% (total %)	Normal Hb >11gm% (total %)	p value
Primigravida	84	33.6	0	52(20.8%)	20(8%)	12(4.8%)	<.001
Gravida 2	58	23.2	0	46(18.4%)	10(4%)	2(0.8%)	>.05
Gravida 3 or more	108	43.2	7(2.8%)	95(38%)	5(2%)	1(0.4%)	<.05
Total	250	100	7(2.8%)	193(77.2%)	35(14%)	15(6%)	

$\chi^2=34.116$, D.F.= 4, $p < .001$ i.e. highly significant at 0.001.

Table 4: Estimation of Hb gm% according to trimester in primigravida (with percentage out of total 84 patients).

Trimester	Hb<7 gm%	Hb 7-9.9 gm%	Hb10-10.9gm%	Hb e"11 gm%
I trimester	Nil	1(1.19)	Nil	Nil
II trimester	Nil	44(52.38%)	20(23.81%)	8(9.52%)
III trimester	Nil	7(8.33%)	Nil	4(4.76%)

$\chi^2=7.339$, D.F. =2, $p < .05$ (significant)

Table 5: Estimation of Hb gm% according to trimester in Gravida 2 patients (with percentage out of total 58 patients)

Trimester	Hb<7	Hb 7-9.9 gm%	Hb10-10.9gm%	Hb e"11 gm%
I trimester	Nil	5(8.62%)	Nil	Nil
II trimester	Nil	31(55.17%)	8(13.79%)	2(3.45%)
III trimester	Nil	10(17.24%)	2(3.45%)	Nil

$\chi^2=1.765$, D.F. =2, $p > .05$ (not significant)

of primigravida patients.(Table 4)

Maximum number of patients were having moderate anaemia in second trimester at the time of booking of gravida2 patients.(Table 5).

Maximum no. of patient were in moderate anaemia in second trimester followed by third trimester at the time of booking in multigravida patients. 3.7% patients were severely anaemic in third trimester and 2.78% in second trimester (Table 6).

Maximum no of patients were in moderate anaemia in age group 20-30 years, followed by mild anaemia.(Table7).

80% patients were suffering from iron deficiency anaemia, 15% from dimorphic anaemia and 5.1% from anaemia due to chronic blood loss.(Table8).

Discussion

The prevalence of anaemia in pregnancy is 94% in this study was more than data observed in other studies, 65-75% in India.¹

WHO estimates that even among the South Asian countries, India has the highest prevalence of anaemia. Most of the anaemic patients, 14% in this study were of mildly anaemic variety where as 77.2% were moderately anaemic. Only 2.8% had severe anaemia only found in multigravida patients.

In India, prevalence of anaemia is high because of low dietary intake, poor iron and folic acid intake, poor bioavailability of iron in phytate and fiber rich Indian diet and chronic blood loss due to infection such as malaria Poor iron stores at birth⁶, low iron content of breast milk and low dietary iron intake through infancy and childhood

Table 6: Estimation of Hb gm% according to trimester in Gravida 3 patients (With percentage out of total 108 pts)

Trimester	Hb <7	Hb 7-9.9 gm%	Hb10-10.9gm%	Hb e"11 gm%
I trimester	Nil	10(9.26%)	3(2.78%)	1(0.93%)
II trimester	3(2.78)	55(50.93%)	2(1.85%)	Nil
III trimester	4(3.7)	30(27.8%)	Nil	Nil

$\chi^2=2.553$, D.F. =1, $p> .05$ (not significant)

Table7: Distribution of Hb in pregnant women according to age group out of total 250 patients and their percentage

Age	Hb<7 gm%	Hb 7-9.9 gm%	Hb10-10.9gm%	Hb e"11 gm%
< 20yrs	Nil	13(5.2%)	10(4%)	5(2%)
20-30yr	7(2.8%)	148(72%)	20(8%)	9(3.6%)
>30yrs	Nil	32(12.8%)	5(2%)	1(0.4%)

$\chi^2=22.836$, D.F. =4, $p<.001$ (highly significant)

Table 8: Distribution of the patients according to cause of anaemia out of total 250 patients

Cause of Anaemia	No. of patients	Percentage
Iron deficiency	160	80
Dimorphic	30	15
Chronic blood loss d/t Hook worms	10	5.1

results in high prevalence of anaemia in childhood.^{6,7} Anaemia gets aggravated by increased requirement during adolescence and pregnancy⁸. Assuming that the absorption of iron is 8% in pregnant women, there average dietary intake will meet only 30-45% of the requirement. Pica has been identified as a risk factor for anaemia in pregnancy⁹. Early marriage and adolescent pregnancy aggravates anaemia and results in poor iron stores in the off springs. It is obvious that there is an intergenerational self perpetuating vicious cycle of anaemia in Indian population. Iron deficiency is believed to be the most common cause of anaemia in pregnancy. In our study 80% cases are of iron deficiency anaemia and 15% dimorphic anaemia.

Screening of anaemia, treatment of anaemic women and availability of the food fortification (wheat flour with iron and folic acid, milk, sugar and salt with iron to build long term iron store remains the key to reduce anaemia. Even cooking in cast iron utensils improves the iron content in diet⁷.

Programmes for prevention and management of anaemia:-

India was the first developing country to take up a national programme to prevent anaemia among pregnant women and children. There were two major component of the anaemic prophylaxis programme, preschool children were to receive 20 mg elemental iron and 100 micro gm folic acid and pregnant women to receive 60mg elemental iron, 500 micro gm of folic acid. Of the two components the coverage under the component for children has always been very poor. The study conducted in 1989 by ICMR¹¹ indicated that coverage under the National Anaemia pregnancy programme was low and 60mg of ferrous sulphate was perhaps inadequate to treat anaemiaThe

programme was revised and remained as National Anaemia Control Programme (NACP). Women would get iron 100mg and folate 500 micro gm. And those with anaemia should get two tablets daily.

DLHS 2¹² also showed that there has been some improvement in percentage of pregnant women receiving IFA tablet. There has been significant reduction in percentage of women who received but did not consume the tablets. These data suggests that if all the pregnant women are screened for anaemia and provided accurate therapy, it might be possible to achieve substantial reduction in prevention of anaemia in pregnancy.

Conclusion

We conclude that the prevalence of anaemia at the time of booking is still high in India. The result suggested that anaemia predates the pregnancy in the majority of the cases. hence preconceptional care, including iron and folic acid supplementation is advocated to reduce this problem. During pregnancy efforts should be geared towards the early detection and treatment of anaemia before delivery.

References

1. Demayer EM, Tegman A. Prevalence of anaemia in the world. World Health Organ Qlty 1998; 38; 302-16.
2. WHO. 2004. Micronutrient deficiency anaemia: the challenge. Available from: <http://www.who.int/nut/ida.htm>, accessed on April 24, 2008.
3. Ezzati m, Lopus AD, Dogers A, Vander HS, Murray C. selected major risk factors and global and regional burden of disease. Lancet 2002; 360; 1347-60.
4. Toteja GS, Singh P. Micronutrient profile of Indian population. New Delhi: Indian Council of Medical Research; 2004.
5. National Nutrition Monitoring Bureau (NNMB). 2002.

NNMB Micronutrient survey. Hyderabad: National Institute of Nutrition.

6. Kilbridge J, Bakea TG, Parapia LA, Khoury SA, Shugaidef SW, Jerwood D. Anaemia during pregnancy as a risk factor for iron-deficiency anaemia in infancy: a case-control study in Jordan. *Int J Epidemiol* 1999; 28: 461-8.
7. Kapur D, Agarwal KN, Sharma S, Kela K, Kaur I. Iron status of children aged 9-36 months in an urban slum Integrated Children Development Services project in Delhi. *Indian Pediatr* 2002; 139: 136-44.
8. DLHS on RCH. Nutritional status of children and prevalence of anaemia among children, adolescent girls and pregnant women 2002-2004. Available from: http://www.rchindia.org/nr_india.htm 2006, accessed on September 24, 2008.
9. Adem, Khamis AH, Elbashir MI. Prevalence and risk factor for anaemia in pregnant women in eastern Sudan. *Trans R Soc Trop Med Hyg* 2005; 99: 739-743.
10. Prema Ramachandran, Anaemia in pregnancy. In: Ratnam SS, Bhasker Rao K, Arulkumaran S, editors. *Obstetrics and gynaecology for postgraduates*, Vol 1. Madras: Orient Longman; 1992. p.42-53.
11. ICMR Evaluation of National Anaemia Prophylaxis Programme. ICMR Task Force Study. New Delhi: Indian Council of Medical Research; 1989.
12. District Level Household Survey. Available from: http://www.rchindia.org/dlhs_india.htm; accessed on September 24, 2008.

Left rectus sternalis muscle – A Case Report

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Abstract

Sternalis muscle is an anatomical variation that is considered as dilemma for surgeons and radiologists, where as matter of interest for anatomists. Sternalis muscle is an occasional muscle which lies along side of the sternum. Existence of sternalis muscle its identification, location is important for confirming diagnosis, missing it completely are mistaking it for tumour in mammography.

Keywords

Sternalis muscle, muscular variant, breast surgery, mammography.

Introduction

Rectus sternalis is a flat ribbon shaped muscle that begins from lower part of the ribs & rectus sheath then courses upwards inserting into upper part of the sternum and ribs joins with sternocleidomastoid [1]. Turner named it first time in his book *Anatomes Elenchus Accuratissimus* published in 1604 and identified by Du Puy precisely in 1726[2]. According to Gray's Anatomy it is derivative of pectoralis major. It is derivative of rectus column of muscles as per Larsen's Embryology which are present in lower animals ; can be occasionally detected in man in greatly reduced condition.

Various names have been coined for these muscles like

1. Sternalis
2. Musculus Sternalis
3. Epi Sternalis
4. Pre Sternalis
5. Sternalis Brutorum
6. Rectus Thoracis
7. Rectus Sternalis Japonicus Thoracicus[3]

Various authors have classified sternalis muscle under four categories regarding structure it has been derived[2,4].

1. Pectoralis major
2. Rectus abdomines
3. Sternocleidomastoid
4. Panculus carnosus

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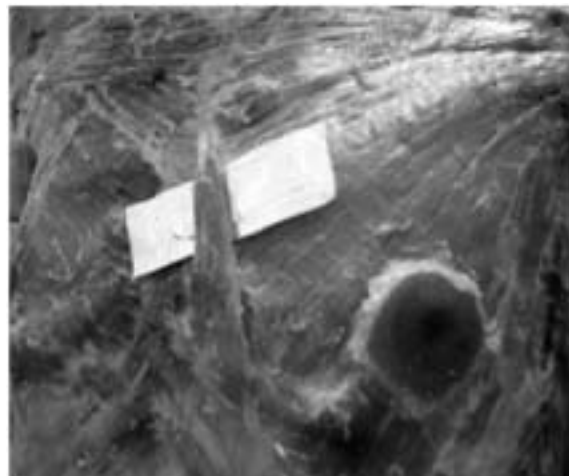
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It is an unusual anatomical variant , could present challenge to radiologists and surgeons to establish the diagnosis.

Case report

During routine dissection for first MBBS students in the department of anatomy, left rectus sternalis muscle had been noticed in 65 years old male cadaver. It was located at left hemithorax and located anteriorly obliquely to pectoralis major lateral side of the sternum. caudally it is attached to 5&6 ribs then it merged with sternocleidomastoid muscle. Its caudal end blends with external oblique aponeurosis and fascia covering pectoralis major. A small twig of Nerve was seen piercing the muscle in deeper aspect could not be traced , located parasternally indicates they are derived from intercostal nerves from 4th&5th intercostal spaces[Fig.1&2].

Fig.1: Left rectus sternalis muscle



Discussion

This muscle variation reported in 3-5% population. It is classified with pectoral group of muscles [2]. According to Baily et al. it is unilateral less common in men(6.4%)than women(8.7%). 2.96% in Bulgarians, 7.1% in Africans, 17.3% in Chinese[3]. According to O'Neil & J-Folan –Crran 55% of sternalis muscle innervated by internal or external thoracic nerves. 43% by branches of intercostal nerves and 2%by both[1]. Sternalis is a slender muscle looks like a band of fibers running parallel to the sternum and it lies superficial to pectoral fascia. Several reports are available about this

Fig. 2: Diagrammatic representation



attachment. It is attached caudally to cartilages of lower ribs & rectus abdominis. In number of cases with external oblique muscle to costal cartilages of 6th rib [Turner]. Takes extra slips from 3rd 4th and 5th costal cartilages and also anterior aspect of the sternum. Cranially it terminates into pectoralis fascia, sternal body, costal cartilages or sternal head of sternocleidomastoid. Nerve supply of the sternalis is variable. It is innervated through inter costal nerves or by pectoral nerves. Variability of its nerve supply appears to indicate that muscle is not constantly derived from same source. In our case sternalis is innervated by 4th & 5th intercostal nerves [3]. It occasionally has tendinous

intersections, when developed platysma co-exists [2]. Natsis & Totlis described it has a little functional significance or it may function as proprioceptor sensing and signaling the movements of thoracic wall.

Ruge anticipated that sternalis is vestige of circular muscle of mammals. Clement described it to be misplaced pectoralis major. Musculus sternalis is rare anatomical variation of chest wall may be included in breast tissue. It can be easily identified as use of CT & MRI. Early identification of rectus sternalis muscle is necessary to proceed in appropriate plane during surgical dissection in breast surgery.

References

1. Raghu Jetty et al. Right sternalis muscle. International Journal of Anatomical Variations. 2009; 2: 41-42.
2. Kumar MR Bhat, Bhagath Kumar Potu, and Siddaraju Gowda. Sternalis muscle revisited in South Indian male cadaver: A case report. Cases J. 2009; 2: 6318.
3. Walid Abbas Zaher, Hasem Hasan Darwish, Ahmed Magzoub Elhag Abdalla, Muhammad Saeed Vohra, Muhammad Mujahid Khan. Sternalis: A clinically important variation. volume 25. Pakistani Journal of Medical Sciences 25 April - June 2009 (part-1) number 2: 325-328.
4. Novakov SS, et al. Sternalis muscle a riddle still awaits an answer short communication. Folia Med. (ploudiv) 2008; April-June, 50(2):63-6.
5. Deepali U. Kulkarni and Umesh K. Kulkarni. Unilateral rectus sternalis muscle - A case report. Al. Amen J. Med. Sci. 2010; 3(2):169-171.
6. Levent saricioglu et al. Three sternalis muscle associated with abnormal attachments of pectoralis major muscle. Turkish Society of Anatomy and Clinical Anatomy. 2008; 2:67-71.

Tuberculosis of intercostal lymphnode

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Abstract

Tuberculosis is most common disease of the world mainly in developing countries with male predominance. Though tuberculosis is common in lungs but can also present as extra-pulmonary disease. It can occur in lymphnodes, intestine, mammary glands, spine etc. The occurrence of isolated tuberculosis in intercostal lymphnode is very rare and that too along the anterior axillary line. The tuberculosis of parasternal and posterior-axillary line lymphnode have been documented.

In our study both patients were females had swelling along the anterior axillary line. The fine needle aspiration cytology in both cases revealed as reactive lymphadenitis. The blood investigations and chest X-ray were normal in both cases.

Clinically both patients were diagnosed as inflammatory lymphadenopathy. The histopathological examination revealed as caseating granulomatous lesion. Serum examination confirmed the diagnosis in both cases.

Keywords

Tuberculosis; Intercostal lymphnode;

Introduction

Tuberculosis is one of the most common disease in the world with high incidence in developing countries. Two billion people are infected with tuberculosis in the world. India is worst affected country, more than 40% of population are infected. 15million people suffer from tuberculosis. Half million die every year ie one every minute[1].

Pulmonary tuberculosis is most common presentation. It can also present as extra-pulmonary disease in lymphnode, intestine breast, spine accounting about 10-20% of tuberculous cases[2].

The cervical group of lymphnodes are commonly involved. The involvement of intercostal lymphnode is very rare and is an unusual presentation[3]. An absolute contraindication for lymphnode biopsy is if the etiology is clear and if the lymphadenopathy is expected to improve

with no further management[4].

If the lymphnode is necrotic in a patient aged 35, without a known primary neoplasm, a diagnosis of tuberculosis can almost certainly be made[5]. The FNAC and biopsy play major role in the diagnosis[6].

Case report 1

A female patient aged 40years presented with a swelling in the right chest wall since 2 months. There was dull aching pain in the swelling, low grade fever and loss of appetite. No history of similar swelling anywhere over the body. The patient was on long term steroids for chronic hypotension.

On examination single swelling in the right 5th intercostal space along anterior axillary line measuring 1x2cms, firm, non tender, mobile. Both breasts and axillae were normal clinically(fig1).

The fine needle aspiration cytology revealed non-specific reactive lymphadenitis(fig2). The swelling was excised completely(fig3) and sent for histopathological examination which revealed as caseating granulomatous lesion(fig4). The ultrasonography of abdomen showed right basal atelectasis with minimal pelvic ascites(fig5). Post-operative scar seen(fig6). The ELISA confirmed the diagnosis with IgA 1.31 OD RATIO(>1.10 od ratio is positive).

Case report 2

A female patient aged 25years presented with swelling in the right chest wall since 2months. On examination single swelling present in the same site as that of case one measuring 1.5x 2cms, firm, non tender, mobile. Both breasts and axillae were normal clinically. The blood investigation showed HIV positive and chest X-ray was normal. The FNAC revealed as non-specific reactive lymphadenitis. Patient was on antibiotics for 2weeks, no change in the swelling. The excision biopsy done and HPE revealed as caseating granulomatous lesion. ELISA confirmed the diagnosis with IgA 1.40 OD RATIO. Post-operatively both patients are on anti-tubercular drugs since 3months.

Discussion

Tuberculosis is one of the most common disease of the world affecting mainly developing countries. 3million people will die due to this disease every year(1). Though it

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is common in the lungs can also present as extra-pulmonary disease in lymphnode, intestine, spine etc[2]. The intercostal lymphnode swelling is usually seen in 4th, 5th and 6th spaces in parasternal and posterior chest wall areas[3]. Lymphnode upto 1cm size can be considered normal except in epitrochlear node upto 0.5cm and inguinal upto 1.5cms are normal[4].

The parasternal lymphnodes lie along the internal mammary vessels, receive lymphatics from anterior diaphragm, antero-superior part of liver, medial part of breasts, deeper structures of anterior chest wall. The posterior nodes are located near head and neck of posterior ribs, receive lymphatics from postero-lateral breast, parietal pleura, vertebrae and spinal muscles[4,7]. Tuberculosis of intercostal lymphnode alone is unusual and that too along the anterior axillary line. 15 cases have been documented to have tuberculosis of intercostal lymphnodes ie parasternal and posterior groups over period of 6years and paravertebral lymphnode tuberculosis is documented[8].

Tuberculosis is caused by Mycobacterium Tuberculosis. It is capable of causing infections throughout the body. This bacterium is found throughout world and is difficult to treat. It triggers an immune response of the body initially. This is called primary infection and often does not cause symptoms. A few organisms will remain dormant, became active years later is called as reactivation. The factors which weaken the immune system are chemotherapy, HIV infection, long term steroids.

On an average a normal person infected with tuberculosis has 10% chance of developing reactivation of the disease during their lifetime. HIV patient have risk of 7% per year. Risk factors: contact with tubercular patient, decreased immune system- HIV, on CT and prolonged steroid use. Having chronic illness like DM, older people, working in health care field. The preferred investigations are ELISA, AFB stain or smear but in some cases AFB stain may not show anything[6]. Culture for growth of organisms needs 6-8weeks. The other tests are PCR, BACTEC, RFLP.

Conclusion

The extra-pulmonary tuberculosis can occur alone or in combination with pulmonary variety, is usually confined to single site. In our study one patient was on longterm steroids and other patient was HIV positive. And both were females. Tuberculosis of intercostal lymphnode to be considered if there is swelling in the chest wall without pulmonary tuberculosis. The HPE and Serum test will play role in confirmation of the diagnosis. Earlier the diagnosis better the prognosis. For a definitive diagnosis of tuberculosis, culture the mycobacteria is essential and many of affected sites may require an invasive procedure to get a biological sample to reach a diagnosis. Tuberculosis of anterior axillary line intercostal lymphnodes has not been documented so far.

References

1. The Indian journal of Tuberculosis: Extra-Pulmonary Tuberculosis coming out of the shadow: Indian J Tuberc (2004):51:189-190.
2. Dr. Prasoos Diagnostic Centre(2003): Tuberculosis of the Intercostal Lymphnode; Acta Cytol Jan-Feb Vol. 47, pp 51-55 PMID: 12585031.
3. Rajwanshi A, Bhambhani, Das DK(1987): FNAC diagnosis of Tuberculosis: Diagn. Cytopathol Mar;3 (1); 13-16. PMID: 3568967.
4. Subramanian S, Mazumder PR, Vijaya S, Jain RC(1974): Tuberculosis of the Intercostal Lymphnodes: An unusual presentation: Tubercle Jan;55(2): 163-166. PMID:4470838.
5. Jankharia Imaging(2004) Chest- Subcarinal Lymphnode Biopsy; Innar Spaces Aug: Vol 2; No 1.
6. Kenneth William Gow(2008): Lymphnode Disorders; eMedicine, Dept of Surgery, University of Washington.
7. Kole W(1954): Tuberculosis of Paravertebral and Intercostal Lymphnode; Apr.17; 104(16): 323-326. PMID: 13169846.
8. Anathnaryan and Paniker's Textbook of Microbiology (2005): Incidence of Tuberculosis 7th edn. Page;356.

School teachers as facilitators in road safety education

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Abstract

Background

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

Methods

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

Results

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

Conclusion

Teachers can play a pivotal role in providing road safety measures to school children because of their proximity to school children. There is a need to explore the possibilities

of including road safety measures to be followed by school children through school curricula.

Keywords

Knowledge, Facilitator, Road safety, School teachers, Children

Introduction

Health habits created in childhood, especially the school going age, pass on to the succeeding phases of life and even to the next generation. Health promoting schools are a successful mode of promoting the health of children internationally.⁽¹⁾ Road traffic accidents are a major public health issue throughout the world. Globally, people killed in road traffic accidents each year is estimated to be nearly 1.2 million, whereas the number injured could be far above 50 million. By 2020, the deaths are expected to increase by as much as 80% in low and middle income countries. Majority of such deaths currently occur among the vulnerable road users - pedestrians, pedal cyclists and motor cyclists. According to the WHO global burden of disease project (2002), road traffic injuries account for the leading cause of deaths among the age group of 0-4 years.⁽²⁾

Child trauma is a major world wide problem. Children are especially vulnerable as their physical and cognitive skills are not fully developed and their smaller stature makes it hard for the rider to see and to be seen.⁽²⁾ Road traffic accident is a leading cause of injury and trauma to children. In low income and middle income countries, child deaths and injuries are rising as the number of vehicles increases. According to WHO estimates (2002), 1,80,500 children were killed as the result of road crashes. 97% of these child road deaths occurred in low and middle income countries.⁽²⁾

Global burden of disease by WHO reported that fatal road-traffic injury rates per 1,00,000 among boys in the age group of 5- 9 is 13.3 and 10-14 years is 8.7. Among girls it is 9.3 and 4.5 respectively.⁽³⁾ A report from UNICEF showing the annual number of deaths from injuries among 1 to 14 year old children during 1991-95, expressed ranges from 5.1 to 25.6 per 1,00,000 children. The annual deaths among children aged 1 to 14 years, caused by transport accidents during 1991-95 ranged from 2.5 per 100,000 in Sweden to 12.6 per 100,000 in Korea.⁽⁴⁾ Data on road accident deaths in India (1980-2007) shows a steady increase over years.⁽⁵⁾ A retrospective study by Bener et al at among children in

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the age group of 0-14 years in United Arab Emirates observed that during the period 1980 – 1995, 301 children died due to accidents. Among these children about 70% were males and the most common cause of accidental death was road traffic accident. The most common cause of trauma in 5-9 years old was road traffic accident. Almost 33% of trauma in 10-14 years old was also due to road traffic accident. They concluded that road traffic accidents mainly occurred in children over 10 years.⁽⁶⁾

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

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

Methods

This school based cross sectional study was carried out in the northern part of Kerala, India. Kerala has 3.44% of India's population, and 819 persons per square kilometer (three times as densely settled as the rest of India). However, Kerala's population growth rate is far lower than the national average. As per 2001 census, Kerala has a population of 3,18,41,374. Kerala's people are most densely settled in the coastal region, leaving the eastern hills and mountains comparatively sparsely populated. Northern part of Kerala includes the northern half of the state of Kerala and some coastal regions. The religion wise distribution of this area shows Hindu predominance, but the majority of Kerala's Muslim population also lives in this area, as well as a sizable ancient Christian population.⁽⁸⁾ The districts in northern Kerala included were Kasaragod, Kannur, Kozhikode, Wayanad and Malappuram.⁽⁹⁾ Primary Education in Kerala consists of two levels, lower primary (Grade I - IV) and Upper Primary (Grade V to VII). There are around 6,726 lower primary and 2,968 upper primary schools. Among primary schools, 61.07% are private aided (partially supported by Government), 2.98% are private unaided and 35.95% are government schools. A total of 2,580 secondary schools (Grade VIII to X) are functioning in Kerala. These include 975 (37.67%) Government schools, 1,400 (54.1%) private aided schools and 213 (8.23%) private

unaided schools. There are 931 higher secondary schools (Grade XI to XII) of which 417 are in government sector, 506 in private aided sector and 8 in private unaided sector.⁽¹⁰⁾

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

Results

Socio-demographic characteristics of the respondents

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

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

details are given in Table-1.

Table I : Socio-demographic Characteristics of the respondents

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

Extent of participation of teachers in health related activities

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

Willingness to impart knowledge about Road Safety measures to school children

Of the total, 152 (76%) of the respondents were willing to impart knowledge on road safety measures to school children. Among participants, 71.4% between 20-29 years, 76.7% between 30-39 years, 73.6% in the age group of 50 years and above expressed their willingness to impart knowledge about road safety measures to school children. No significant statistical association was found for age and willingness to impart knowledge on road safety measures to school children. Of the total (73) male participants, 84.9% willing to impart knowledge on road safety measures to school children. However, among female participants 70.9% willing to take part in creating awareness on road safety measures to school children. A statistically significant association was observed between gender and willingness to impart knowledge on road safety measures to school children ($p < 0.02$). Among 162

participants who were married, 122 (75.3%) willing to impart knowledge on road safety measures to school children and among 38 unmarried, 78.9% were willing to take part in creating awareness on road safety measures to school children. No significant association was observed for marital status and willingness to impart knowledge on road safety measures to school children. With regard to educational attainment of participants and their enthusiasm to impart knowledge on road safety measures to school children, 70.8% of under graduates, 78.7% of graduates and 76.2% of post graduates were willing to provide education on road safety measures to school children. The association between education and willingness to take part in imparting knowledge on road safety measures was not statistically significant. Of the participants who commute more than or equal to 20 kilometers daily to reach school, 33 (70.2%) were willing to take part in creating awareness on road safety measures to school children. Among 153 participants who commute less than 20 kilometers daily, 119 (77.8%) expressed their willingness to impart knowledge on road safety measures to school children. No statistically significant association was observed for distance commuted daily and willingness to impart knowledge on road safety measures. The details are given in Table-2.

Willingness to impart knowledge on road safety measures to children and their previous experience in health related activities, showed a statistically significant association ($p < 0.001$). Of the 97 teachers who had previous experience in participation in health related activities, 86 (88.7%) were willing to impart knowledge on road safety measures to school children and among those without previous experience in health related activities, 66 (64.1%) were willing to participate in creating awareness on road safety measures to school children. Of the participants, 35 had their own vehicle and among them 31 (88.6%) were willing to impart knowledge on road safety measures. However, 165 participants did not have any personal vehicle and among them 121 (73.3%) expressed their willingness in providing road safety measures to school children. The association was found to be statistically significant ($p < 0.05$). Half of the participants opined that they follow traffic/road safety measures and among them 80% expressed their enthusiasm in providing knowledge on road safety measures to school children compared to those who do not follow traffic/road safety measures. The association was not statistically significant. Among 44 participants who had experienced road traffic accident in their life time, 81.8% expressed their willingness in teaching school children about road safety measures than those who did not experience road traffic accident in their life time. The association was not statistically significant. Of the total participants, 26 opined that helmet is not required as a part of road safety measures and among them 57.7% were willing to impart knowledge on road safety measures to school children. The association was not statistically significant. In the present study, 55 participants

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

Variable	Group	Willing to impart knowledge on Road safety measures		p value
		Yes Number (Percentage)	NoNumber (Percentage)	
Gender	Male	62 (84.9)	11(15.1)	NS
	Female	90 (70.9)	37 (29.1)	
Age group(in years)	20-29	20 (71.4)	8 (28.6)	NS
	30-39	56 (76.7)	17 (23.3)	
	40-49	53 (73.6)	19 (26.4)	
	50 and above	23 (85.2)	4 (14.8)	
Educational attainment	Below graduate	34 (70.8)	14 (29.2)	NS
	Graduate	70 (78.7)	19 (21.3)	
	Above graduate	48 (76.2)	15 (23.8)	
Marital status	Married	122 (75.3)	40 (24.7)	NS
	Unmarried	30 (78.9)	8 (21.1)	
Distance traveled to reach school	Less than 20 kilometers	119 (77.8)	34 (22.2)	NS
	More than 20 kilometers	33 (70.2)	14 (29.8)	
Mode of Conveyance used to commute	Walk	40 (81.6)	9 (18.4)	NS
	Bus	98 (73.7)	35 (26.3)	
	Bike	14 (77.8)	4 (22.2)	

opined that the seat belt is not necessary while driving and among them 56.4% expressed their interest in imparting knowledge on road safety measures to school children. 145 participants felt that seat belt is necessary and among them 83.4% were willing to take part in creating awareness on road safety measures to school children. A statistically significant association was observed between attitude towards seat belt use and willingness to impart knowledge on road safety measures to school children ($p < 0.001$). Those with positive attitude regarding seat belt use had higher chance of imparting knowledge compared to those with negative attitude. It was observed that 54 participants had previous experience in creating awareness on road safety measures to school children and among them 90.7% expressed their willingness to impart knowledge on road safety measures to school children compared to 70.5% of those without any previous experience in imparting road safety measures to school children. The association was found to be statistically significant for previous experience in imparting knowledge on road safety measures to school children and willingness to impart knowledge on road safety to school children ($p < 0.003$). A statistically significant association was observed between opinion of teachers about the need for imparting knowledge on road safety measures to school children and willingness in providing knowledge on road safety measures to school children ($p < 0.001$). 185 participants opined that there is a need in creating awareness on road safety measures to school children and among them 147 (79.5%) expressed their willingness in providing knowledge on road safety

measures to school children. 15 participants had the opinion that education about road safety measures is not needed in schools. However, among them 5 (33.3%) were willing to impart knowledge on road safety measures to school children. The details are given in Table-3

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

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

Discussion

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

A study conducted in Zimbabwe included secondary school teachers and headmasters for eliciting their opinion on implementation of AIDS prevention education programs in the school setting. 95.2% supported implementing AIDS prevention programs in the school setting.⁽¹²⁾ Another study in South Africa to investigate the knowledge of grade 3 and 4 school teachers on HIV/AIDS and their opinion on educating their pupils about HIV prevention suggests that, school teachers would need to be adequately trained prior to their involvement in HIV/AIDS education to pupils.⁽¹³⁾ In the present study, we tried to assess the scope and extent of participation of teachers

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

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

in imparting knowledge on road safety measures to their students. This study observed that, about 75% teachers had a positive attitude towards educating their students on road safety measures. Those who are having a positive attitude towards creating awareness among school children on health related issues also favoured educating the school children on road safety measures. A postal survey conducted in North Staffordshire reported majority of their participants agreed that prevention of road traffic accidents is an important topic to be taught to children in schools as a method of accident prevention and a small percentage of participants revealed that they had adequate training on accident prevention.⁽¹⁴⁾

Conclusion

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

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

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Competing interests

None declared

Ethical approval

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

References

1. Mukoma W, Flisher AJ. Evaluations of health promoting schools: A review of nine studies. *Health Promot. Int.* 2004; 19: 357- 68.
2. Peden M, Scurfield R, Sleet D et al. eds. *World report on road traffic injury prevention*, Geneva: World Health Organization, 2004.
3. World Health Organization, *Global Burden of Disease: 2004 update*. Switzerland, 2008. [online]. Available at : http://www.who.int/healthinfo/global_burden_disease/GBD_report_2004_update_full.pdf, Accessed 3 March 2010)

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

Histopathological study of cutaneous granuloma

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Abstract

Background

Granulomatous dermatoses frequently present a diagnostic challenge to both pathologist and dermatologist. In order to treat these lesion, definitive diagnosis by demonstration of the etiological agent is essential, which will bear an impact on patient management and outcome.

Objective

The aim was to study the morphology and find the etiology of all the granulomatous lesions on histopathologically evaluated biopsies of the skin and subcutaneous tissue.

Materials and methods

Two year prospective study was done in KIMS; Hubli. The biopsies of the cases diagnosed as granuloma on H&E stained sections were selected. Special stains like Ziehl-Neelsen stain, Gomori's Methenamine silver, and Fite faraco were done wherever required.

Results

Total of 53 granulomatous lesions were studied. Granulomas with different morphology and etiology were seen. The most common morphological type of granuloma seen was tuberculoid granuloma with 20 cases followed by histiocytic granuloma with 14 cases, foreign body granuloma with 09 cases, suppurative granuloma with 08 cases and necrobiotic granuloma 02 cases.

Commonest etiology of granuloma was leprosy with 30 cases followed by foreign body granuloma, granulomas of fungal etiology, and granulomas of tuberculous etiology, actinomycosis and the granulomas of unknown etiology.

Conclusion

An attempt has to be made to put these granulomas into

specific etiological and morphologic category for specific treatment. Granulomatous lesion of skin was most common lesion in males. Commonest type of granuloma was tuberculoid and the most common etiological subtype was borderline tuberculoid leprosy. Morphology of lesion and use of special stain helped us to diagnose with specific etiology for 51 out of 53 cases.

Keywords

Granulomas, leprosy, fungal.

Introduction

Granulomatous inflammation defines a pattern of reaction to a wide range of etiologic agents, organic and inorganic with certain morphologic correlates.¹ Granuloma is "a focal chronic inflammatory response to tissue injury evoked by a poorly soluble substance characterized by the accumulation and proliferation of leukocytes, principally of the mononuclear type"¹

Fully developed granulomas with sheets of epithelioid histiocytes and giant cells are easily recognized, but more subtle lesions containing a few epithelioid histiocytes still qualify as granulomatous.²

The provocative agents of granulomatous inflammation appear to be non-degradable, by both neutrophils and non-active macrophages. The actions of polymorphonuclear leucocytes, non-activated macrophages and chemical mediators associated with tissue injury are insufficient to completely digest and eradicate the offending agent.

Required for such degradation are the action of transformed macrophages formed with the help of CD4+T cells. CD4+T cells secrete various mediators such as IL2, IF γ , TNF and lymphotoxin for the transformation of macrophage into epithelioid cells and giant cells, which are the component of granuloma.³

Granulomatous dermatoses frequently presents a diagnostic challenge. An identical histologic pattern may be produced by several causes, and conversely a single cause may produce several histologic patterns.⁴ Good clinical history, close histological examination and clinico-pathological correlation are essential in making a final diagnosis.⁵

By combining all the available information, one should be able to arrive at a reasonable differential diagnosis on which to proceed. However in minority of cases, it will not

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be possible to make a definitive diagnosis, even with all clinical information available.

A rational histological diagnostic approach to granulomatous inflammation is also not without its problems. Special stains may also be required to reach a diagnosis. In a small percentage of cases no definitive diagnosis can be given other than that of granulomatous inflammation.⁵

Histological types of granuloma are:

1. Tuberculoid
2. Histiocytic
3. Necrobiotic
4. Suppurative
5. Foreign body.

The frequency and types of different granulomatous lesions vary according to geographical locations.⁶

Classification based on etiology:

1. Bacterial
2. Metal induced
3. Fungal
4. Viral / Chlamydial
 - a) Cat scratch fever
 - b) Lymphogranuloma venerium
5. Helminthic
6. Foreign body type
7. Unknown cause.⁷

However, no comparative study, to our knowledge, has been carried out to determine the frequency and types of different granulomatous lesions of skin in India, hence this study.

Materials and methods

This study was undertaken from October 2004 to April 2006 in the department of pathology, Karnataka institute of medical sciences, Hubli.

Histopathological study of 53 granulomatous lesions of skin were done. The biopsies were received from skin departments of KIMS hospital Hubli and few from other hospitals in and around Hubli.

The biopsies of the cases diagnosed as granuloma on Haemotoxyline and eosin stained sections were selected. Special stains like ZN, GMS, PAS, Fite Faraco stain were used when required.

The relevant clinical findings and lab investigation details were collected by personal interview and examination of the patient, or from hospital case sheets.

Results

Total cases showing granulomatous inflammation during study period were 53 cases. Out of 53 cases, 33 cases were male and 20 cases were females. Ages of 53 patients ranged from 2 to 65 years. Maximum numbers of patients were found to be in 2nd decade.

- Out of a total 53 cases, 26cases(49.05%)showed tuberculoid granulomas,08 cases(15.1%)showed histiocytic granulomas,09cases(17%)showed foreign

Table 1: Age and sex distribution of the patients.

Age Groups (years)	Male	Female	Total (%)
0-10	1	5	6
11-20	4	3	7
21-30	11	3	14
31-40	9	3	12
41-50	6	4	10
51-60	1	1	2
61-70	1	1	1
Total	33	20	53

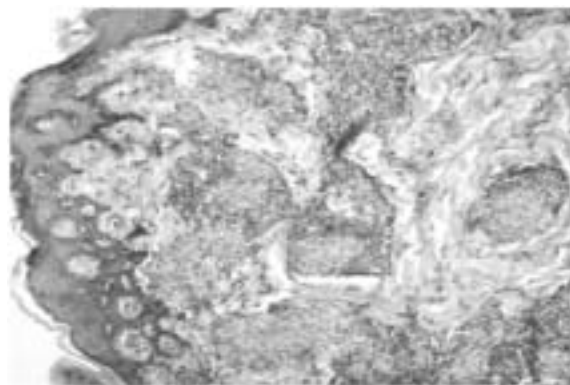
Table 2: Morphological type of granuloma.

Type of Granuloma	Number	%
tuberculoid	26	49.05
histiocytic	08	15.1
Foreignbody	09	17.00
sarcoidal	-	-
suppurative	08	15.1
necrobiotic	02	3.77

body granuloma, 8 (15.1%)showed suppurative, 2(3.77%) showed necrobiotic granuloma.

- Out of 26 cases of tuberculoid granulomas 11 were borderline tuberculoid leprosy, 06 cases were indeterminate leprosy, 05 cases were tuberculoid leprosy and 04 cases were lupus vulgaris.
- Out of 09 cases of foreign body granuloma, 06 cases were xanthoma, 02 cases were epidermal cyst with granuloma, 01 case were Squamous cell carcinoma with granuloma. In foreign body granuloma, foreign body was seen within the giant cells.

Fig 1: Epithelioid cell granulomas in tuberculoid leprosy (H&E,×40).



- Out of 08 cases of histiocytic granuloma 04 cases were lepromatous leprosy, 02 cases were borderline lepromatous leprosy, and 02 cases were histioid leprosy.
- Out of 08 cases of suppurative granuloma, 02 cases were actinomycosis, 03 cases were maduramycosis, 02 cases were of pseudallescheria boydii infection, and

Fig 2: Histiocytic granulomas in lepromatous leprosy (H&E, ×40).

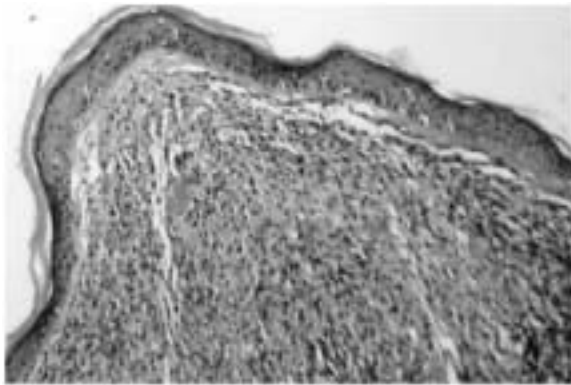


Fig 3: Mixed inflammatory granuloma with actinomycotic colonies. (H&E,)

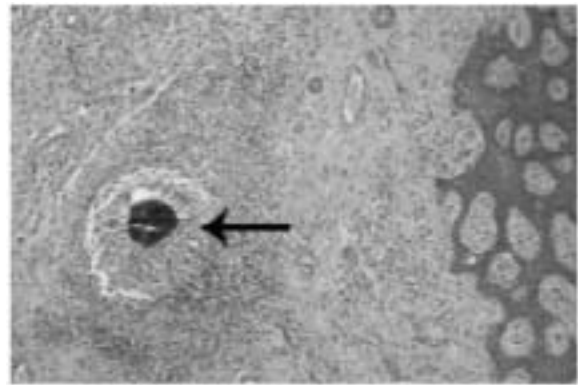


Fig 4: Oval brownish granule in maduramycosis (H&E, ×40).

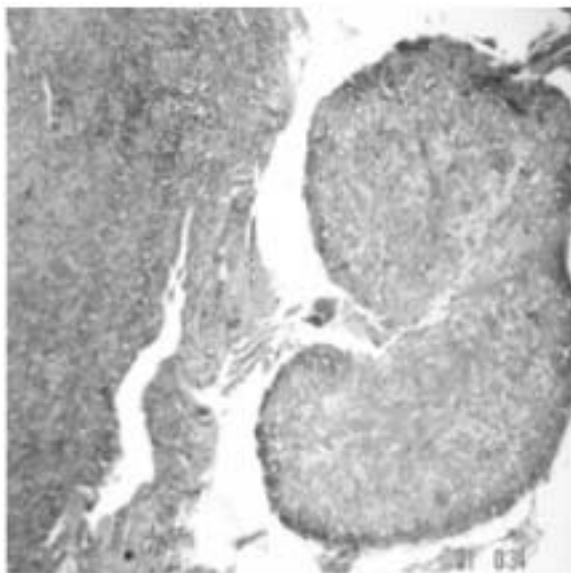


Fig 5: Mixed inflammatory granuloma in P.boydi (H&E , ×100).

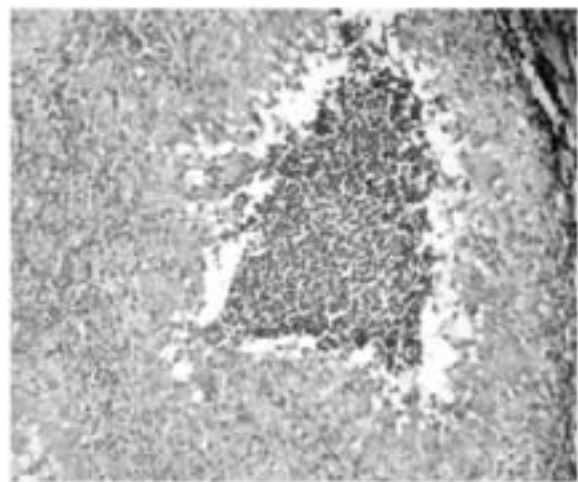
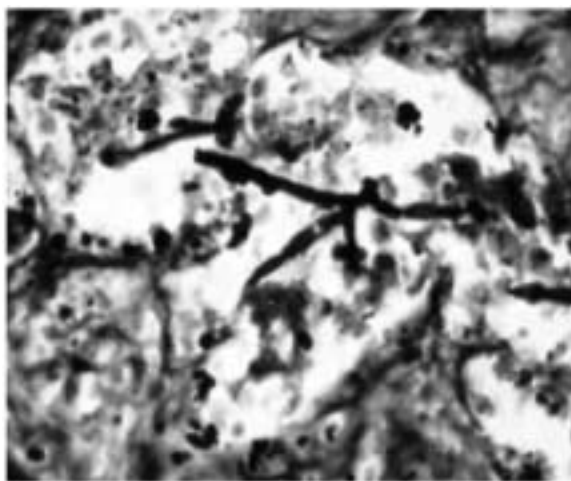


Fig 6: P.boydii showing obtuse angle branching and beaded hyphae (GMS , ×100).



- 01 case was of histoplasmosis
- Actinomycosis were confirmed by grams stain and other fungal lesions were confirmed by GMS stain.
- Two cases of necrobiotic granuloma were granuloma annulare in etiology and both the cases were diagnosed on clinical history.

Discussion

Granulomatous inflammation was recognized as a distinct entity in the early nineteenth century and has been of continuing interest since then. Granulomatous inflammation forms a common and intriguing problem. Arrival at a proper diagnosis is mandatory so that appropriate treatment can be delivered to the patient. Histopathology remains a time-tested tool for establishing a correct diagnosis, like in many other diseases pertaining to various organ systems of the body.⁶ A large number of individual studies on granulomatous lesions of skin were found but still no comprehensive comparative study was found on various granulomatous lesions of skin in our region except morphological study

Table 3: Etiological types of granuloma.

Sl. No	Etiology	Disease	No. of cases	Total/percentage	
1	M. Tuberculosis	Lupus vulgaris	04	4(7.54%)	
2	M. Leprae	TT	05	30(56.60%)	
		BT	11		
		BL	02		
		LL	04		
		IL	06		
3	Actinomyces Israeli	Actinomycosis	02	02(3.77%)	
4	Fungal			06(11.32%)	
		a) H. capsulatum	Histoplasmosis		01
		b) M. mycetomatis	Maduramycosis		03
		c) P. boydii	Pseudallescheria boydii		02
5	Foreign body			09(16.98%)	
		a) Lipid	Xanthoma		06
		b) Keratin	Epidermal cyst with granuloma		02
		c) Keratin	SCC with granuloma		01
6	Unknown etiology	Granuloma annulare	02	02(3.77%)	
Total			53	53(100%)	

Table 4: Showing the comparison of age and sex distribution of the present study with other study.

Age group in years	Zafar M study			Present study		
	Male	female	Total	Male	Female	Total
1-10	1	2	3(2.4%)	1	5	6(11.32%)
11-20	12	35	47(38.2%)	4	3	7(13.20%)
21-30	13	13	26(21.1%)	11	3	14(26.41%)
31-40	6	11	17(13.8%)	9	3	12(22.64%)
41-50	6	7	13(10.6%)	6	4	10(18.86%)
51-60	9	2	11(8.9%)	1	1	2(3.77%)
61-70	5	1	6(4.8%)	1	1	1(1.88)
Total	52	71	123	33	20	53

of different granulomatous lesions of the skin done by Zafar M in Pakistan in 2002.⁶

Out of total 53 cases, 33 cases were males and 20 cases were female. It showed that males are more susceptible to develop granulomatous lesions of skin. This finding was not in accordance with study done by Zafar M. He found 52 cases of males out of a total of 123 cases.

It was in accordance with study done by Dhar S who found 12 males involved out of 22 cases.⁷

Ages of our patients ranged from 6-65 years similar to the study by Zafar M.⁶

Commonest morphological type of granuloma in our study was tuberculoid type with 26 cases(49.05%) and was comparable to study by Zafar M showing 114(92.7%).⁶

Leprosy was the commonest granulomatous lesion of skin in our study due to poor nutrition, and lower socioeconomic status of the patients.

Tuberculosis was the commonest granulomatous lesion of skin in the study done by Zafar M.⁶

Tuberculosis can involve any organ or tissue of the body including skin. Worldwide incidence of tuberculosis varies from 0.1 to 1% of all cutaneous disorder.^{9,10,11,12}. They found 3.7% of all dermatology patients in spite of the active

immunization programme through BCG vaccination. With emergence of anti-tuberculosis drug-resistant strains and AIDS epidemic, there has been a worldwide rise of tuberculosis in the recent years more so ever in poverty-struck areas.

Fite faraco stain was done on all the 30 cases of leprosy. It was positive in 17 (56.66%) and negative in 13(43.33%)cases, where as in the study done by Nayak SV et al. Out of 56 cases it was positive in 25(44.64%) and negative in 31(55.35%).¹³

In the present study, 2 cases of actinomycosis were identified and were confirmed by Grams stain. Histopathology revealed skin multiple suppurative granulomas in the dermis and subcutaneous tissue having central actinomycotic colonies which was comparable to Mirza M et al.¹⁴ Fungal infections of humans are divided into the superficial mycoses and the deep mycoses. We found 6 cases of fungal infections in our study.

Five of them showed suppurative granulomas with fungal elements which on GMS stain proved to be 3 cases of maduramycosis and two cases of Pseudallescheria boydii. One case of histiocytic granulomas showed macrophage with small, rounded bodies on H & E stain which were

Table 5: Showing the comparison of Fite Faraco stain in leprosy in the present study with other study.

Type of leprosy	Nayak SV et al Fite Faraco			Present study Fite Faraco		
	Positive	Negative	Total	Positive	Negative	Total
TT	4	5	9	1	4	5
BT	9	2	11	6	5	11
BB	3	4	7	-	-	0
BL	-	-	-	2	0	2
LL	4	-	4	4	0	4
IL	5	20	25	2	4	6
Histioid	-	-	-	2	0	2
Total	25	31	56	17	13	30
%	44.64	55.35		56.66	43.33	

proved to be spores of *H. capsulatum* on GMS and PAS. In such cases histopathology can give only a clue to the referring dermatologist that he is dealing with a granulomatous lesion consistent with fungal infection.

Whereas study done by Zafar et al showed 4 cases of fungal lesions, two were suppurative granuloma showing aspergillosis and other two showed tuberculoid granuloma, in these 2 cases fungal hyphae could be identified on GMS stain but could not be typed.⁶

Nine cases of foreign body granulomas were identified, the most common were xanthomas, followed by 3 cases of keratin induced granuloma.

Majority of cases xanthoma showed aggregates of foamy histiocytes and touton type of giant cells with interspersed bands of collagen in the lower dermis. Cholesterol clefts was seen in one case.

Similar observation was seen by Bulkley BH et al in his case study of 17 year old girl presenting as a nodule over the knee¹⁵

Internationally, granuloma annulare is an uncommon dermatosis whose frequency in the general population is unknown. Most cases resolve without adverse medical sequel. We found only two case of granuloma annulare. Only one case was identified by Zafar et al.⁶

In order to apply the knowledge effectively when examining biopsy sections, it is essential that submitting dermatologist provide detailed clinical information. Clinical diagnosis or a list of differential diagnosis should be given.¹⁶ By comparing the clinician's list with his own, the pathologist may be able to rule out certain diagnoses, to favour others, and perhaps to come up with a single one that fits clinical and pathologic data alike.

Cooperation between dermatologist and pathologist is more important in the field of skin disease than in almost any other field if the patient is to derive the greatest benefit from the biopsy.¹⁶

Conclusion

Our study shows that granulomatous lesions of skin are more common in males. Leprosy is one of the most common causes of granulomas. Borderline tuberculoid leprosy, is the leading cause. Other granulomatous

diseases are less frequent.

Cooperation between dermatologist and pathologist is more important in the field of dermatology than in any other field if the patient is to derive the greatest benefit from the biopsy. Even after relevant special stains, etiological diagnosis could be confirmed in only 25(47.17%) cases. This percentage can be further consolidated, if culture, serological investigations and PCR are done.

Reference

- Hirsh BC, Johnson W C. Concepts of granulomatous inflammation. International Journal of dermatology 1984 March; 24(2): 90-100.
- Rabinowitz LO, Zaim MT. Clinicopathologic approach to Granulomatous dermatoses. J Am Acad Dermatol 1996; 35: 588-600.
- Adams DO. The granulomatous inflammatory response. American Journal of Pathology 1976 July; 84(1): 164-187.
- Zaim MT, Brodell RT, Pokorney DR. Non-neoplastic inflammatory dermatoses: a clinical pathologic correlative approach. Mod Pathol 1990; 3: 381-414.
- Blessing K. Mini- Symposium: Inflammatory skin Pathology: Cutaneous granulomatous inflammation. Current Diagnostic Pathology 2005 August; 11 (4): 219-235.
- Zafar M, Sadiq S, Memon MA. Morphological study of different granulomatous lesions of the skin. Journal of Pakistan Association of Dermatologists 2008; 18; 21-28.
- Chensue SW, Ward P A. Inflammation. In: Damjanov I, Linder J editors. Anderson's Pathology. 10th ed. Vol 1. London: Mosby; 1996.
- Dhar S. Histopathological features of granulomatous skin diseases; an analysis of 22 skin biopsies. Indian Journal of Dermatol 2002; 47: 88-90.
- Kumar B, Muralidhar S. Cutaneous tuberculosis: a twenty year prospective study. Int J Tuberculosis Lung Disease 1999; 3: 494-500.
- Sehgal VN, Srivastava G, Khurana VK. An appraisal of epidemiologic, clinical, bacteriologic, histopathologic, and

- immunologic parameters in cutaneous tuberculosis. *Int J dermatol* 1987;26:521-6.
11. Pandhi D, Reddy BSN, Chowdary S, Kurana N. Cutaneous tuberculosis in Indian children; the importance of screening for involvement of internal organs. *Journal of Eur Acad Dermatol venereol* 2004;5:546-5.
 12. Singh G. Lupus vulgaris in India. *Indian J Dermatol venereol* 1974;40:257-60
 13. Nayak SV, Shivrudrappa AS, Mukamil AS. Role of fluorescent microscopy in detecting *Mycobacterium leprae* in tissue sections. *Annals of diagnostic pathology* 2003 April; 7(2): 78-81
 14. Mirza M, Sarwar M. Recurrent cutaneous actinomycosis. *Pakistan Journal of medical sciences* 2003 July-September; 19(3): 230-231
 15. Bulkley BH, Buja LM, Ferrans VJ, Bulkley GB, Roberts WC. Tuberos xanthoma in homozygous type 11 hyperlipoproteinemia. A histologic, histochemical, and electron microscopical study. *Arch pathol* 1975 June; 99: 293-300.
 16. Pinkus H, Mehregan AH, eds. *A Guide to Dermatopathology*. 3rd edn. New York; Appleton-century-crofts; 1981.

Biochemical study of antioxidant profile in acute ischemic stroke

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Abstract

Background

The present study was designed to measure changes in markers of antioxidant capacity (measured individually and total) following acute ischemic stroke.

Methods

The study included 80 subjects. 40 were controls and 40 were ischemic stroke patients diagnosed clinically and by CT scan of the brain. Serum vitamin E, vitamin C, superoxide dismutase, uric acid and total antioxidant capacity were estimated in all subjects.

Results

Ischemic stroke patients had significantly lower levels of vitamin E, vitamin C, superoxide dismutase and significantly higher levels of uric acid as compared to controls. Total antioxidant capacity strongly correlated with serum uric acid in cases.

Conclusion

These results suggest that estimation of vitamin E, vitamin C, superoxide dismutase, uric acid and total antioxidant capacity may be used as an indirect evidence of oxidative stress induced neuronal damage in acute ischemic stroke which may be useful for monitoring and optimizing antioxidant therapy.

Keywords

Antioxidants, Oxidative stress, Stroke, Super Oxide Dismutase (SOD), Vitamin C, E.

Introduction

Ischemic stroke is a leading cause of mortality and disability in Western countries, particularly in the elderly. Many studies have assessed or are in the process of evaluating

neuroprotective therapies in the acute phase of stroke, but there is a substantial need for further research on agents able to significantly reduce the cerebral damage related to both ischemia and reperfusion. These agents might be particularly important not only in those patients who cannot receive thrombolysis but also in those who, undergoing this type of treatment, are at risk for so-called reperfusion injury¹.

Antioxidants have been evaluated as neuroprotective agents in stroke² since there is evidence supporting the occurrence of a condition of oxidative stress in the brain during ischemia. In experimental studies, an increased free radical generation during cerebral ischemia/reperfusion injury has been shown in vivo using several techniques such as microdialysis, salicylate spin trapping, and electron paramagnetic resonance.^{3,4,5,6} An increase of lipid peroxidation products^{7,8} and a decrease in tissue antioxidant levels in the brain during ischemia⁹ have been reported as indirect evidence of oxidative stress. Pharmacological studies in animals showed that antioxidant molecules able to cross the blood-brain barrier, such as polyethylene glycol-conjugated superoxide dismutase (SOD) and catalase¹⁰ and lazaroids¹¹ reduce ischemic cerebral damage. Finally, transgenic mice overexpressing SOD have reduced infarct size compared with wild-type mice,¹² while SOD knockout mice have an increased infarct size compared with controls.¹³

Human studies on stroke and oxidative stress in the brain are still lacking, mainly because of the methodological difficulties in measuring free radical production in the cerebral tissue. Research aimed at evaluating oxidatively modified molecules or antioxidants in blood, urine, or cerebrospinal fluid, however, revealed the evidence of lower plasma vitamin C and vitamin E levels in patients with stroke^{14,15} as well as a decrease in vitamin C and an increase in thiobarbituric acid reactive substances 2 days after the onset of cerebral ischemia.¹⁶ Lower serum SOD activity has been found in acute stroke patients.¹⁷ Recently, it has been shown that total peroxyl radical trapping potential of plasma as well as ascorbic acid, α -tocopherol, and protein thiol plasma levels are inversely correlated with neurological impairment after cerebral infarction.¹⁸ In other studies, however, no differences in vitamin C¹⁹ or in vitamin A or E²⁰ concentrations were found between stroke patients and controls.

With respect to byproducts of lipid peroxidation, malondialdehyde and 4-hydroxynonenal were found to

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have increased in stroke patients with cardioembolic source,²¹ and higher levels of malondialdehyde were found in subjects with ischemic stroke than in controls.¹⁶ In another study, however, the urinary excretion of F2-isoprostanes, a specific *in vivo* marker of free radical damage to lipids, was similar in acute ischemic stroke patients and controls.²²

Materials and methods

This study was conducted at Saraswathi Institute of Medical Sciences, Hapur, Ghaziabad, UP, India from July 2009 to June 2010, by including 40 healthy controls (of were men and 18 were women aged between 31 and 78 years) and 40 patients of ischemic stroke clinically diagnosed. A CT scan of the brain was performed in all patients. Subjects with hemorrhagic stroke, with other neurological diseases, or taking iron or antioxidant vitamins during the months preceding the enrollment were excluded. Control subjects were age- and sex-matched healthy relatives of hospital employees. None of the controls was undergoing pharmacological treatment. All subjects gave informed consent to participate in the study. The stroke patients due to cerebral hemorrhage, malignancy, sepsis. Serve medical or psychiatric illness, language disorders, swallowing difficulties, cognitive impairment, gout, renal failure and patients who were taking antioxidant vitamins were excluded from this study.

Under aseptic precautions about 6 ml of a non fasting venous blood sample was collected from patients within 24 hours following stroke onset and from healthy controls. Blood was collected in appropriate tubes and centrifuged at 3000 g for 15 min to separate plasma from red blood cells. The supernatant was stored at 4°C until analysis was carried out..

Antioxidant measurements

To preserve vitamin C, an aliquot of plasma was deproteinized with 10% metaphosphoric acid, and the supernatant was kept at -80°C. Vitamin C and uric acid were detected by high-performance liquid chromatography with electrochemical detection according to Kutninkat al²³ with a Supelco C18 column (250x4.6 mm ID) and a Supelco C18 guard column (20x4.6 mm ID).

Vitamin A and vitamin E were measured, after extraction with ethanol and hexane, by high-performance liquid chromatography with UV detection at 280 nm²⁴ with a Waters Symmetry C8 column (150x4.6 mm ID). The levels of the vitamins and of uric acid are expressed as micromoles per liter.

SOD (U/mL) and glutathione peroxidase (GPX) (μmol/L NADPH per minute per milliliter) activities were measured in plasma according to the methods of L'Abbé and Fisher²⁵ and Flohé and Günzler,²⁶ respectively.

Results

Table no-1 shows the distribution of patients according to age group. The result shows maximum patients (18) 45% were in the age group of 51-60 years followed by (14) 35% were in age group of 61-70 years, while the least (02) 5% were in age group of 30-40 years and 71 years above.

Table 1: Distribution of patients according to age

Age group (Years)	No of patients	Percentage
30-40	02	5.0%
41-50	04	10.0%
51-60	18	45.0%
61-70	14	35.0%
71 and above	02	5.0%
Total	40	100%

Table no.2 shows that serum levels of vitamin E, vitamin C, TAC and SOD were significantly lower and serum uric acid levels were significantly higher in ischemic stroke patients as compared to controls p<0.001.

Discussion

In present study, there were reduced levels of vitamin E, vitamin C, SOD, TAC and increased levels of uric acid in stroke patients as compared to controls. FRAP assay is presented as a novel methods of assessing total antioxidant capacity²⁷ which is believed to be a useful measure of the ability of antioxidant present in the fluids to protect against oxidative damage to membranes and other cellular components.

Vitamin E, a potent chain breaking lipid soluble antioxidant, reacts with lipid peroxy radicals' eventually terminating the peroxidation chain reaction and thereby reducing oxidative damage. Some studies have shown reduced serum vitamin E levels in stroke patients and this may be due to high lesion volume resulting in production of more number of free radicals' from a large ischemic injury. It is also shown that reduced vitamin E levels resulted in poor clinical outcome in stroke patients^{28,29}. In the present study serum vitamin E levels were significantly decreased in ischemic stroke patients when compared to controls.

Vitamin C represents the major water soluble antioxidant in the human body. Many studies show that reduced

Table 2: Comparison of serum Vitamin E, Vitamin C, SOD, Uric Acid and Total Antioxidant in ischemic stroke patients and control.

	Vitamin E mg/L	Vitamin C mg/dl	SOD units/ml	Uric acid mg/dl	TAC mol/l
Controls (n = 40)	10.38 ± 0.97	1.09 ± 0.16	9.87 ± 1.07	4.89 ± 0.37	1089.9 ± 187.6
Patients (n = 40)	6.97 ± 0.81	0.61 ± 0.09	4.78 ± 0.6.4	6.89 ± 0.69	1036.48 ± 137.5
Comparison	p < 0.001	p < 0.001	p < 0.001	p < 0.001	p > 0.001

vitamin C levels are associated with increased risk of both ischemic and hemorrhagic stroke³⁰. In our present study the serum vitamin C levels were decreased significantly in ischemic stroke patients as compared to controls. It may be due to the exhaustion of this antioxidant in the neutralization of free radicals which are formed in excess during ischemic and reperfusion^{31, 32}.

SOD is an endogenous antioxidant that catalyses the dismutation of the superoxide anion radical. SOD plays an important role in the defense against free radical damage in reperfusion injury and helps in reducing the infarct size during ischemia and reperfusion^{33, 34}. In the present study the serum SOD levels were decreased significantly in ischemic stroke cases decreased in large vessel infarcts than in small vessel infarcts compared to controls.

Uric acid, most abundant endogenous aqueous antioxidant in humans, may protect against oxidative modification of endothelial enzymes and preserves the ability of endothelium to mediate vascular dilatation during oxidative stress³⁵. Several studies have shown that increased oxidative stress is associated with high circulating uric acid levels due to elevation of xanthine oxidase in stroke induced brain damage^{36, 37}. In this study, there was a significant increase in the serum levels of uric acid in ischemic stroke patients as compared to controls. Serum TAC strongly correlated with serum uric acid. Under multivariate analysis, serum uric acid explained most of the variance in TAC during the study period.

This study suggests that estimation of serum vitamin E, vitamin C, SOD, uric acid a total antioxidant capacity may be used as an indirect evidence of oxidative stress induced neuronal damage in ischemic stroke.

Conclusion

In conclusion, our longitudinal study of antioxidant levels during after acute ischemic stroke reveals that almost all antioxidants are reduced immediately after a cerebrovascular accident and increase over the following days, suggesting the presence of a condition of oxidative stress in this setting. Furthermore, the finding of a relationship between antioxidant profile and early outcome of the cerebral infarct might provide new insights into the pathogenesis of ischemic stroke as well as open new therapeutic possibilities.

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References

1. Halsey JH Jr, Conger KA, Garcia JH, Sarvary E. The

- contribution of reoxygenation to ischemic brain damage. *J Cereb Blood Flow Metab.* 1991; 11:994–1000.
- Hickenbottom SL, Grotta J. Neuroprotective therapy. *Sem Neurol.* 1998; 18:485–492.
- Zini I, Tomasi A, Grimaldi R, Vannini V, Agnati LF. Detection of free radicals during brain ischemia and reperfusion by spin trapping and microdialysis. *Neurosci Lett.* 1992; 138:279–283.
- Globus MYT, Busto R, Lin B, Schnippering H, Ginsberg MD. Detection of free radical activity during transient global ischemia and recirculation: effects of intrischemia brain temperature modulation. *J Neurochem.* 1995; 65:1250–1256.
- Dugan LL, Sensi SL, Canzoniero LMT, Handran SD, Rothman SM, Lin TS, Goldberg MP, Choi DW. Mitochondrial production of reactive oxygen species in cortical neurons following exposure to N-methyl-D-aspartate. *J Neurosci.* 1995; 15:6377–6388.
- Kil HY, Zhang J, Piantadosi CA. Brain temperature alters hydroxyl radical production during cerebral ischemia/reperfusion in rats. *J Cereb Blood Flow Metab.* 1996; 16:100–106.
- Sakamoto A, Ohnishi ST, Ohnishi T, Ogawa R. Relationship between free radical production and lipid peroxidation during ischemia-reperfusion injury in the rat brain. *Brain Res.* 1991; 554:186–192.
- White BC, Daya A, DeGracia DJ, O'Neil BJ, Skjaerlund JM, Trumble S, Krause GS, Rafols JA. Fluorescent histochemical localization of lipid peroxidation during brain reperfusion following cardiac arrest. *Acta Neuropathol (Berl).* 1993; 86:1–9.
- Kinuta Y, Kikuchi H, Ishikawa M, Kimura M, Itokawa Y. Lipid peroxidation in focal cerebral ischemia. *J Neurosurg.* 1989; 71:421–429.
- Liu TH, Beckman JS, Freeman BA, Hogan EL, Hsu CY. Polyethylene glycol-conjugated superoxide dismutase and catalase reduce ischemic brain injury. *Am J Physiol.* 1989; 256:H589–H593.
- Hall ED, McCall JM, Means ED. Therapeutic potential of the lazaroids (21-aminosteroids) in acute central nervous system trauma, ischemia and subarachnoid hemorrhage. *Adv Pharmacol.* 1994; 28:221–267.
- Kinouchi H, Epstein CJ, Mizui T, Carlson E, Chen SF, Chan PH. Attenuation of focal cerebral ischemic injury in transgenic mice overexpressing CuZn superoxide dismutase. *Proc Natl Acad Sci U S A.* 1991; 88:11158–11162.
- Kondo T, Reaume AG, Huang TT, Carlson E, Murakami K, Chen SF, Hoffman EK, Scott RW, Epstein CJ, and Chan PP. Reduction of CuZn-superoxide dismutase activity exacerbate neuronal cell injury and edema formation after transient focal cerebral ischemia. *J Neurosci.* 1997; 17:4180–4189.
- Hume R, Wallace BD, Muir MM. Ascorbate status and fibrinogen concentration after cerebrovascular accident. *J Clin Pathol.* 1982; 35:195–199.

15. Chang CY, Lai YC, Cheng TJ, Lau MT, Hu ML. Plasma levels of antioxidant vitamins, selenium, total sulfhydryl groups and oxidative products in ischemic-stroke patients compared to matched controls in Taiwan. *Free Radic Res.* 1998;28:15–24.
16. Sharpe PC, Mulholland C, Trinick T. Ascorbate and malondialdehyde in stroke patients. *Ir J Med Sci.* 1994;163:487–491.
17. Spranger M, Krempien S, Schwab S, Donnenberg S, Hacke W. Superoxide dismutase activity in serum of patients with acute cerebral ischemic injury: correlation with clinical course and infarct size. *Stroke.* 1997;28:2425–2428
18. Leinonen JS, Ahonen JP, Loennrot K, Jehkonen M, Dastidar P, Molnàr G, Alho H. Plasma antioxidant capacity is associated with high lesion volume and neurological impairment in stroke. *Stroke.* 2000;31:33–39.
19. Barer D, Leibowitz R, Ebrahim S, Pengally D, Neale R. Vitamin C and other nutritional indices in patients with stroke and other acute illnesses: a case-control study. *J Clin Epidemiol.* 1989;42:625–631.
20. De Keyser J, De Klippel N, Merkx H, Vervaeck M, Herroelen L. Serum concentration of vitamins A and E and early outcome after ischaemic stroke. *Lancet.* 1992;339:1562–1565.
21. Re G, Azzimondi G, Lanzarini C, Bassein L, Vaona I, Guarnieri C. Plasma lipoperoxidative markers in ischemic stroke suggest brain embolism. *Eur J Emerg Med.* 1997;4:5–9.
22. V Kooten F, Ciabattini G, Patrono C, Dippel DW, Koudstaal PJ. Platelet activation and lipid peroxidation in patients with acute ischemic stroke. *Stroke.* 1997; 28:1557–1563.
23. Kutnink MA, Hawkes WC, Schaus EE, Omaye ST. An internal standard method for the unattended high-performance liquid analysis of ascorbic acid in blood components. *Anal Biochem.* 1987; 166:424–430.
24. Nierenberg DW, Nann SL. A method for determining concentrations of retinol, tocopherol, and five carotenoids in human plasma and tissue samples. *Am J Clin Nutr.* 1992; 56:417–426.
25. L'Abbé MR, Fisher PWF. Automated assay of superoxide dismutase in blood. *Meth Enzymol.* 1990; 186:232–237.
26. Flohé L, Günzler WA. Assays of glutathione peroxidase. *Meth Enzymol.* 1984; 105:114–121.
27. Cherubini A, Ruggiero C. Potential marker of oxide stress in stroke. *Free Radical Biology and Medicine* 2005;39(7):841-853.
28. Tornwall ME, Virtamo J, Korhonen PA. Postintervention effect of alpha tocopherol and beta carotene on different strokes. *Stroke* 2004; 35(8):1908-1913.
29. Yokeyama T, Date C, Kokubo Y. Serum vitamin C concentration was inversely associated with subsequent 20 years incidence of stroke in a Japanese Rural Community. *Stroke*, 2000; 31(10):2287-2294.
30. Kurl S, Tuomainen TP, Laukkanen JA, Nyyssonen K. Plasma vitamin C modifies the association between hypertension and risk of stroke. *Stroke*, 2002; 33(6):1568-1573.
31. Joshi PP, Gawande AS, Ughade SN, Salkar RG. Low plasma ascorbic acid in acute ischemic stroke. *Milestone*, 2003;2(3):119-125.
32. Kim GW, Kondo T, Noshita N. Manganese superoxide dismutase deficiency exacerbates cerebral infarction after focal cerebral ischemia/ reperfusion in mice. *Stroke*, 2002; 33(3):809-815.
33. Zimmermann C, Winnefeld K, Streck S, Haberl RL. Antioxidant status in acute stroke patients and patients at stroke risk. *Eur. Neurol.* 2004;51(3): 157-161.
34. Weir CJ, Muir SW. Serum urate as an independent predictor of poor outcome and future vascular events after acute stroke. *Stroke*, 2003; 34(8): 1951-1957.
35. Hariklia VD, Apostolos IA. The role of uric acid in stroke. *Neurologist*, 2008; 14(4):238-242.
36. Hazawa A, Folsom AR. Serum uric acid and risk of ischemic stroke the ARIC study. *Atherosclerosis*, 2006; 187(2): 401-407.
37. Leinonen JS, Ahonen JP. Low plasma antioxidant activity is associated with high lesion volume and neurological impairment in stroke. *Stroke*, 2000; 31(9):33-39.

Health hazards of rearing silk worms and environmental impact assessment of rearing households of Kashmir, India

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Abstract

The paper is an endeavor to study the role and importance of sericulture in Kashmir together with the issue of occupational health problems and their causes in the rearing units of Kashmir. The objective of this paper is to review the status of rearers, health risk factors and related occupational health problems in the rearing units. In the current study an attempt has been made to study the environmental impact caused by these units. Certain measures have been suggested that can improve the economic conditions of the rearers which may ultimately reduce the health risk factors among the rearers.

Keywords

Rearing of silk worms, health problems, environmental impact, Kashmir.

Introduction

Sericulture has attained the status of household industry. It is a labour intensive; export oriented, agro-based industry, generating high employment and income per unit area of land. (Rani, 2007; Unni *et al.*, 2009). Sericulture is ideally suited for improving the rural economy of the country, as it is practiced as a subsidiary industry to agriculture. The annual production of silk in the world is estimated at 45,000 tonnes of which Japan and China contribute 18,936 and 13,200 tonnes respectively (www.krishiworld.com). Mulberry silk is produced extensively in the states of Karnataka, West Bengal and Jammu and Kashmir. Owing to its salubrious climate, Jammu and Kashmir state is producing silk by rearing univoltine and bivoltine silkworms. The silk industry of Kashmir provides employment to about 0.050 lakh people and produces goods worth rupees 0.0336 crore. It also exports products to a tune of rupees 0.0037 crore (Digest of statistics, 2008).

To obtain the quality cocoons, the environmental conditions such as temperature, relative humidity as well as light plays a critical role. These parameters influence the growth and development of silkworm *Bombyx mori* L. The optimum temperature for healthy growth and for cocoon production of good quality is 28 °C for the first instar, 27 °C for the second, 26 °C for the third, 24-25 °C for the fourth, 23-24 °C for the fifth, 22-23 °C for mounting and 24-25 °C for egg incubation. For technical reasons, temperature of

25 °C is used for all ages (Ifantidis 1982, Patil and Gowda 1986, Upadhyay and Misha 1994). Optimum relative humidity values depend on the age of larvae: for the first two instars relative humidity is 80-90 %, for the third it is 80 % and for the fourth and fifth it is 70-75 %. Optimum relative humidity value during mounting should be 60-70 %, resulting to healthy larvae and good cocoon quality. When the larva begins to excrete, proper ventilation of the rooms becomes essential. During egg incubation it is important that relative humidity is 80 % on average for normal embryo development. If relative humidity decreases less than 70 %, then egg hatching is low and abnormal. If relative humidity increases more than 80 %, fungus grows on eggs and larvae and become vulnerable to diseases (Ifantidis 1982, Patil and Gowda 1986). In practice, relative humidity used in all instars is 75 % and is decreased to 70 % during the mounting.

Silkworm is an insect of small day with positive phototaxis (Ito 1981, Meenal *et al* 1994a). It is reported that light period affects the growth of larvae during feeding. Patil and Gowda (1986) reported that, when silkworms are fed in complete darkness their duration is longer and cocoon quality is low. For this reason, it is necessary to keep the room 16-18 hours in light and 6-8 hours in dark. Light intensity must be medium and direct solar rays on silkworms must be avoided. In practice, in rearing rooms, solar radiation is avoided and normal light period is preferred, meaning 14-16 hours of light and 8-10 hours of dark.

This chapter is based on the study, which was conducted in Pulwama and Anantnag districts of Jammu and Kashmir state. Commercial silkworm rearing in these areas is still relatively of the simple kind and includes traditional Sikiris, local mounting material and is done under domestic conditions and other activities are carried out simultaneously in other rooms of the house. Sometimes rearing as well as cooking is carried out in a single room due to lack of space. There is no proper ventilation in these rooms. Workers in these rearing units are among the poorest and are all Muslims. The present study has interviewed about 406 sericulture farmers in the year 2008 and 2009, from Pulwama and Anantnag districts. The main aim of the study was to identify environmental and health concerns associated with silk rearing, assess the potential environmental problems rearing and to suggest remedial measures to reduce the adverse impact of the rearing activities on the environment and public health.

Methodology

The study group comprised of 214 and 192 rearers during 2008 and 2009 respectively. The rearers were selected from 10 villages of district Pulwama and Anantnag. The rearers chosen for the present study were traditionally sericulturists or who had an experience of 10-20 years. The purpose of study was explained to every rearer before interview.

120 (2008) and 112 (2009) persons of same age group that do not have any sericulture activities in the neighborhood of their village served as controls. Each person was thoroughly interviewed about his/her present and past status of health. Observations were recorded in a pre-structured questionnaire, wherever required additional information was received from their family members.

Blood pressures were measured by the oscillatory method with the help of stethoscope and sphygmomanometer. Height and weight were measured with the help of tape and weighing machine respectively. table 1 shows the characteristics of the respondents in the table.

Table 1: Characteristics of the respondents

S.No	Parameters	2008	2009
1	Weight(kgs)	62.30 ±7.6	58.23±6.3
2	Age (years)	41.36 ±3.4	42.3±5.1
3	Height (foot)	5'4"±0.03	5'2"±0.2
4	Systolic Pressure (mmHg)	127 ±5.7	130±8.5
5	Diastolic pressure (mmHg)	67±9.1	73±7.5

Income and economic factors

Reasons for joining rearing work are essentially related to economic factors, this seems to be the most regular and suitable occupation to take up from the economic point of view. Other occupations are either not available or are not sufficiently income generating. Hence, in spite of health problems like respiratory, headache, common cold, burns, backache, people still opt for silk rearing. Workers earn about 2100-3500 rupees per month and usually work about 6 – 7 hours a day. Considering the income levels of the workers and health problems that they encounter, intensify their already precarious living conditions. Work in silkworm rearing units is not continuous over the year, but last for only 2-3 months per year in Kashmir due to its climatic conditions. Silk rearing is being conducted by elder members of the family, both men, women of the family. Children are involved infrequently even though it is common to find that parents are introducing them to sericulture techniques very early. Substantial number of rearers has followed this line after their parents. Women bear several responsibilities, which also enhance or increase their prosperity to suffer from various health problems. Burning biomass fuel in these units provokes

their health problems. Further they are also exposed to several hours of wood fuel smoke in their homes while, they cook food. It has been found in the study area that both rearing as well as other household activities are carried out in the same house simultaneously. Such exposure faced by the women could cause respiratory problems in women's. In an average 2 – 3 rooms were occupied by silkworm rearing.

Problems

Poor quality of leaves

Sometimes silkworms get diseased during the course of silkworm rearing. Rearers remarked that this was probably because of the low quality of mulberry leaf. Bivoltine silkworms are also susceptible to diseases and are very sensitive and require temperatures of 23 - 28 °C, 65-85% humidity, good rearing technique, and good mulberry leaf quality to survive. In the last stages of growth, silkworms need a greater quantity of mulberry leaves that means more time spent collecting leaves, which the rearers do not have or cannot afford.

Heating system

Sometimes climatic conditions in the valley changes unexpectedly, as a result of which the required temperature for silkworm growth is not maintained owed to lack of heating system. The outcome of which is a great loss to the rearer due to the low cocoon production.

Plantations

Mulberry plantation is mainly available on roadsides, with some farmhouse plantations put in by rearers. Bush plantations are found only in Sericulture Centers. Mulberry sapling root purification (protection from insects) is done by soaking the plant three or four times in a solution of dyathin-M-45 (20 l water + 250 gm chemicals), after which the pesticide wastewater is thrown away. Heptachlor powder is used as a protection against termites and applied directly to affected trees. Kerosene oil is used against the stem borer (insect). Fertiliser consisting of urea, phosphate, potash, cow-dung, is used in fertile areas for saplings. Throughout the application of pesticides and fertilizers the rearer does not use any kind of personal protective equipment, which exposes them to large number of health risk factors.

Rearing shed

The people of the area were more concerned about rearing sheds than health problems. They claimed that rearing occupies all our rooms and we have to face acute shortage of rooms as rearing progresses. It has been observed in an average 2-3 rooms are occupied by rearing, which puts these rearers to a mental stress. The unpleasant smell coming out from these rooms affects their children badly.

Table 2: List of villages, population, education, no of rearing houses, and income is given in the table

S.No	Village	Population	Education		No. of Rearing houses	Average Income monthly from sericulture		Average no of rooms in a house	No of rooms occupied by rearing
			M	F		2008	2009		
1	Panner Jagir	791	370	503	25	2245	2193	4	2
2	Mondoora	843	327	563	18	2575	2396	3	2
3	Bathnoor	965	533	863	40	3287	2905	4	2
4	Brinal Lammar	6745	1232	558	31	3501	3156	4	2
5	Y.K.Pora	3767	1140	668	33	3211	2986	3	2
6	Chowgam	2693	750	453	27	3063	2735	3	2

Although, the concerned department has assured several times that, rearers will be given proper sheds for rearing. It has been seen that rearers were not provided sikiris in which they can burn charcoal to keep the temperature of the room constant. They were seen using tin canes and instead of charcoal they were burning biomass. In order to provide optimum environmental conditions like temperature and humidity during rearing period a separate rearing shed should be constructed with a size of 20' x 40' x 15' (L x B x H) or 30'x18'13'(L x B x H). Free cross ventilation must be ensured by providing more no. of windows.

Unsuitable environmental conditions

For the proper growth of silkworm the proper humidity, temperature and light intensity is very important. It has been found that in the study area environmental conditions are unsuitable for the rearing as shown in the Table 3.

Table 3: Environmental conditions at rearing units

Parameters	Summer 2008	Summer 2009
Average Tempt.	23.6±0.3	23.01±0.59
Max. Tempt at Unit °c	29.8±1.2	30.265±0.533
Min Tempt at Unit °c	17.5±1.05	18.803±0.198
Day hmidity	64.3±4.3	58.965±1.65
Max Humidity (%) at unit	73.2±1.7	74.931±1.302
Min Humidity (%) at unit	31.6±3.2	33.862±2.067
Light Intensity	121±7.8	95.2±1.07

Health risk factors

Workers involved in rearing mentioned that they suffer from coughs, gastrointestinal pains, ulcers, throat infections, thinning nails, dry skin, hand and eye burning. The disinfectants used in rearing have pungent smell, affecting their eyes, throats, nose, hands, and possibly internal functions because, they are neither using masks nor any protecting cover on nose as it is advised by sericulture field staff. Workers were not observed to use gloves for mixing disinfectants either. They wash chemicals off their hands with tape water or use normal soap.

Most of the people involved in rearing in were suffering from headache (42.99%), common cold (31.77%), chest pain (27.1%), vertigo (35.51%), eye irritation (14.95%), injuries (37.38%), burns (11.21%), wheezing (2.8%), allergy (4.5%). however, in control group it was 14.01%, 10.28%, 8.41%, 6.54%, 1.8%, 0%, 0%, 0%, respectively during the year 2008. However, the percentage of diseases (headache 46.35%, common cold 32.81%, chest pain (29.16%), vertigo (38.02%), eye irritation (16.66%), injuries (40.10%), burns (13.54%), wheezing (3.12%), allergy (6.25%). however, in control group it was 16.14%, 10.93%, 6.25%, 8.33%, 2.08%, 0%, 0%, 0%, respectively among the rearers was found to be higher in 2009 as shown in the table. the calculated value is less than the table value , hence there is no significant differences between the diseases during 2008 and 2009. Fig 1. and Fig.2 shows the prevalence of diseases among rearers during year 2008 and 2009 respectively.

Environmental assessment

During the investigation it was found that the wastewater and solid waste disposal are the main cause of environmental affects. There are many chemicals, pesticides and fertilizers used in the different stages of sericulture activities, including plantation, rearing, grainage, and weaving. These chemicals will have deleterious effects on the human ecosystem if not handled properly. Fertilizers and pesticides used in mulberry plantations may have an effect on the silkworm due to its

Fig 1: Prevalence of diseases among rearers during year 2008.

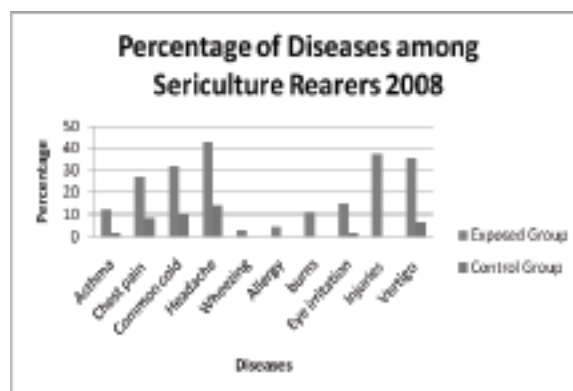
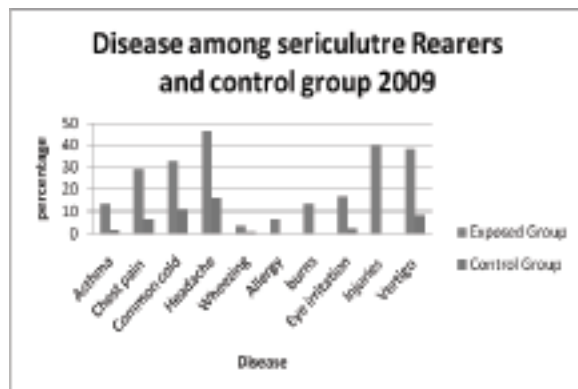


Fig 2: Prevalence of diseases among rearers during year 2009



residual toxicity, which affects in the long run on the quality and quantity of cocoons production and poses negative impacts on the environment.

Employees, who work in rearing, suffer from many diseases. This also has impact on their economic status as they work less due to poor health. A large amount of fire wood is used for keeping the temperature of the room constant. The smoke may emit toxic carbon monoxide (CO) fumes in to the air. Use of firewood also adds to forest destruction. In most of the sites visited, the disposal of the chemicals and solid wastes seem to be a neglected issue. Silkworm farmers seem to be not fully aware of the hazardous effect of these chemicals.

Land-soil characteristics: Solid waste is dumped in open land or thrown outside which may cause changes in soil characteristics. Different types of chemicals from wastewater and solid waste decomposition left on soil may destroy soil microbes and reduce the natural soil fertility. The chemicals may also alter soil texture and permeability of soils.

Water pollution: Surface water pollution may occur due to drainage of waste into water bodies by rain water. Residue of chemicals from waste reaches ground water through infiltration. Pollutants may persist in ground water over a long period of time and can travel a long distance without any alteration. This causes ground water pollution.

Air pollution: air emissions from rearing contain oxides of nitrogen, sulphur, carbon, volatile organic solvents, dust and soot. These emissions may be toxic to the environment and cause occupational health problems of the work force. These may also cause environmental and health hazards in surrounding areas.

Discussion

Sericulture being a labour intensive rural based industry offers a qualitative and quantitative change in the poverty alleviation. It offers the chain creation of employment for unskilled farm labours to silk artisans to all sections especially women folk, but it simultaneously as by product

causes instrumental health problems in a significant proportion of workers. The silk rearing technology which is predominantly used is of relatively simple, making it possible for poorly educated people to work with them. However, the health problems associated with rearing is going to get into their income, and make it less likely that they can make out of rearing, or into better paying higher silk occupations. This makes it likely that most of the rearing workers will remain in rearing for their life and their children too. Rearing as a means of social mobility has very large limitations, and broadly can be considered as an effective means of improving the lives of workers.

In the situation of acute poverty, people of Anantnag and Pulwama take up silk rearing as their means to earn living. However, they have to face the problems of working in an atmosphere which has many health hazards. With very proportion of workers being victims of various diseases this seems to be a high risk occupation which lessens their quality of life. The pollution caused by burning biomass fuel, in order, to keep the temperature of the room maintained has several implications on their health. Use of various types of disinfectants like Vijatha, formalin, lime and detergent solutions exposed them to burning eyes, sneezing as well as chest related problems. Disinfection with formalin and dusting with lime without using personal protective equipments leads to burning of eyes and throat. Long hours of contact with mulberry leaf causes allergy (itching). Application of lime, formalin, NaHCl bleaching powder leads to respiratory problems also (Ramanathan, 1997). Rearers are burning biomass in traditional tin cans instead of Sikiris, and get various types of burns. In order to chop leaves people very often acquire injuries and find it difficult to treat it at the first place. They masticate the leaves of mulberry and apply it at the injured part which they said is very effective as compared to the medicines available in the market. Rearers have to clean the bed and feed the worms at regular intervals in addition to their domestic work without having sufficient rest, which exposes them to backache, fatigue, and headache. This is further aggravated by the imbalanced food habits of the rearers. Weeding, transport of mulberry leaves to the rearing sheds and rearing of worms are the important activities where women's involvement is higher than women.

Adherence to age old traditional practices, slow penetration of improved technologies, shortage of quality of silkworm seed, inadequate rearing space and appliances, primitive rearing, spinning and weaving and insufficient marketing and value addition linkages are some of the major constraints of sericulture in these areas. Protective environmental measures are not only healthier for people and the environment in general, but also more cost-effective in the long-run. If hidden costs are considered, such as medical bills, production loss due to health effects, poor crop output due to deterioration in land quality, and negative impacts on biodiversity of neighboring areas, the costs of ignoring environmental

protection will be higher than taking appropriate steps now. CSR&TI sericulture program may not currently have widespread environmental impacts, but as CSR&TI plans to significantly increase its output in the coming years, the potential for environmental harm will increase. This is the most important time to implement sound safety measures, as the program is still in its early stages of development. It will be easier and cheaper to develop more environmentally friendly alternatives to any harmful substances being used. As the sericulture program keeps expanding, health problems will occur that are currently not experienced in Kashmir due to the small scale of production in silk.

In view of the problems encountered by rearers in the activity such as high fluctuations in cocoon prices, pests and diseases, climatic disturbances, inadequate finance for investment, inadequate market facilities, exploitation by middlemen, transportation problem, shortage of skilled workers and health problems like giddiness, burning of eyes, backache and fatigue and other related problems, following suggestions have been made for the overall development of sericulture in Jammu and Kashmir.

Training programmes should be conducted at the village level to ensure greater and effective participation of women to transfer the technology to upgrade the skill and suggest simple alternative and safe technologies to overcome the health problems.

Higher fluctuations in cocoon prices are limiting the farmers from derivable higher profits, which arise due to heavy import of China silk. Government should take necessary policy decisions to safeguard the farmers from these fluctuations of prices by reducing the imports of china silk based on the supply and demand of Indian silk. The working posture, work methods, tools and appliances based on the economic condition have to be introduced to improve work efficiency and production.

Acknowledgemnt

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References

1. Digest of statistics. (2008). directorate of statistics and economics; government of Jammu and Kashmir.
2. Ito T. (1981) Development of artificial diets and their application in sericulture. *Sericologia* 21(4): 298-306
3. Meenal A., V. B. Mathur and R. K. Rajan (1994) Effect of light on incubation. *Indian Silk* 33(8): 45-46. New evidence for silk in Indus civilization. www.nature.com/news/2009/090217
4. Patil C. M. B. L. Vishweshwara Gowda (1986) Environmental adjustment in sericulture.
5. Ramanathan, Arun (ed.). *India Silk*. Vol. 36, No. 6. October 1997. (Jwalamukhi Job Press, Bangalore, India).
6. Rani, J.U. (2007) Employment Generation to Women in Drought Prone Areas: A Study With Reference to the Development of Sericulture in Anantapur District of Andhra Pradesh; *J. Soc. Sci.*, 14(3): 249-255
7. Unni, Bg., Goswami, M., Kakoty, Y., Bhattacharjee, M., Wann, SB. Rajkhowa, G., et al., (2009). Indigenous knowledge of silk worm cultivation and its utilization in North Eastern region of India. *Indian Journal of traditional Knowledge*. 8(1):January;2009. 70-74.
8. Upadhyay V. B. and A. B. Mishra (1994) Influence of temperature on the passage of food through the gut of multi voltine *Bombyx mori* L. larvae. *Indian Journal of Sericulture*. 33(2):183-185.
9. www.krishiworl.com/html/seri_ind1.html

Safety and efficacy of Formoterol Fumarate + Fluticasone propionate in Indian asthmatic patients

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Abstract

Background

Asthma is characterized by a chronic airway inflammation that may lead to airway obstruction, hyperresponsiveness, and clinical symptoms of cough, wheeze, and shortness of breath. Current asthma management guidelines recommend the use of this combination of LABA + ICS for patients who remain symptomatic on low-dose inhaled corticosteroids.

Objective

This study was conducted to evaluate the efficacy and safety of the fixed dose combination of formoterol and fluticasone in clinical practice.

Method

It was an open – labeled surveillance study enrolling 110 patients of asthma not adequately controlled on ICS alone.

Results

At the end of 4 week of treatment with MDI and DPI of the fixed dose combination of Formoterol and Fluticasone, study population reported a significant reduction of mean cough score by 87.9% from baseline (Baseline 2.31 Vs 0.28 at 4 week). Similarly, the mean scores for wheeze and tightness of chest reduced to 0 from baseline (a reduction of 100%). The mean score of shortness of breath also showed a significant reduction of 89.6% at the end of study period from baseline.

Conclusion

A fixed dose combination of formoterol + fluticasone MDI/DPI is safe and efficacious in the management of asthmatic patients not adequately controlled on inhalational corticosteroids alone in clinical practice in India.

Introduction

Asthma is characterized by a chronic airway inflammation

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that may lead to airway obstruction, hyperresponsiveness, and clinical symptoms of cough, wheeze, and shortness of breath.¹ Because the prevalence, morbidity, and perhaps mortality of asthma have been increasing worldwide², there is concern that asthma patients are not always readily identified and may not receive optimum treatment of their disease. To provide more effective care for patients who have asthma, physicians need to recognize asthma, diagnose it, and monitor its control.

For patients poorly controlled on existing inhaled corticosteroid therapy, the addition of long-acting β_2 -agonists improves lung function and reduces symptoms to a greater extent than doubling the dose of inhaled corticosteroid.³ The addition of a long-acting β_2 -agonists to inhaled corticosteroid therapy has also been shown to reduce exacerbation rates.⁴ Current asthma management guidelines therefore recommend the use of this combination of therapies for patients who remain symptomatic on low-dose inhaled corticosteroids.⁵

Formoterol is a highly selective β_2 -adrenergic agonist with onset of action after aerosol delivery similar to that of albuterol. Formoterol is moderately lipophilic and most of the inhaled dose is taken up into the cell membranes. This forms a depot from which formoterol is thought to progressively leach out to interact with the β_2 -receptors. Inhaled formoterol thus has a prolonged effect, causing 12 h or more of bronchodilation. However, adequate numbers of molecules remain in the aqueous phase outside the cells to allow immediate interaction with β_2 -receptors, resulting in a fast onset of action (within 1–3 min). Compared with albuterol and salmeterol, formoterol is a full agonist at the β_2 -receptor and results in more than 80% of maximal β_2 -receptor activation. In clinical studies of 3 and 6 months' duration in patients with asthma, formoterol produced better pulmonary function, better control of symptoms, and less use of rescue bronchodilators than either placebo or albuterol four-times daily.⁶

Fluticasone belongs to a new group of corticosteroids. Unlike traditional steroids that mask the 17 carbon with an acetone, valerate, or other ester, fluticasone uses a fluorocarbothioate ester linkage at the 17 carbon position. Initial data show that the halomethyl carbothioates exhibit extremely potent antiinflammatory activity; fluticasone propionate is the most active of the series. It also has a weak hypothalamic-pituitary-adrenocortical axis (HPA) inhibitory potency when applied topically, which gives the

drug a high therapeutic index. Although HPA suppression does occur after intravenous administration, fluticasone is inactive when administered orally due to first-pass hydrolysis of the carboethoxy ester to the corresponding carboxylic acid, which is inactive.⁷

We conducted a surveillance study using MDI and DPI of the fixed dose combination of Formoterol and Fluticasone to evaluate its efficacy and safety in clinical practice.

Patients and method

Study design

This was a surveillance study carried out at Department of Respiratory Medicine and General Medicine, Subharti medical college, Meerut. Patients attended the OPD at the start of treatment (baseline), during treatment (2 weeks after the start of treatment) and at the end of treatment (4 weeks after the start of treatment).

The study conformed to Good Clinical Practice Guidelines and to the Declaration of Helsinki 1964, as modified by the 41st World Medical Assembly, Hong Kong, 1989; local ethics committee approval was obtained at all participating sites. All patients provided written informed consent.

Study population

The study population was selected as per the inclusion and exclusion criteria which were as follows:

Inclusion criteria

1. Patients > 18 years of age.
2. Patients with an established diagnosis of bronchial asthma/COPD not controlled on the conventional dosages of inhalation corticosteroids or long acting β_2 -agonists alone.

Exclusion criteria

1. Pregnancy and lactation.
2. Patients with severe or unstable bronchial asthma/COPD.
3. Patients requiring nebulized therapy or oral corticosteroids.
4. Patients with a clinically relevant respiratory tract infection in the four weeks prior to enrolment.
5. Grossly abnormal liver or kidney function tests.

Treatment

After enrollment, the patients were given MDI and DPI of the fixed dose combination of Formoterol and Fluticasone to be administered by the orally inhaled route only. All patients were instructed to take the inhalation therapy twice daily and titrate the combination to the lowest effective strength after adequate asthma stability was achieved.

Salbutamol was provided for use throughout the treatment period on an 'as required' basis.

Primary efficacy variables

The efficacy of formoterol + fluticasone Metered Dose Inhaler (MDI) and Dry Powder Inhaler (DPI) was assessed by measuring the degree of improvement in the day-time and the night-time asthma symptoms (cough, wheeze, chest tightness, and shortness of breath) in the patients enrolled into the study as assessed on a 4-point scale as follows at Week 2 and Week 4 as compared to baseline:

0 = no symptoms;

1 = symptoms, but not affecting any activities during the day/sleep at night;

2 = symptoms affecting at least one activity or disturbing sleep; and

3 = symptoms affecting >2 daily activities or disturbing sleep all night or most of the night

Secondary efficacy variables

The secondary efficacy variables in the study were the following:

1. Number of symptom-free days in the preceding fortnight

2. Number of symptom-free nights in the preceding fortnight

3. Number of rescue medication-free days in the preceding fortnight

4. Number of rescue medication-free nights in the preceding fortnight

At the end of the treatment, the investigator gave an overall assessment of the efficacy of the drug, as follows:

Excellent = Significant improvement in the patient's condition;

Good = Moderate improvement in the patient's condition;

Fair = Mild improvement in the patient's condition and

Poor = No improvement or worsening in the patient's condition as compared to baseline

Tolerability Assessments

Tolerability assessments included the incidence of reported adverse events and oropharyngeal examinations. An adverse event was defined as any untoward medical occurrence experienced by the patient, whether or not it was caused by the study drug, and was recorded as mild, moderate or severe. Adverse events were rated by the investigator as serious or non-serious, and the cause assessed as either unrelated, unlikely, possibly, probably or almost certainly related to the study drug. All adverse events were documented.

Oropharyngeal examinations were carried out at the beginning and end of the treatment period. If patients presented with clinical evidence of oral candidiasis, swabs were taken for confirmation. At the end of therapy, the investigators will also give an overall assessment of tolerability based on a 4-point scale as follows:

Excellent = No adverse event reported;

- Good= Mild adverse event(s) reported which subsided with or without medication and did not necessitate stoppage of study medication;
- Fair= Moderate to severe adverse event(s) reported which subsided with or without medication and did not necessitate stoppage of study medication and
- Poor= Severe or serious adverse event(s), which necessitated stoppage of study medication.

Statistical analyses

Statistical analysis was done using ANOVA (Kruskal Wallis).

Results

Out of 110 patients enrolled for the study 102 completed the study and were eligible for statistical analysis. 6 patients were lost to follow-up and 2 patients were withdrawn from the study due to lack of relief of symptoms with the study medications. Age of the patients was ranging from 21 - 60 years with average age of 36.68 years. 75.5% of the total cases were male and duration of illness was 54.92 months. Primary efficacy variables (Table 1)

Mean score of cough

Mean score of cough at baseline was 2.31. After two weeks of treatment from baseline mean score of cough decreased significantly by 55.4%. At the end of 4 weeks of treatment from baseline mean score of cough decreased significantly by 87.9%.

Mean score of wheeze

Mean score of wheeze was 1.91 at baseline. After two weeks of treatment from baseline mean score of wheeze decreased significantly by 84.8%. At the end of 4 weeks of treatment from baseline mean score of wheeze decreased significantly by 100.0%.

Mean score of tightness of chest

Mean score of tightness of chest was 0.95 at baseline. At the end of 2 weeks of treatment mean score of tightness of chest showed a fall of 94.7% which was significant from baseline. At the end of treatment mean score of tightness of chest decreased significantly by 100.0% from baseline.

Mean score of shortness of breath

Mean score of shortness of breath was 1.73 at baseline. At

the end of 2 weeks of treatment mean score of shortness of breath showed a significant fall of 76.3% from baseline. At the end of treatment mean score of shortness of breath showed a fall of 89.6% which was also significant from baseline.

Mean total score

Mean total score was the composite of the mean scores of cough, wheeze, tightness of chest and shortness of breath. Mean total score was 6.90 at baseline. At the end of 2 weeks of treatment mean total score showed a significant decrease of 74.2% from baseline. At the end of treatment mean total score showed a fall of 93.3% which was also significant from baseline

Secondary efficacy variables

Number of symptom-free days in the preceding fortnight

Mean number of symptom free days in the preceding fortnight was 5.84 at baseline which increased significantly to 108.7% at the end of 2 weeks and further to 134.8% at the end of 4 weeks from baseline.

Number of symptom-free nights in the preceding fortnight

Mean number of symptom free nights in the preceding fortnight was 7.56 at baseline. At the end of 2 weeks of treatment mean number of symptom free nights showed a rise of 76.2% which was significant from baseline. At the end of treatment mean number of symptom free nights showed a significant increase of 85.2% from baseline.

Number of rescue medication-free days in the preceding fortnight

Mean number of rescue medication free days in the preceding fortnight was 8.23 at baseline. At the end of 2 weeks of treatment mean number of rescue medication free days showed a significant increase of 66.3% from baseline. At the end of treatment mean number of rescue medication free days showed an increase of 70.1% which was also significant from baseline.

Number of rescue medication-free nights in the preceding fortnight

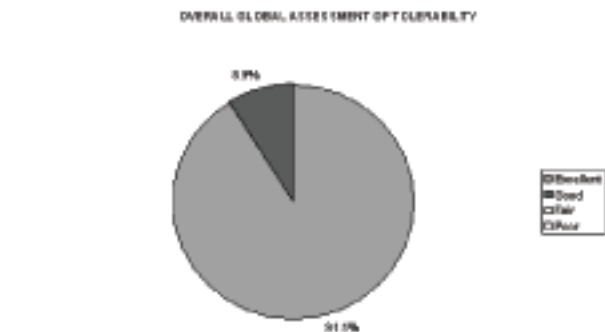
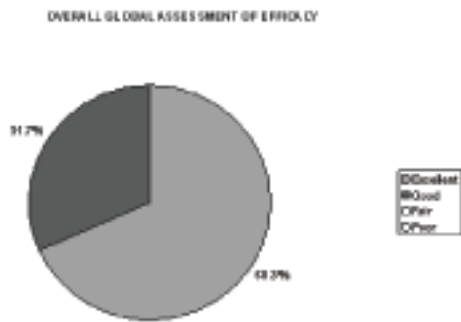
Mean number of rescue medication free nights in the

Table 1:

Mean score	Baseline	2 week	4 week
Cough	2.31 ± 0.78	*1.03 0.60(! 55.4%)	*0.28 ± 0.45(! 87.9%)
Wheeze	1.91 ± 0.88	*0.29 0.46(! 84.8%)	*0.00 ± 0.00(! 100%)
Tightness of chest	0.95 ± 0.92	*0.05 ± 0.22(! 94.7%)	*0.00 ± 0.00(! 100%)
Shortness of breath	1.73 ± 0.83	*0.41 ± 0.49(! 76.3%)	*0.18 ± 0.38(! 89.6%)
Total	6.90 ± 2.82	*1.78 1.14(! 74.2%)	*0.46 ± 0.50(! 93.3%)

By ANOVA (Kruskal Wallis)

*P < 0.05 Significant



preceding fortnight was 9.53 at baseline. At the end of 2 weeks of treatment mean number of rescue medication free nights showed a significant increase of 44.7% from baseline. At the end of 4th week of treatment mean number of rescue medication free nights showed an increase of 46.9% which was also significant from baseline.

Investigators overall global assessment of efficacy and tolerability

According to the investigator 68.3% of the total cases had an excellent effect followed by 31.7% good efficacy of treatment. Also, 91.1% of the total cases had an excellent tolerance followed by 8.9% good tolerability of treatment.

Discussion

The combination of inhaled corticosteroids (ICSs) and long-acting b₂-adrenergic agonists (LABAs) is recommended by the National Asthma Education and Prevention Program asthma guidelines for patients whose symptoms are not adequately controlled with low- to medium-dose ICSs alone.⁸

In this surveillance study we evaluated the MDI and DPI of the fixed dose combination of Formoterol and Fluticasone in clinical practice. The results presented here are the analysis of data only at one centre in India. Hence, the sample size is small.

In this study, we observed that at the end of 4 week of treatment with MDI and DPI of the fixed dose combination of Formoterol and Fluticasone, study population reported a significant reduction of mean cough score by 87.9% from baseline (Baseline 2.31 Vs 0.28 at 4 week). Similarly, the mean scores for wheeze and tightness of chest reduced to 0 from baseline (a reduction of 100%). The mean score of shortness of breath also showed a significant reduction of 89.6% at the end of study period from baseline.

The secondary efficacy variables also showed a significant increase in favor of MDI and DPI of the fixed dose combination of Formoterol and Fluticasone. At the end of the study period, the number of symptom free days and nights increased significantly. Similarly, Number of rescue medication-free days and nights in the preceding fortnight also increased significantly.

None of the patient participating in this study complained of any adverse effect in due to the fixed dose combination

of formoterol + fluticasone MDI or DPI.

Conclusion

A fixed dose combination of formoterol + fluticasone MDI/ DPI is safe and efficacious in the management of Indian asthmatic patients not adequately controlled on inhalational corticosteroids alone.

Disclosures

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References

1. Busse WW, Lemanske RF. Advances in immunology/asthma. *N Engl J Med* 2001;344:350–62.
2. Masoli M, Fabian D, Holt S, et al. The global burden of asthma: executive summary of the GINA Dissemination Committee Report. *Allergy* 2004;59:469–78
3. Woolcock A, Lundback B, Ringdal N, et al. Comparison of addition of salmeterol to inhaled steroids with doubling of the dose of inhaled steroids. *Am J Respir Crit Care Med* 1996 May; 153 (5): 1481-8
4. Pauwels RA, Lofdahl CG, Postma DS, et al. Effect of inhaled formoterol and budesonide on exacerbations of asthma. Formoterol and Corticosteroids Establishing Therapy (FACET) International Study Group. *N Engl J Med* 1997 Nov 13; 337 (20): 1405-11
5. Global Initiative for Asthma. National Institutes of Health, National Heart, Lung and Blood Institute. Publication number 95-3659. 1995; Chapter 7: 70-117
6. Adkinson: Middleton's Allergy: Principles and Practice, 7th ed. Chapter 85 - Beta-Adrenergic Agonists. Vol 2. Copyright © 2008 Mosby, An Imprint of Elsevier
7. Phillipps GH: Structure-activity relationships of topically active steroids: the selection of fluticasone propionate. *Respir Med* 1990; 84(suppl A):19-23
8. National Asthma Education and Prevention Program. Expert panel report 3: guide-lines for the diagnosis and management of asthma—Full report. Bethesda (MD):National Institutes of Health; 2007. NIH publication no. 08-4051.

Tympanoplasty with and without mastoidectomy for non-cholesteatomatous chronic otitis media

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Abstract

Chronic otitis media is an inflammatory process of the mucoperiosteal lining of the middle ear space and mastoid. Infection represents the single major cause for the failure of tympanoplasty and can result from a hidden mastoid disease. Cortical mastoidectomy is an effective means of repneumatizing the mastoid and eradicating the mastoid source of infection. The effect of mastoidectomy on patients without evidence of active infection remains highly debated and unproven.

Keywords

Type I tympanoplasty, Cortical mastoidectomy.

Introduction

Chronic otitis media is an inflammatory process of the mucoperiosteal lining of the middle ear space and mastoid. Although much has been written about the pathology, treatment modalities and outcome of cholesteatomatous ear disease, little has been mentioned about management of non-cholesteatomatous Chronic Suppurative Otitis Media (CSOM).¹ It is well accepted that the main purpose of operation is to obtain permanently dry ear and close the perforation and improve the hearing. The use of mastoidectomy as a means to establish drainage of a complicated infection of the ear sparks little controversy.² Well trained, experienced otologists currently remain divided as to the importance of mastoidectomy in the treatment of chronic non-cholesteatomatous suppurative otitis media. However, the use of mastoidectomy to treat chronic drainage or suppuration from otitis media remains an issue of debate. Some authors have thought that mastoidectomy is justified in cases of chronic suppurative otitis media, which have been refractory to maximal antibiotic therapy.³ Other authors have argued that closure of tympanic membrane perforations and elimination of chronic drainage can be achieved effectively when performing tympanoplasty with or without mastoidectomy. The non-mastoid causes of graft failure include general disability, technical error, and most importantly – eustachian tube dysfunction.⁴ Mastoid factors include the extent of mastoid pneumatization and the presence of inflammatory disease in mastoid, while there is little controversy over the importance of non-mastoid factors; otologists have debated the role of mastoid in tympanic membrane reconstruction. Some

argue that tympanic membrane perforations should be repaired by type I tympanoplasty alone, regardless of the status of the mastoid, others advocate mastoidectomy coupled with tympanic membrane repair when mastoid condition warrants. Ventilation of middle ear is an essential predictor of functional results following middle ear reconstruction⁵. It is a complex and dynamic process depending upon a number of factors. Most important of which include the functional status of the eustachian tube, the degree of pneumatization of mastoid air cells and the condition of middle ear mucosa. The role of mastoid pneumatization in the middle ear aeration is not exactly known. But it forms an air reservoir and acts as a surge of tank to minimize pressure fluctuation.^{6,7} The exact mechanism of the pneumatization of the mastoid air cell system and the factors influencing the pneumatization are poorly understood. The pneumatization has been linked to hereditary and genetic factors. It has also been related to the size of the skull and the height of the individual.⁸ The functional status of the eustachian tube has been correlated to the pneumatization of the mastoid air cells by some authors, whereas, others do not confirm a significant correlation between the two. However, the ears with chronic suppurative otitis media have consistently shown a reduction in the size of mastoid air cell system. The purpose of this study is to examine the role of the mastoid air cells in the tympanic membrane reconstruction.^{9,10} The goal is to determine whether mastoidectomy is an effective means of repneumatizing the mastoid air cell system and eradicating mastoid sources of infection, to analyse the post-operative results for non-cholesteatomatous CSOM treated by tympanoplasty with or without mastoidectomy and to determine whether mastoidectomy is helpful or not.

Materials and methods

This study comprises of 60 patients with chronic suppurative otitis media safe type in quiescent stage. All the cases were operated during a period of 2 years between June 2005-June 2007 in the department of ENT, Father Muller Medical College, Mangalore: 30 of these cases were selected for type I tympanoplasty alone (Group A) and 30 cases were selected for type I tympanoplasty with cortical mastoidectomy (Group B).

The work up for these cases consisted of a detailed history and a complete general physical, systemic and ear, nose and throat examination. In all the patient a routine blood and urine examination, X-ray of paranasal sinuses and

mastoids, examination under microscope and puretone audiometry were done. Eustachian tube function was assessed clinically. The size of the mastoids was roughly measured by using a graph paper, on which the X-ray film of the mastoid taken in the lateral oblique view was superimposed.

Results

Sixty cases of type I tympanoplasty were studied during a period of two years from June 2005 to June 2007 in the Department of ENT, Father Muller Medical College, Mangalore. The study group comprised of 55 patients, five of whom operated on both the ears, thus making the total number of operated cases sixty. Out of 60 patients 30 cases were selected for type I tympanoplasty alone (Group A) and other 30 cases were selected for type I tympanoplasty with cortical mastoidectomy (Group B).

Table 1: Showing groups

Type I tympanoplasty (Group A)	Type I tympanoplasty with cortical mastoidectomy (Group B)
30 cases	30 cases
Total no. of cases 60	

The age and sex incidence and various factors influencing the success of Type I tympanoplasty were analysed and the following results were observed.

Table 2: Showing range of age (Age incidence)

Age (in years)	No. of patients	%
10-19	13	23.6%
20-29	21	38.2%
30-39	14	25.4%
40-49	6	11%
>50years	1	1.8%
Total	55	100%

$\chi^2_{(4)} = 21.636$, $p = 0.001$ significant

In present study, number of patients were seen in the age group of 20-29 years (38.2%), ($p = 0.001$) with a mean age of 26.4 years. The youngest patient was 14 years and the oldest 55 years.

In present series only eight type I tympanoplasties were performed on patients aged over 40 years. The graft take up rates were found to be lower in these patients (75%) compared to that of the younger age groups (84.7%) but statistically not significant.

Table 6: Audiological Benefits between the types of perforations

	N	Mean	Std. deviation	95% confidence interval for mean		Minimum	Maximum
Medium	19	6.84	4.682	4.59	9.10	0	18
Large	26	11.85	6.044	9.40	14.29	0	28
Subtotal	5	13.40	3.507	9.05	17.75	8	17
Total	50	10.10	5.877	8.43	11.77	0	28

$F_{(2,47)} = 5.808$, $p = 0.006$ (Significant)

Table 3: Age Factor in Successful Type I Tympanoplasty

Age (in years)	No. of cases	Failures	Take-up rates
10-39 years	52	8 (15.3%)	44 (84.7%)
40 years and above	8	2 (25%)	6 (75%)
Total	60	10	

Table 4: Graft Takeup Rates in Patients with Bilateral CSOM

CSOM-Safe type	No. of cases	Failures	Take-up rates
Unilateral	26	4 (15.4%)	22 (84.6%)
Bilateral	34	6 (17.6%)	28 (82.4%)
Total	60	10	

$\chi^2_{(1)} = 0.054$ $p = 0.816$ (Not significant)

Presence of bilateral CSOM at the time of Type I tympanoplasty did not seem to have any influence on the graft take up. In present study, 29 patients had bilateral ear disease, but the graft take up rates were similar to that with unilateral CSOM.

Table 5: Size of Perforation with Regard to Graft Up-Take and Audiological Benefit

Size of perforation	No. of cases	Failures	Take-up rates	Average hearing gain
Medium	19	Nil	19 (100%)	6.8 dB
Large	29	3 (4%)	26 (89%)	12.6 dB
Subtotal	12	7 (58%)	5 (42%)	13.4 dB

Adjusted $\chi^2_{(2)} = 18.476$ $p = 0.0001$ (significant)

Higher failure rates were noticed with increasing size of perforation, irrespective of the surgical approach. However, in successful cases of type I tympanoplasty, patients with subtotal and medium sized perforations showed a better audiological improvement (13.4 dB).

According to multiple comparison test significant difference observed between Large and medium central perforations, medium and subtotal perforations.

As seen from the above charts a larger mastoid gives a much better take up rate, as compared to a smaller mastoid, irrespective of whether Type I tympanoplasty was done with or without cortical mastoidectomy. However, with a cortical mastoidectomy, the take up rates were found to be better even for smaller mastoids.

In group A (type I tympanoplasty only) patients the graft take – up rates were 80% compared to 86.7% of group B

Table 7: Relation of the Mastoid Size of Graft Uptake Type I tympanoplasty (Group A)

Size of mastoids	No. of cases	Take up rate	Failure rate
Small	6	4 (66.6%)	2 (34.4%)
Medium	18	14 (77.7%)	4 (22.3%)
Large	6	6 (100%)	0

Adjusted $c^2_{(2)} = 3.317$ $p = 0.190$ (Not significant)

Cortical mastoidectomy + type I tympanoplasty (Group -B)

Size of mastoids	No. of cases	Take up rate	Failure rate
Small	13	10 (76.9%)	3
Medium	15	14 (93.3%)	1
Large	2	2 (100%)	0

Adjusted $c^2_{(2)} = 2.167$ $p = 0.338$ (Not significant)

Table 8: Post – Operative Clinico-Audiological Evaluation

Procedure	No. of cases	Take up rates	Failures	Freedom from discharge	Audiological benefit
Group-A	30	24 (80%)	6 (20%)	25	10.4 dB
Group-B	30	26 (86.7%)	4 (13.3%)	30	9.7 dB

$c^2_{(1)} = 0.480$ $p = 0.488$ (Not significant)

Table 9: To test the significant difference between the two groups with respect to Audiological Benefit

Procedure	No. of cases	Medium	Maximum	Mean	Std. Deviation
Group-A	24	0	28	10.46	6.547
Group-B	26	0	18	9.77	5.294

$T_{(48)} = 0.41,$ $p = 0.685$ (Not significant)

(type I tympanoplasty with cortical mastoidectomy). Although there was failure of the graft to take up in 4 cases of Group B, all the patients were free from ear discharge post operatively. However in the failed cases of Group A, there was no clinical improvement in five cases and ear discharge persisted even after surgery. The audiological improvement was found to be almost equal in both Group-A and Group – B.

Table 10: Audiological Assessment

Hearing	No. of cases	Percentage
Improvement	47	78.33%
No change	12	20%
Worsened	1	1.7%
Total	60	100%

$c^2_{(1)} = 21.6$ $p = 0.0001$ (Significant)

In our study of 60 cases, there was an average hearing improvement of 10.74 dB in speech frequencies in 78.3% of cases. 10 cases were not taken into account, as there was failure of graft take up. 2 cases showed no post operative audiological benefit inspite of graft take up. In one case there was deterioration from moderate conductive hearing loss to moderately severe mixed hearing loss after surgery.

Conclusion

Infection represents the single most important cause of graft failure and can result from a hidden mastoid disease. A simple mastoidectomy is an effective means of repneumatizing the mastoid air cell system as well as eradicating the mastoid source of infection. Our study

proves that type I tympanoplasty along with a cortical mastoidectomy gives better results than type I tympanoplasty alone.

References

1. Rizer F. M. Overlay versus underlay Tympanoplasty. Part I: Historical Review of the Literature. Laryngoscope. 1997; 107: 1-23
2. Ortegren. Myringoplasty. Acta Otolaryngology. Suppl: 193, 1-41.
3. Siedentop K.H., Lee R.H and Osenar S.B. Predictability of tympanoplasty results. Arch Otolaryngology. 1972; 94: 146-50.
4. Booth J.B. Myringoplasty – The lessons of failure. The journal of laryngology and otology. 1974; 88: 1223-36.
5. Holmquist J and Bergstrom B. The mastoid air cell system in ear surgery. Arch otolaryngology. 1978; 104:127-9.
6. Wehrs R.E. and Tulsa O.K. Aeration of the middle ear and mastoid in tympanoplasty. Laryngoscope. 1981; 91: 1463-7.
7. Packer P., Mackendrick A. and Solar M. What's best in Myringoplasty: Underlay or overlay, dura or fascia? 1982; 96: 25-41
8. Yung M.W. Myringoplasty: Hearing gain in relation to perforation site. 1983; 97: 11-7.
9. Jackler R.K. and Schindler R.A. Role of the mastoid in tympanic membrane reconstruction, Laryngoscope. 1984; 94: 495-500.
10. Adkins W.Y., White B and Charleston.S.C., Laryngoscope. 1984; 94:916-8.

A study on management of blood bank services at Sir Sunderlal hospital, BHU, Varanasi

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Abstract

Blood transfusion practices in a tertiary care hospital and teaching institute i.e SSL hospital, BHU, Varanasi were analysed through retrospective study of blood bank records for the year 2008-09. It was found that voluntary blood donation was 20.41% and 58.65% in the year 2008 and 2009 whereas replacement blood donations were 79.59% in the year 2008 and 41.35% in the year 2009. Male voluntary blood donors in the year 2008 and 2009 were 92.33% and 90.26% whereas male replacement donors in the year 2008 and 2009 were 91.09% and 89.55% respectively. Most common blood donor age group in the year 2008 -09 were from 21-35 years contributing 52.45% and 51.07% in respective years. Only 70.20% and 55.48% whole blood of the total blood units was utilized during this period and rest in the form of blood components. The prevalence of HIV seropositivity was nil. Hence it is inferred that more than 99% of the total blood collected in this blood bank is safe to use.

Keywords

Model Blood Banks, Blood transfusion, seropositive, Emergency obstetric care, External and Internal Quality control, NACO-National AIDS control organisation, EmOC-Emergency obstetric care.

Introduction

Blood is the river of life that flows through the human body. We cannot live without it. The heart pumps blood to all our body cells, supplying them with oxygen and food. At the same time, blood carries carbon dioxide and other waste products from the cells. Blood also fights infection, keeps our temperature steady, and carries chemicals that regulate many body functions. Finally, blood even has substances that plug broken blood vessels and so prevent us from bleeding to death.

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Blood transfusion is the transfer of whole blood or blood components into a person's bloodstream. People who lose large amounts of blood in accidents, during surgery or due to some illnesses often need blood transfusions. Blood Transfusion is a safe and effective medical procedure that saves many lives [1].

A well organized Blood Transfusion Service (BTS) or blood bank is a vital component of any health care delivery system. A blood transfusion service is a complex organization requiring careful design and management. Essential functions of a blood transfusion service are donor recruitment, blood collection, testing of donor blood, component preparation and supply of these components to the patients. The organization of a blood transfusion service should receive utmost attention and care for smooth functioning of various components of the service. The goal of blood transfusion service is to provide effective blood and blood components which are as safe as possible and adequate to meet the patients' needs.

For quality, safety and efficacy of blood and blood products, well-equipped blood centres with adequate infrastructure and trained manpower is an essential requirement. For effective clinical use of blood, it is necessary to train clinical staff. To attain maximum safety, the requirements of good manufacturing practices and implementation of quality system moving towards total quality management, have posed a challenge to the organisation and management of blood transfusion service. Thus, a need for modification and change in the blood transfusion service has necessitated formulation of a National Blood Policy and development of a National Blood Programme which will also ensure implementation of the directives of Supreme Court of India - 1996.

The policy aims to ensure easily accessible and adequate supply of safe and quality blood and blood components collected / procured from a voluntary non-remunerated regular blood donor in well equipped premises, which is free from transfusion transmitted infections, and is stored and transported under optimum conditions. Transfusion under supervision of trained personnel for all who need it irrespective of their economic or social status through comprehensive, efficient and a total quality management approach will be ensured under the policy. [2]

Materials and methods

A descriptive study was conducted at the blood bank of a tertiary super specialization teaching hospital at northern

part of India i.e. S S L Hospital, BHU, Varanasi. The data for the study were collected from the blood bank unit of subjected hospital containing blood requisition forms and blood issue registers for the period from 1st January 2008 to October 2009 retrospectively using checklists. Interview of all the treating doctors working in various specialties of the hospital was also done using semi structured interview schedule.

14700 donors were registered in 2008 where as in 2009, 13300 donors were recorded. Blood grouping and cross matching was done by gel as well as slide methods. Donor blood samples were tested for hemoglobin by the cyanmethemoglobin method; for HIV, HCV and Australia antigen by ELISA and for syphilis by the VDRL technique. For suspected cases of HIV, samples were sent to screening and surveillance centre (which is also a nodal centre of HIV screening for this region) of this hospital using Rapidex spot test followed by the ELISA method, repeated twice using kits from different companies; and positive cases of Australia antigen and HCV were confirmed by a repetition of the ELISA technique in the Department of Microbiology. The positive samples are discarded subsequently. During the study period the collected data have been used in observation with appropriate percentage method analysis and displayed in the form of tables and their respective graphs.

Observations

Information on demographic profile, risk factors and laboratory results was collected after the donors had been recruited by the blood bank functionaries. These observations thus serve the dual purpose of determining donor profile as well as the efficiency of the process of donor selection by the blood bank staff.

Blood transfusion practices of the treating doctors in Sir Sunder Lal Hospital, BHU, and Varanasi were studied through retrospective study of blood bank records for the year 2008 to 2009 (till October 2009) and interview of the clinicians of various specialties in the hospital. The study revealed that the percentage of voluntary donors have increased from 2008 to 2009. In 2008 about 1/5th (20.41%) donors were voluntary whereas in year 2009 it reached up to about 2/3rd (58.65%) of all blood donations in this hospital. In the year 2008 and 2009 replacement donors were 79.59% and 41.35% respectively. [Table 1]

Out of all voluntary donors the percentage of male donors were 92.30% whereas female donation was only 7.67% in year 2008 and in year 2009 the percentage of male and female blood donors were 90.26% and 9.74% respectively. Hence it was observed that male outnumbered female in

Table 1: Type of Blood Donors for 2008 and 2009 (till October 2009)

Type of Blood Donors	2008		2009	
	No	%	No	%
Voluntary	3000	20.41	7800	58.65
Replacement	11700	79.59	5500	41.35

blood donation. In case of replacement blood donation in the year 2008 male were 90.09% and female 8.91% whereas in year 2009 male and female replacement donors were 89.55% and 10.45% respectively. So it is obvious that in case of replacement blood donation the percentage of female donors have increased in both the years. [Table 2] The age group involved in more than half of the blood donations in the year 2008 and 2009 was between 21-35 years of age and percentage of donations by this group was 52.45% in the year 2008 and 51.04% in the year 2009. This age group was followed by the age group of 36-50 years in which about 1/4th of all blood donations took place. In the year 2008 it was 25.16% and in 2009 it was 25.38% by the same age group. This figure clearly depicts that young adult age group is more productive for blood donation because in this age group physical condition of a person is at its best and according to blood donation policy a person below 18 and above 65 are not allowed for blood donation under normal circumstances. [Table 3]

Table 3: Age Distribution of Blood Donors

Age Group	2008		2009	
	No	%	No	%
18- 20	1956	13.31	1985	14.92
21-35	7710	52.45	6792	51.07
36-50	3699	25.16	3375	25.38
51-65	1335	9.08	1148	8.63
Total	14700	100	1330	100

By study of the Table 4 it is clearly indicated that the percentage requirements of whole blood has declined from the percentage requirement of different components of the blood from year 2008 to 2009. In the year 2008 the utilization of whole blood by this hospital was 70.20% whereas in year 2009 it was reduced to 55.48%. This is a positive trend. It shows the increase in the efficiency of the services of the blood bank of this hospital. This result also indicates the use of advanced techniques for separation, preservation and utilization of different blood cell components.

Table 2: Sex Distribution of Blood Donors

Year	Voluntary				Replacement			
	Male	%	Female	%	Male	%	Female	%
2008	2770	92.33	230	7.67	7105	91.09	695	8.91
2009	10560	90.26	1140	9.74	4925	89.55	575	10.45

Table 4: Blood components used during 2008 and 2009(till October 2009)

Blood components	2008		2009	
	No.	%	No.	%
Whole blood	10319	70.20	7379	55.48
RBC concentrate (packed cell)	4381	29.80	7100	53.38
FFP	4381	29.80	7100	53.38
Platelet concentrate	4381	29.80	7100	53.38
Cryoprecipitate	200	1.36	200	15.04
Platelet pharases	182	1.24	130	0.98
Plasma pharases	64	0.44	70	0.53
Leuco reduced blood product	1031	7.01	350	2.63

Due to stringent donors selection criteria, highly advanced screening tests and efficient blood bank staffs as well as continuous monitoring and evaluation of blood bank services, the status of seropositivity for HIV is nil whereas blood units are also very much safe in respect to other transfusion transmissible diseases. The seropositivity of HBs Ag+, HCV+ and VDRL were 0.57%, 0.14% and 0.12% respectively. More than 99% of the total blood collection is safe to use in the blood bank. [Table 5]

Table 5: Prevalence of major infections in total collected blood units

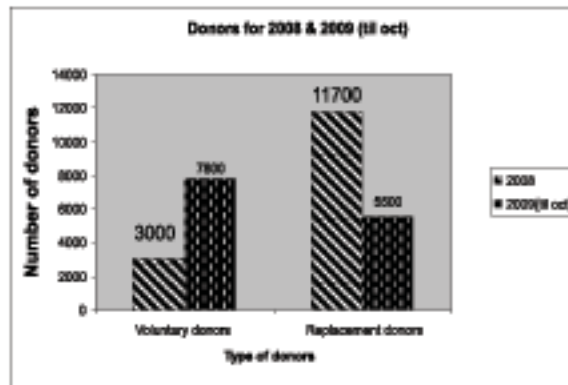
Indicators	Percentage
HIV +	Nil
HBs Ag+	0.57
HCV+	0.14
VDRL	0.12
Total safe blood (%)	99.17

Discussion

In the year 2008 voluntary blood donation was 20.41% and replacement blood donation was 79.59% voluntary donation increase to 58.65% in 2009 whereas replacement blood donation was 41.35%. Education and awareness play a positive role in encouraging hospital attendance and blood donation by creating a demand for blood and dissipating ignorance. In another study only 2.6% of the donations were purely voluntary. This is far below the national average of 39.30% for voluntary donations (Kapoor et al. 2000) [3] vis a vis 50% replacement donations from a study conducted in 1996.

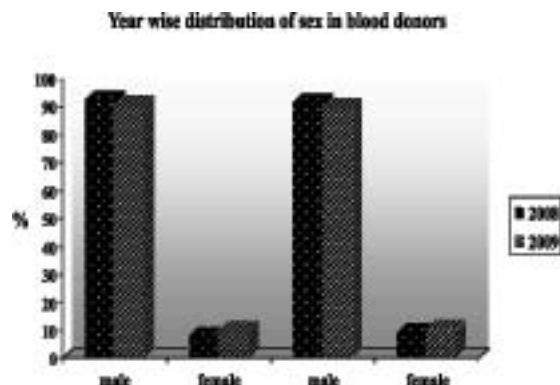
With the introduction of good manufacturing practices and quality assurance programmes in the west told heavily upon the community spirit of blood donation, the ignorance, fear and confusion of our indigenous donor have never given him the courage to donate blood freely on a voluntary basis. In contrast to this UK obtained 52.30% of its blood supply from voluntary donations in the late nineties (Westphal 1997) [4]. [Figure 1]

Figure 1:



Most of the voluntary as well as replacement donors in the year 2008 and 2009 were male, 92.33%, 91.09% in 2008 and 90.26%, 89.55% in 2009 whereas female donors were 16.62% and 20.19 in the year 2008 and 2009. The typical donor is male in 90% of the cases (Madan et al. 2005 figure 1) [5]. [Figure 2]

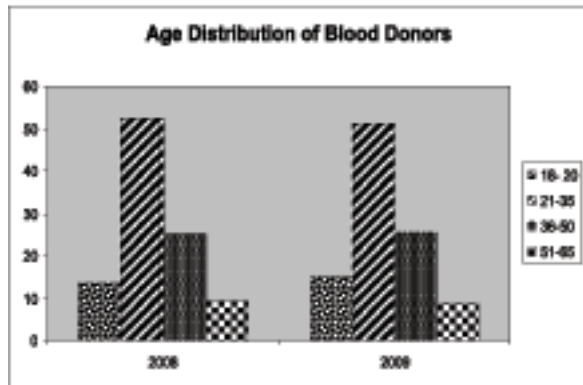
Figure 2:



By the young adult age group (21-35 yr) more than half of the blood donations in the blood bank of this hospital took place in the year 2008 and 2009, 52.45% and 51.07% respectively. About one fourth of all blood donations of this blood bank was contributed by the people of the age group of 36-50 years in 2008 and 2009 i.e. 25.16% and 25.38%. This study is in concordance with results of similar studies conducted by Madan et al. 2005 [5], (figure 1) who describe that the typical donor is a young rural male in the third decade of his life belonging to lower socioeconomic status and donate blood for a close relative. He also tends to be a first time donor, donating mostly out of social compulsion for an exchanged donation of the allergenic kind. [Figure 3]

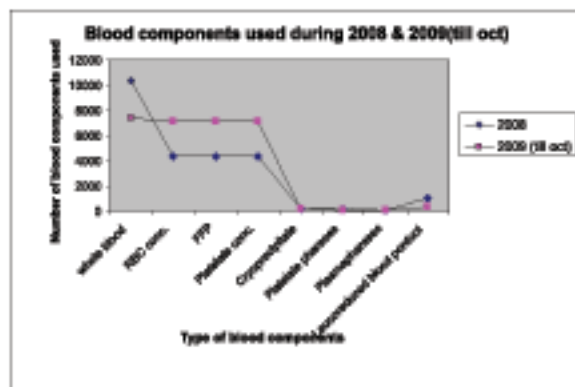
Our study revealed that the requirement of whole blood was 70.20% in the year 2008 and it was reduced to 55.48% in the year 2009. Thereby this study clearly indicates that the requirement of whole blood has reduced and the utilization of different blood components has been

Figure 3:



enhanced. The requirements for whole blood from the blood bank of this centre were during surgery by surgeons and to replenish excessive loss of blood due to hemorrhage caused by accidents. This is a positive result to depict the efficiency of any blood bank. In this regard the blood bank centre of SSL hospital, BHU, Varanasi has been successful in achieving its target and this centre is on the way for its accreditation as a model blood bank. Saxena et al.[6] reported that the utilization of whole blood was 90%, 89% and 81% of the total blood units utilized during the three years respectively. In rest of the cases, packed red cell units were obtained from Red Cross blood bank at Delhi (due to absence of facilities for manufacturing blood cell components at the blood bank). The proportion of single unit blood transfusions out of total transfusions done was 87% during 1992 as well as in 1993 and 89.90% during 1994. Blood was often requested in case of acute hemorrhage due o injuries or internal hemorrhage which could otherwise be treated with plasma expanders. [Figure 4]

Figure 4:



None of the blood samples were seropositive for HIV at our centre due to advanced screening status in this blood bank. After screening for all major diseases HBs Ag+, HCV+, VDRL were positive in 0.57%, 0.14% and 0.12% respectively. Hence it is clearly obvious that more than 99% of the

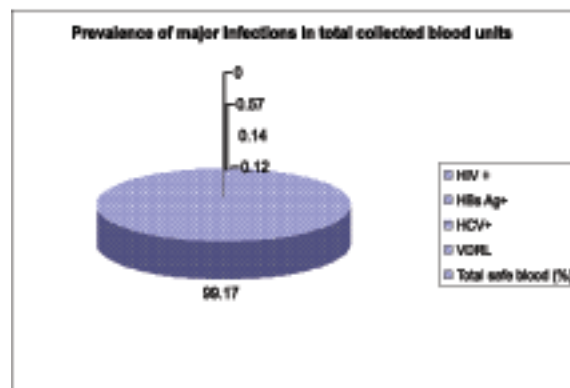
collected blood is safe for transfusion purposes and the remaining infected units are discarded. Ramani et al. 2009 [7] reported in their comparative study of blood transfusion services in Maharashtra and Gujarat states, India.

In Maharashtra, as all blood-banks report to the SBTC, each collected blood unit is screened. In 2005, the seropositivity of HIV in Maharashtra was 0.66%. The state achieved a decline (60.4%) in seropositivity of HIV, along with all major diseases in collected blood units between 1998 and 2005. After screening for all major diseases, 97% of colleted blood units are safe to use; the remaining 3% infected units are discarded.

In Gujarat, some blood-banks are not regularly reporting to the Gujarat SACS. Therefore, the screening status of non-reporting blood-banks is not known. In 1998, the seropositivity of HIV was 0.36%, which reduced to 0.32% in 2005, a decline of 11%. Almost 98% of the total blood collection is safe to use.

Although India has regulations to screen donated blood for HIV, hepatitis B and C, malaria, and syphilis, coverage and sustainability of screening depend on the availability of testing reagents and budget for the same. One hundred percent of blood units in licensed blood-banks are to be screened for all major diseases; however, the status of screening among unregistered blood-banks is unknown. Nationally, 1.2% of blood units are positive for hepatitis B, followed by 0.48% for hepatitis C, and 0.34% for HIV. Thus, an estimated 2% of blood collected is infected and is discarded. [Figure 5]

Figure 5:



Conclusion

While the Indian health sector has made some noteworthy achievements over the last 50 years, it has not responded satisfactorily enough to meet the national goals on blood-transfusion services as is witnessed by the substantial negligence to blood-banking services in the country. In India, blood transfusion relies on very fragmented blood-supply systems, where control is exercised by different layers of the Government, making it difficult to assure the quality of blood and blood products. Two parallel systems are in place to monitor the blood-safety programmes in

India—NBTC/SBTC and NACO/SACS.

The existing blood bank is up to mark in providing its services to the concerned hospital and catered population by it. By application of gel technology the blood grouping and cross matching have become very fast and accurate. Due to efficient and recent advanced blood component separation equipments and storage techniques the consumption of blood components are increased in comparison to whole blood. In this way this centre has been successful in achieving its target. This blood bank centre has also maintained the internal, external as well as additional quality management. The internal quality controls are managed for reagents, manpower, modern equipments and blood products (RBC, FFP and other cellular products). External quality control is approved by National Institute of Biological (NIB), Noida. License number of this blood bank is I. additional quality management is done to detect professional donor by CCTV camera and within a span of fifteen years more than 15000 professional donors are detected.

This blood bank is confirming to the prescribed blood policy and it is in the race for its recognition as model blood bank.

Recommendations

Ensuring a safe supply of blood and blood products and the appropriate and rational clinical use of blood are important public-health responsibilities of every national and state government, especially for saving lives of mothers who need comprehensive EmOC services because of pregnancy-related hemorrhage, severe anemia, or abortions. The mechanism of availability of blood in rural areas is quite frail. There is a need for networking between

urban blood-banks and rural blood-storage units. And as there is no special provision for timely blood supply for maternal emergencies in rural areas, it may not be possible to reduce maternal mortality due to hemorrhage, anemia, and abortions. The use of blood components, at least in urban areas where facilities exist for storage of components, will also enhance supply of whole blood for rural areas. This blood bank is following the national blood policy, the Supreme Court judgment and directions of 1996, universal precaution norms as well as objectives and policy of NACO (National Aids Control Organization) Ministry of Health and Family Welfare, Government of India. Hence this centre is recommended for its status as a model blood bank.

References

1. www.bloodbank.bsacs.org
2. National Blood Policy 2000
3. Kapoor et al: Blood transfusion practices in India: results of national survey; *Ind. Jr. of Gastroent: April-June, 2000 (19:2); 64-71.*
4. Westphal RG. Donors and the US Blood Supply. *Transfusion 1997 (37): 237-41.*
5. N. Madan, J. Qadiri, F. Akhtar. Study of Blood Donor Profile at a Tertiary Care Teaching Hospital. 2005. *Journal of the Academy of Hospital Administration. Vol. 17, No. 2*
6. P Saxena, A Banerjee. Blood transfusion practices - A case study. 1999. *Indian J Med Sci. 53(1):18-21.*
7. K.V. Ramani, Dileep V. Mavalankar, and Dipti Govil. Study of Blood-transfusion Services in Maharashtra and Gujarat States, India. *Journal of Health, Population and Nutrition. 2009. Vol. 27, No. 2, Apr, pp. 259-270.*

Dental Care in Diabetes: A Review

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Abstract

The prevalence of diabetes is increasing worldwide. Diabetic population is growing fastest in south Asian region. Currently India is having more than 45 million diabetics. As the longevity of diabetic patients is being increased due to effective diagnostic protocols, increasing awareness and better treatment options available, more and more dentist has to come across diabetic population with dental problems. Therefore, it is important for dentists to be aware of medical and dental management considerations for this expanding patient population. Diabetes mellitus can have a significant impact on the delivery of dental care.¹

Introduction

The link between diabetes and oral health can't be ignored. In fact, dental problems in people with diabetes are so rampant that Mark Finney, DDS, believes oral disease should be referred to as "the sixth 'opathy' of diabetes," deserving of the attention given to retinopathy, neuropathy, nephropathy and the likes. While everyone is prone to periodontitis, or diseases of the tissues surrounding the teeth and gingiva, people with diabetes often have more severe cases that can both cause and predict additional diabetic complications. So for people with diabetes, getting that cleaning and check-up are especially important. Unfortunately, most diabetics do not pay enough attention to the increased need for oral care and the potential for dental problems that accompany this disease.²

Oral complications

The first oral complication of diabetes is periodontal disease, which stems from a chronic inflammation caused by various types of bacteria and microbes in the oral cavity of diabetics. The first stage of periodontal disease is gingivitis, which occurs when the bacteria in dental plaque irritate the gingiva and cause infection, to which your body responds by causing the gums to become red and swollen and bleed easily. Gingivitis only rarely causes discomfort, and therefore, it is especially important that diabetic patients train themselves to be aware of even slight changes in gum tissue and consult with their medical and dental care providers. It is important to note that gingivitis in diabetics is a direct result of poor glycemic control, and

is not because of higher levels of plaque accumulation. Diabetes does not significantly increase plaque. Getting and keeping your blood sugar level even will go a long way toward solving your gingival problems. Research indicates that the risks of developing periodontal disease appears to increase over time for those with diabetes; while those who have had diabetes for fewer than 10 years are less likely to lose teeth due to the complications of their disease.²

Improving control over blood sugar levels is the best way a person with diabetes can improve overall oral health, because diabetes weakens the body's normal defenses against disease. Diabetes also adversely affects salivary gland production, causing xerostomia, or dry mouth, which leads to having higher concentrations of glucose in saliva and bacteria in the mouth. Elevated salivary glucose and dry mouth both increase the likelihood of dental cavities.³

How xerostomia affects oral health

When the normal environment of the mouth is altered due to a decrease in salivary flow or alteration in salivary composition, a healthy mouth becomes is not only at risk for tooth deterioration, but can suffer from dry, cracked oral tissue as well, which leads to mouth ulcers; an inflamed tongue and inflamed mucosal tissues lining the mouth more likely.

In addition to adversely affecting salivary glands, diabetes causes blood vessels to thicken, which in turn slows down the flow of blood to body tissues, including the gums and dental bones. Good blood flow is essential to provide important nutrients and eliminate harmful wastes from body tissues, including tissues of the mouth. Lowered blood flow causes the gum and bone tissue that support the teeth to become less healthy and less resistant to infection from the bacteria found in dental plaque.⁴

The most common reasons for a dry mouth in a diabetes patient are

- Side effects of medication
- Neuropathy (autonomic)
- Lack of hydration
- Kidney dialysis
- Hyperglycemia
- Mouth breathing
- Smoking

Some clinical signs of dry mouth

- Loss of moisture, glistening of the oral mucosa
- Dryness of the oral membranes
- Irritated corners of the mouth (cheilitis)
- Gingivitis
- Difficulty wearing dentures
- Mucositis
- Mouth sores
- Yeast infection (Candidiasis), especially on the tongue and palate.
- Dental cavities: increased prevalence and located in sites
- generally not susceptible to decay

Dental care for dry mouth patients

The diabetes patient with dry mouth along with his or her oral health team will have to develop a routine for optimal oral health.

Here are some simple ways to accomplish that goal:

- Perform oral hygiene at least four times daily, after each meal and before bedtime
- Rinse and wipe the mouth immediately after meals.
- Brush and rinse removable dental appliances after meals.
- Use only toothpaste with fluoride. Some toothpastes (such as Biotene) are formulated for dry mouth.
- Keep water handy to moisten the mouth at all times.
- Apply prescription-strength fluoride at bedtime as prescribed.
- Avoid liquids and foods with high sugar content.
- Avoid overly salty foods.
- Limit citrus juices (orange, grapefruit, tomato), as well as diet sodas.
- Avoid rinses containing alcohol. Several nonalcoholic mouthwashes are now available on the market.
- Use a lip balm or moisturizer regularly.
- Try salivary substitutes, gels or artificial saliva preparations. These may relieve discomfort by temporarily wetting the mouth and replacing some of the saliva constituents.
- In severe cases, use of pilocarpine might be used under a physician's care.^{4,5}

Diabetics also face increased susceptibility to getting other nasty dental health problems such as oral yeast infections, gingival abscesses, lichen planus, burning mouth syndrome and possible difficulties in wearing dental prosthetics.

Though diligent blood sugar control is the most important factor in maintaining

Diabetic's oral health, rigorous dental hygiene is also imperative for those with this disease, for without it oral health problems can multiply exponentially. No one should smoke cigarettes, and this is especially true for diabetics. Smoking is injurious to gums and mouth tissues and only adds to diabetic dental health problems.

If all of this sounds like bad news, there is an upside:

Diabetics who keep their blood sugar levels in check can usually receive any dental treatments that patients without diabetes can receive, which is especially important if you want to undergo cosmetic dental procedures to improve your smile.^{7,8}

Management issues of operative dentistry among diabetics

To minimize the risk of an intraoperative emergency, clinicians need to consider a number of management issues before initiating dental treatment.

Medical history: It is important for clinicians to take a good medical history and assess glycemic control at the initial appointment. They should ask patients about recent blood glucose levels and frequency of hypoglycemic episodes. Antidiabetic medications, dosages and times of administration should be determined. A variety of other concomitantly prescribed medications may alter glucose control through interference with insulin or carbohydrate metabolism. The hypoglycemic action of sulfonylurea's may be potentiated by drugs that are highly protein-bound, such as salicylates, dicumerol, β -adrenergic blockers, monoamine oxidase inhibitors, sulfonamides and angiotensin-converting enzyme inhibitors. Epinephrine, corticosteroids, thiazides, oral contraceptives, phenytoin, thyroid products and calcium channel-blocking drugs have hyperglycemic effects.

In general, morning appointments are advisable since endogenous cortisol levels are generally higher at this time. Patients undergoing major surgical procedures may require adjustment of insulin dosages or oral antidiabetic drug regimens. Any complications of DM, such as cardiovascular or renal disease, will have their own effects on dental treatment planning. If necessary, the dentist should consult with the patient's physician.⁸

Scheduling of visits: In general, morning appointments are advisable since endogenous cortisol levels are generally higher at this time (cortisol increases blood sugar levels). For patients receiving insulin therapy, appointments should be scheduled so that they do not coincide with peaks of insulin activity, since that is the period of maximal risk of developing hypoglycemia.

Diet: It is important for clinicians to ensure that the patient has eaten normally and taken medications as usual. If the patient skips breakfast owing to the dental appointment but still takes the normal dose of insulin, the risk of a hypoglycemic episode is increased. For certain procedures (for example, conscious sedation), the dentist may request that the patient alter his or her normal diet before the procedure. In such cases, the medication dose may need to be modified in consultation with the patient's physician.

Blood glucose monitoring: Depending on the patient's medical history, medication regimen and procedure to be performed, dentists may need to measure the blood glucose level before beginning a procedure. This can be

done using commercially available electronic blood glucose monitors, which are relatively inexpensive and have a high degree of accuracy. Patients with low plasma glucose levels (< 70 mg/dl for most people) should be given an oral carbohydrate before treatment to minimize the risk of a hypoglycemic event. Clinicians should refer patients with significantly elevated blood glucose levels for medical consultation before performing elective dental procedures.

During treatment: The most common complication of DM therapy that can occur in the dental office is a hypoglycemic episode. If insulin or oral antidiabetic drug levels exceed physiological needs, the patient may experience a severe decline in his or her blood sugar level. The maximal risk of developing hypoglycemia generally occurs during peak insulin activity. Initial signs and symptoms include mood changes, decreased spontaneity, hunger and weakness. These may be followed by sweating, incoherence and tachycardia. If untreated, possible consequences include unconsciousness, hypotension, hypothermia, seizures, coma and death.

If the clinician suspects that the patient is experiencing a hypoglycemic episode, he or she should terminate dental treatment and immediately administer 15 grams of a fast-acting oral carbohydrate such as glucose tablets or gel, sugar, candy, soft drinks or juice. It is important to note that the α -glycosidase inhibitors prevent the hydrolysis of sucrose into fructose and glucose. Therefore, a hypoglycemic episode in a patient taking these drugs should be treated with a direct source of glucose. After immediate treatment, dentists should measure blood glucose levels to confirm the diagnosis and determine if repeated carbohydrate dosing is needed. If the patient is unable to swallow or loses consciousness, the dentist should seek medical assistance; 25 to 30 ml of a 50 percent dextrose solution or 1 mg of glucagon should be administered intravenously. Glucagon also can be injected subcutaneously or intramuscularly.⁷

It is important for dentists to educate patients about the oral implications of diabetes mellitus. Among the mechanisms thought to produce the tissue damage associated with chronic hyperglycemia are glycation of tissue proteins and excess production of polyol compounds from glucose.¹ People with poorly controlled DM also may have impaired wound healing and increased susceptibility to infections. Some people experience peripheral and autonomic neuropathies such as numbness and tingling of extremities, oral paresthesia and burning.

Severe hyperglycemia associated with type 1 ketoacidosis or type 2 hyperosmolar nonketotic state usually has a prolonged onset. Therefore, the risk of a hyperglycemic crisis is much lower than that of a hypoglycemic crisis in a dental practice setting. Ketoacidosis may develop, with nausea, vomiting, abdominal pain and an acetone odor. Definitive management of hyperglycemia requires medical

intervention and insulin administration. However, it may be difficult to differentiate between hypoglycemia and hyperglycemia based on symptoms alone. Therefore, the dentist should administer a carbohydrate source to a patient in whom a

presumptive diagnosis of hypoglycemia is made. Even if the patient is undergoing a hyperglycemic episode, the small amount of additional sugar is unlikely to cause significant harm.² The clinician should measure blood glucose levels after immediate treatment.

After treatment: Clinicians should keep in mind these postoperative considerations. Patients with poorly controlled DM are at greater risk of developing infections and may demonstrate delayed wound healing. Acute infection can adversely affect insulin resistance and glycemic control, which, in turn, may further affect the body's capacity for healing. Therefore, antibiotic coverage may be necessary for patients with overt oral infections or for those undergoing extensive surgical procedures.

If the dentist anticipates that normal dietary intake will be affected after treatment, insulin or oral antidiabetic medication dosages may need to be appropriately adjusted in consultation with the patient's physician. Salicylates increase insulin secretion and sensitivity and can potentiate the effects of sulfonylurea's, resulting in hypoglycemia. Therefore, aspirin and aspirin-containing compounds generally should be avoided for patients with DM.⁸

The following tips are from the National Institute of Dental Health

- Controlling your blood glucose is the most important step you can take to prevent tooth and gum problems. People with diabetes, especially those whose blood glucose levels are poorly controlled, are more likely to get gum infections than non-diabetics. A severe gum infection can also make it more difficult to control your diabetes. Once such an infection starts in a person with diabetes, it takes longer to heal. If the infection lasts for a long time, the diabetic person may lose teeth.
- Much of what you eat requires good teeth for chewing, so it is extremely important to try to preserve your teeth. Because the bone surrounding the teeth may sometimes be damaged by infection, dentures may not always fit properly and may not be perfect substitutes for your natural teeth.
- Taking good care of your gums and teeth is another important measure. Use a soft-bristle brush between the gums and the teeth in a vibrating motion. Place the rubber tip of the toothbrush between the teeth and move it in a circle.
- If you notice that your gingiva bleeds while you are eating or brushing your teeth, see a dentist to determine if you have a beginning infection. You should also notify your dentist if you notice other abnormal changes in your mouth, such as patches of

whitish-colored skin.

Have a dental checkup every six months. Be sure to tell your dentist that you have diabetes and ask him or her to demonstrate procedures that will help you maintain healthy teeth and gums.

References

1. Diabetes statistics. National Diabetes Information Clearinghouse, National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health. Available at www.niddk.nih.gov/health/-diabetes/pubs/dmstats/dmstats.htm. Accessed Aug. 27, 2001.
2. Moore PA, Weyant RJ, Mongelluzzo MB, et al. Type 1 diabetes mellitus and oral health: assessment of periodontal disease. *J Periodontol* 1999;70:409–17.
3. Lin BP, Taylor GW, Allen DJ, Ship JA. Dental caries in older adults with diabetes mellitus. *Spec Care Dentist* 1999;19:8–14.
4. Levin JA, Muzyka BC, Glick M. Dental management of patients with diabetes mellitus. *Compend Contin Educ Dent*.1996;17:82–90.
5. Rees TD. The diabetic dental patient. *Dent Clin North Am* 1994; 38:447–63
6. Sreebny LM, Yu A, Green A, Valdini A. Xerostomia in diabetes mellitus. *Diabetes Care* 1992;15:900–4.
7. Quirino MR, Birman EG, Paula CR. Oral manifestations of diabetes mellitus in controlled and uncontrolled patients. *Braz Dent J* 1995;6:131–6.
8. Haber J, Wattles J, Crowley M, Mandell R, Joshapura K, Kent RL. Evidence for cigarette smoking as a major risk factor for periodontitis. *J Periodontol* 1993;64:16–23.

Effect of examination stress on autonomic functions

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Abstract

Present study was conducted in the Department of Physiology, on first year medical students on two intervals of one academic year; middle of the 1st Term (Pre examination), interval between essay paper and practical examination (Examination). The objectives were to determine the effect of examination stress measured by self-evaluation questionnaire and its correlation with autonomic function tests. The parameters used to measure the level of stress; Spielberger State Trait Anxiety Inventory (STAI) self evaluation questionnaire and autonomic function tests.

The study revealed that, autonomic functions are disturbed during the examination indicated by increase in abnormal autonomic function tests. However the group with elevated anxiety was not associated with increased abnormal autonomic functions from baseline to examinations. The examinations in first year medical students are stressful enough to affect the autonomic functions by increasing the abnormal autonomic function tests.

Keywords

Examination Stress, Stress and autonomic functions

Introduction

The stress system is essential for individual and species survival. Normal stress system function is crucial for maintenance of mental and physical health. Dysregulation of stress system entails pathophysiology. The human body reacts to stress by activating a complex repertoire of behavioral and physiologic responses.¹ Stress is produced when stressor interacts with individual's appraisal of it to induce emotional behavioural and physiological reactions.² The present study adds to the literature of the level of stress during examination and its impact on autonomic functions in a cohort of first year medical students. Objectives of the Study was to determine the effect of examination stress measured by self-evaluation questionnaire and correlation of examination stress with autonomic function tests.

Methodology

Forty medical students studying in first academic year admitted for the first year. The total strength of 1st year

Medical students was 150. Using a random number table, 30 students were selected. Additional 10 students who wanted to participate in the study were also enrolled. Thus systematic randomly selected Cohort of 40 1st year Medical students were the sample for the study underwent evaluation at two intervals as follows:

1. Midterm: Pre examination
2. During the first terminal examination - interval between essay paper and practical examination: Examination

All healthy 1st year medical students who were mentally and physically fit, studying in the 1st academic term were included in the study. Students with any illness fever or on drug treatment were excluded from the study. A written informed consent was obtained from the participants. Information about demographic, social, cultural, and life-style factors were collected using a proforma of questionnaire.

Stress was measured during first terminal examination since it was the first major examination faced by the students after entering into the professional course. Two parameters were used to measure the level of stress;

1. Spielberger State Trait Anxiety Inventory (STAI) self-evaluation questionnaire to measure the level of stress.³ and
2. Autonomic function tests.⁴

1) STAI self evaluation questionnaire

Spielberger State Trait Anxiety Inventory (STAI) self-evaluation questionnaire comprises of separate self-report scales for measuring two distinct anxiety concepts: anxiety state (A-state) and anxiety trait (A-Trait). "State" items require him to report how he/she feels at this moment, while the "Trait" items ask the respondent to indicate how he/she generally feels. Each section of the inventory comprises of 20 items.

Scoring

Participants respond to each STAI item by rating themselves on a four point scale. Hence, the range of possible scores varies from a minimum of 20 to a maximum of 80 on both the A-State and A-Trait subscales.

The students were subdivided into two groups based on STAI state anxiety scores with those scoring < 40 considered as low anxiety group while those with a score of > 40 were considered as high anxiety group.

Autonomic function tests (AFT)

These tests involved variation in heart rate and blood pressure to variety of stimuli. Beat to beat heart rate was measured using students physiograph, from a continuous running electrocardiographic (ECG) record. Blood pressure was recorded manually using sphygmomanometer. Autonomic function tests were,

1. Heart rate variation during the deep breathing, 2. Heart rate Response to Valsalva manoeuvre, 3. Immediate heart rate response to standing, 4. Blood pressure response to sustained handgrip and 5. Blood pressure response to standing.

Based on autonomic function tests (AFT) students were divided into two groups one with normal autonomic function tests and another with abnormal tests. Students showing borderline or abnormal tests were included in abnormal classification of AFT and remaining students showing normal AFT are included in normal group.

Statistical analysis

Student's t test and Mc Nemar test were used for analysis of the data. Statistical results were considered significant at $p < 0.05$.

Results

Pre- examination readings were considered as baseline values. Out of 40 students recruited (25% of the class), 32 students (80% of recruited) completed the study. The study participants included 20 boys (representing 20% of total boys) and 12 girls (24% of total girl population). The data for the group ($n=32$) were averaged and expressed as mean \pm standard deviation. Means were compared between groups at two different times and within the groups, and correlated with AFT.

Students showing abnormal AFT increased from baseline to examinations ($P > 0.05$). (Table 1)

Table 1: AFT normal and abnormal group comparisons on two intervals.

AFT Subgroups	Pre examination	Examination
Normal ($n=32$)	24	18
Abnormal ($n=32$)	08	14

Comparison of STAI and AFT on two intervals

At baseline reading, low anxiety group showed lower abnormal AFT compared to high anxiety group ($p > 0.05$). But these students observed during examination low anxiety group showed more abnormal AFT, compared to high anxiety group (Table 2).

Discussion

The students showed rise in abnormal autonomic function tests from baseline to examinations. This finding was

Table 2: Comparisons of abnormal AFT in the students classified in low (≤ 40) and high anxiety (> 40) at baseline on two different intervals.

STAI subgroups	AFT	
	Pre-examination	Examination
≤ 40 ($n = 19$)	4 (21.05%)	6 (31.57%)
> 40 ($n = 13$)	3 (23.07%)	2 (13.35%)

consistent with other studies which showed moderate real-life stressor, raises resting arterial pressure and in addition, induces important humoral changes and impairs autonomic regulation.⁵ Another study showed that exercise induces a response of the sympathetic nervous system, psychological stress induces primarily an adrenal response.⁶ The persons who are undergoing chronic life stress are confronted with an acute psychological challenge, an exaggerated psychologic and peak sympathomedullary reactivity occurs.⁷ The study carried out on medical students suggests that with high self-report stress scale there was an impaired cardiac autonomic regulation. The findings are suggestive of a shift in cardiac autonomic regulation towards sympathetic activation in response to real life stressors.⁸ However in this study the expected increase in abnormal autonomic functions in the high anxiety group was not observed.

The results of this study should help understand the pattern of response to the examination stress and enable development of strategies that will assist the students to handle the stress in a more efficient manner. The strategies could be the one, which enable the students to face the examination or to increase the number of formative tests that will give feedback to the students and guide them to improve deficiencies in learning.

Conclusion

The examinations in first year medical students, affects the functioning of autonomic nervous system. Continued follow up of this cohort can provide information regarding changing response to stress and can help medical teachers understand more about stress among their students and guide them to improve in academic context which is important for student achievement.

References

1. Chrousos, G. P., McCarty, R., Pacak, K., Cizza, G., Sternberg, E., Gold, P.W. et al. Stress: Basic mechanisms and clinical implications. The New York Academy of Sciences 1995; 771: 15-8.
2. British Medical Association. Work related stress among senior doctors: A review of research. London: Health Policy and Economic Research Unit (HPERU); 2000.
3. Spielberger, C. D. Manual of the state trait anxiety inventory (Self evaluation questionnaire Palo Alto, California, Consulting Psychologists Press 1970.
4. Ewing, D. J., Clarke, B. F. Diagnosis and management

- of diabetic autonomic neuropathy. *Br. Med. J.* 1982; 285: 916-20.
5. Daniela Lucini; Guido Norbiato; Mario Clerici; Massimo Pagani. Hemodynamic and Autonomic Adjustments to Real Life Stress Conditions in Humans. *Hypertension*. 2002;39:184.
 6. Joel E. Dimsdale. Plasma Catecholamines in Stress and Exercise. *JAMA*. 1980;243(4):340-342.
 7. JL Pike, TL Smith, RL Hauger, PM Nicassio, TL Patterson, JMcClintick, C Costlow and MR Irwin. Chronic life stress alters sympathetic, neuroendocrine, and immune responsivity to an acute psychological stressor in humans. *Psychosomatic Medicine*, Vol 59, Issue 4 447-457.
 8. K. Srinivasani, Mario Ario Vaz and S. Sucharita. A Study of stress and Autonomic nervous function in first year undergraduate medical students. *Indian J Physiol Pharmacol* 2006; 50 (3) : 257–264.

Six thinking hats technique for evaluation and strategic formulation in postgraduate medical teaching system

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Abstract

Background

Six thinking hats" technique has been used in both private and government sectors worldwide. The technique symbolizes six different colors of the hat to induce group brainstorming in systematic fashion. We share our experience of applying this technique in medical school setting.

Material and methods

Twenty-one departments were invited to send two faculties and at least one resident to participate in this activity. "Six thinking hats" technique was introduced to all participants, then seven minutes were allocated to each hat for brainstorming session.

Results

Twenty-one faculties and 11 residents attended in the morning for postgraduate medical teaching session, and 16 faculties with 11 residents participated in the afternoon for medical research session. The analytic results from "Six thinking hats" technique were delivered from the group members in systematic fashion.

Conclusions

"Six thinking hats" technique has been demonstrated as a feasible and acceptable choice to create responsive and possible interventions to existing problems in the medical school system.

Keywords

Six thinking hats, Strategic formulation, Medical school

Background

Faculty of Medicine, Chulalongkorn University, has been recognized as one of the best medical schools in Thailand. Our missions comprise provision of tertiary medical services, undergraduate and postgraduate medical training, and generation of high quality and high impact medical research. In order to maintain a top level of standard in those missions amid rapid changes from globalization trend, it is noticeable that many organizations has tried to utilize both conventional and innovative

methods in assessment, monitoring, evaluation, and formulation of effective development strategy.

Six thinking hats technique has been used in private and government sectors worldwide^{1, 2}. The technique symbolizes six different colors of the hat, i.e. yellow, black, white, red, green, and blue, to induce group brainstorming in systematic fashion. Yellow color is to let the group assess strengths or good points of the system they are considering, whereas black is to spell out weak points or bad things happening in the system. White hat is used to induce the analysis whether the system has run on evidence-based fashion or not, and which evidence has been used as well as any necessary evidences is absent. For red color, a rapid emotional reflection from the member of the group will be generated in order to see overall atmosphere regarding the system we are considering. Green hat is used to stimulate creative thinking from group members to find out improvement strategies, and finally the blue hat is for assisting the group to summarize what and how they may go back to their department to implement those strategies step-by-step. This study is to share our experience of applying strategic analysis technique from business sector named "Six thinking hats" in medical school setting.

Material and methods

As a pilot project, twenty-one departments involving postgraduate medical training and medical research were invited to send two faculties and at least one resident to participate in this activity. The activity was divided into two main sessions: three hours in the morning involved evaluation and strategic formulation for postgraduate medical teaching system, and another three hours in the afternoon for medical research.

The participants were divided into three groups, 10-12 members in each group. The objective of the activity was explained and the questions were welcome with clarification until well understanding was achieved.

Six thinking hats technique was introduced to all participants by Dr.Thira Woratanarat, a facilitator of this activity. Since this was the first time for all participants exercising this technique, seven minutes were allocated to each hat for determining and discussing on the issue of teaching and research in accordance with the sessions. In real life, five minutes are usually spent for each hat except a minute for red hat. There was a note-taker in each group for jotting down the details as well as consensus on the

flip chart.

In order to assist better understanding and wrapping up all outputs, after six hats session finished, a representative from each group went up to present their outputs to all participants.

After the activity, all outputs were compiled and analyzed by knowledge management subcommittee of the Faculty of Medicine, Chulalongkorn University, so as to write up a policy recommendation as well as action plan for the administrators, and in parallel send those documents back to each department for their further use.

Findings

Twenty-one faculties and 11 residents attended in the morning for postgraduate medical teaching session, and 16 faculties with 11 residents participated in the afternoon for medical research session. However, the results of medical research session were reported elsewhere.

Postgraduate medical teaching session

Red hat

After consensus was achieved, there were two types of expression regarding postgraduate medical teaching at Faculty of Medicine, Chulalongkorn University. Most of the faculties expressed urgent need for improvement in current teaching system, whereas the resident group reflected this as a tough system with impaired work-life balance.

Yellow hat

In light of the strengths of existing teaching system, the results from faculty group and resident group were described in Table 1.

Black hat

Regarding the weakness of existing teaching system, the results from both faculty group and resident group were shown in Table 2.

White hat

The groups spent their time discussing the evidences they used in current teaching system, and what they thought were necessary to have for teaching system improvement. The results were demonstrated in Table 3.

Green hat

The participants scrutinized the results from aforementioned discussion to generate some "how-to" processes in order to improve postgraduate medical teaching system as shown in Table 4.

Blue hat

After finishing previous five hats, the members configured the steps necessary to fostering "how-to" ideas into actual implementation either at their own departments or at the Faculty level. The results were demonstrated in Table 5.

Discussion

Main missions of the medical schools in Thailand comprise teaching, research, and service provision. We have been acquainted with common problems in every institution, for instances, limited resources, high work burdens, etc. Frequently, most of medical schools exercises single-loop problem solving strategy, i.e., encountering the problem and then find out alleviating solution. For this kind of problem solving, the solution may be only symptomatic and temporarily effective. Sometimes this measure also

Table 1: Strengths of postgraduate medical teaching system

Faculty group	Resident group
<ul style="list-style-type: none"> • Appropriate specialty diversity. • Support for medical service and research system. • Good source for prospective faculty screening. • Flexibility. • Unity and warm relationship 	<ul style="list-style-type: none"> • Good academic environment • Quality of the faculties • Critical and systematic thinking • Patience training for tough situation such as workloads tolerance

Table 2: Weaknesses of postgraduate medical teaching system

Faculty group	Resident group
<ul style="list-style-type: none"> • Very high workloads • Low compensation • Inadequate workforce • Young faculty and resident have low tolerance to tough works • Inadequate teaching resources such as limited spaces, materials, and budget • Some faculties and residents have limited capabilities on teaching and communication skills 	<ul style="list-style-type: none"> • Very high workloads • Low compensation • Inadequate welfare • Working more than studying • Inadequate teaching resources • Complicated working system • Limited work safety system

Table 3: Evidences used and evidences in need for postgraduate medical teaching system

Evidences used	Evidences in need
<ul style="list-style-type: none"> Detailed curriculum Some monitoring surrogates/indicators such as numbers of publication, faculty:resident ratio, workloads report, work schedule, satisfaction survey Department working guideline for residents Resident evaluation results Employers' feedbacks for residents 	<ul style="list-style-type: none"> Reasons for resignation from residents Evaluation and feedback from society Resident guideline for inter-departmental working

Table 4: How to improve current postgraduate medical teaching system

Faculty group	Resident group
<ul style="list-style-type: none"> Positive reinforcement strategies to increase faculty motivation such as increase compensation Changes teaching system in accordance with societal needs Training the faculty for teaching skills at timely fashion Establish "Professional teaching development team" in Faculty of Medicine, Chulalongkorn University Improve welfare and teaching resources Focus more on work-life balance policy 	<ul style="list-style-type: none"> Increase the number of faculties Increase compensation for the residents Improve welfare and teaching resources Simplify working process and get rid of redundancy for inter-departmental works Focus more on work safety for health personnel

Table 5: Steps to implement for postgraduate medical teaching system improvement

Faculty group	Resident group
<ul style="list-style-type: none"> Establish a war room for SWOT analysis, priority setting, and implementation planning Additional needs assessment for all faculties Collecting residents' feedback to be essential inputs for policy formulation 	<ul style="list-style-type: none"> Inter-departmental resident meeting for knowledge and experience exchange Setting up resident union to have better negotiation power

herald subsequent complication with regards to unexpected impact from different demands and needs among various stakeholders in the system.

"Six thinking hats" technique has been demonstrated as a feasible and acceptable choice in applying the strategic management technique for system assessment and strategy formulation so as to create responsive and possible interventions to existing problems in the system. With appropriate planning for brainstorming activity by inviting all stakeholders to share their concerns, needs, and opinions, in a systematic manner, we did achieve the results that may be used to direct our postgraduate medical teaching system in a common goal. However, the limitations of this technique are the number of experienced facilitators, and requirement of only small to medium sized group (e.g. no more than 7-10 persons per group).

In the organization like medical schools, it would be wise to utilize this technique by organizing several forums with specific aims and appropriate stakeholders in each session. A data-returning strategy might be useful in order to continuously engage all stakeholders after finishing the

sessions.

Conclusion

"Six thinking hats" technique has been shown to be feasible, acceptable, and useful for system assessment and strategy formulation in medical school setting. Data-returning strategy might be of value to keep in touch with all stakeholders after finishing the activity.

Acknowledgement

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Reference

- de Bono E. Six Thinking Hats: An Essential Approach to Business Management. Little Brown and Company; 1985.
- Kamal SB. Evaluating the effectiveness of creativity training. Journal of European Industrial Training, 2005; 29(2):102-111.

Study of Psychiatric co - morbidity in cases of tuberculosis patients undergoing treatment

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Abstract

A study to determine the point prevalence of psychiatric co-morbidity in tuberculosis patients was conducted at the OPD of department of psychiatry at Patna medical college & hospital, Patna. Patients in follow up or new from other departments were interviewed between March 2004 to Nov.2004. 50 cases who were willing to participate and have fulfilled the inclusion/exclusion criteria were selected for the study. Patients were assessed for common mental disorders using the MINI (MINI international neuropsychiatric interview). They were defined according to ICD 10/ DSM IV criteria. Out of 50 patients, 38 patients satisfied the criteria for the different common mental disorders. Most common presentation were hopelessness, sleeplessness, restlessness. Suicidal ideation was significantly associated with these patients.

Keywords

Tuberculosis, Psychosis, GAD, Hallucination

Introduction

Tuberculosis which is caused by the Tubercle bacilli is still one of the leading cause of morbidity and mortality worldwide. Due to low education level, poverty, malnutrition, poor sanitation and hygiene, poor diagnostic and treatment facility it is more prevalent in countries like India. Due to its chronicity, tuberculosis always interferes life either physically, psychologically, socially or economically. It can result in either loss of job, loss of role in the family, huge expenses, abstinence from the job, long hospitalization, segregation/isolation, perception of being infected, significant weight loss, decreased libido, physical and dermatological changes etc.

Moffic HS, Paykel ES (1975) and Cavanaugh (1983) worked on depression in patients who were admitted in medical wards for general medical conditions. They indicated that between 24 – 36 % patients meet the criteria for the depression which is less than the depression in tuberculosis patients.

Purohit DR, Purohit SD and Dhariwal (1978) worked on depression in hospitalized tuberculosis patients and observed that approximately 54% patients were suffering from depression. It was related with the severity and duration of duration of tuberculosis. Moran MG (1985) worked on the concept that how emotional stress can predispose to acquire or relapse of tuberculosis and how

our reactions to the illness affect the recovery process. Bhatia MS, Dubey KK, Bhasin SK & Narendra Sindhi (2000) studied the psychiatric pattern in tuberculosis patients, attending out patient door (OPD) in GTB hospital, Delhi. They observed 78% patients have co-morbid psychiatric problems.

Materials and method

Study was performed on 50 continuous new/ follow up cases who were labeled tuberculosis patients by the department of medicine and department of pathology, during the period of March 2004 to Nov. 2004. Patients of all age group, from both sexes, from all communities, from all socio economic class and willing to participate were included. Patients who are not willing to participate or are not communicable were excluded. Patients with previous psychiatric history or drug history which can produce psychiatric features were also excluded.

Analysis was done by applying χ^2 test and statistical significance was observed. Patients were divided into 3 groups depending upon the duration of diagnosis.

1ST Group- patients who were interviewed within 2 months of diagnosis.

2ND Group- patients who were interviewed after 2 months but within 6 months of diagnosis.

3RD Group- patients who were interviewed after 6 months of diagnosis.

Results & discussion

Total of 50 patients were selected for the study, who fulfilled the inclusion / exclusion criteria. Analysis of data from the table revealed that psychiatric complications in tuberculosis patients were very high (76%).

It could be due to its chronicity, diagnostic dilemma's, long and costly treatments, social stigma associated with it, medical problems (like infertility, pain, breathlessness etc) due to it. Sometimes poor drug compliance leads to incomplete treatment which results in relapses causing great stress to the patients. Physical weakness associated with the disease leads to frequent abstinence from the work place, which adds to more stress financially. Poor social support system give patients a feeling of being neglected, isolated and worthless.

Aim of this study was to define and understand the stresses to which average tuberculosis patients is subject to, along with the common ways of dealing with such stresses.

Underlying this aim is the hope that such understanding will lead to developing ways of helping the patients to achieve an optimal adjustment.

During interview, it was observed that before the diagnosis, patients had apprehension, insomnia, irritability and restlessness. They had fear of death, decreased sleep and appetite with decreased interest in interaction with people due to complications of the disease and uncertainty of diagnosis.

Once diagnosis is made and treatment is started patients feel relaxed and show's sense of relief, but very soon become anxious, irritable and depressed due to worry about the nature of disease and it's complications and prognosis. So they want more and more information. Intermittent episodes of aggression and irritability was reported by family members. It was felt that emotional maturity and education level was important factors for proper adaptation to treatment. Some researcher's have observed that adolescent patients tend to comply less well to drug treatment than adult or older patients. They are irregular in taking medicines, keep on abusing drugs or alcohol. They are more conscious about changes in body functions and appearance. They are more hostile and aggressive than the adult patients. Even interview with these patients were difficult. They showed anger and non cooperation towards staff and treating physicians. Compliance to diet is poor. But suicidal ideation was less prevalent than older patients, may be due to regression. Adult patients are more prone for the depression, as they are very much concerned for their job loss, burden of expenses in the treatment, reversal of role in their family from bread earner to dependent one. Decreased libido and sexual performance also increases their anxiety and depression. Patients of older age groups are more vulnerable for the psychiatric complications. As they are totally dependent on their family, they feel neglected and isolated. Other medical conditions like diabetes, hypertension aggravates the condition. Due to poor social

support these patients are more susceptible for the psychiatric complications.

Table 1, Shows among 50 selected patients , 38 patients presented with psychiatric complications, which is very high and needs attention of treating physicians.

Table2. Shows maximum participation from the age group 40- 60 years which also have maximum prevalence of psychiatric complications in respect of younger generation.

Table 3. Shows maximum participation is from male population, but proportional percentage of psychiatric complication is more in female patients. Although it is insignificantly high. $Z = 0.75$ ($\hat{A}1.75$)

Table 4. Shows more participation of hindu population, but proportional percentage of psychiatric complication is more in muslim patients. After comparison it was observed to be insignificantly high.

Muslim Vs Hindu , $Z = 0.13$ (Insignificant)

Muslim Vs Others $Z = 1.07$ (Insignificant)

Hindu Vs Others $Z = 1.1$ (Insignificant)

Table 5. Shows the most common psychiatric symptoms associated with tuberculosis patients. These were hopelessness(76.31j), sleeplessness(76.31j), restlessness (73.68j) .

Table 6. Shows the most common psychiatric dianosis in tuberculosis patients. GAD (42j), Depression(39j) etc were the most common diagnosis.

Table 7. Shows patients opinion about their social support system.

Only 28 % patients were satisfied of their social support, rest 72% were unsatisfied.

Table 8. During interview, it was mentioned by the patients and their relatives that attitude and support from the medical team including doctor was the most important factor for the overall wellness of these patients. But , sadly only 60% patients were satisfied by the treating medical personals.

Table 1: No. of patients showing psychiatric symptoms

Total no. of patients recruited and interviewed	No. of patients showing Psych complications	Percentage (%)
50	38	76%

Table 2: Age group distribution of interviewed patients

Age group (yrs)	No. of patients	Percentage (%)	patients with psych. complications	Percentage(%) prevalence
0-20	10	20%	6	60%
21-40	18	36%	13	72.22%
41-60	22	44%	19	86.36%

Table 3: Sex distribution of interviewed patients

Sex of interviewed patients	No. of patients	No. of ptsWith psych. complication	Positive Proportional Percentage (p)	Negative Proportional Percentage(q)	SEP	Range
Male	38	28	73.68	26.32	7.14	87-59
Female	12	10	83.33	16.27	10.6	104-62

Table 4: Religion of interviewed patients

Religion of interviewed patients	No. of patients	No. of pts With psych complication	Positive Proportional Percentage (p)	Negative Proportional Percentage (q)	SEP	Range
Hindu	36	28	77.77	22.33	13.35	104-51
Muslim	10	8	80	20	12.6	105-55
Others	4	2	50	50	25	100-0

Table 5: Chief Psychiatric sign's and symptom's of Patients

Complaints	No. of patients	Percentage(%)
Hopelessness	29/38	76.31
Sleeplessness	29/38	76.31
Restlessness	28/38	73.68
Loss of appetite	22/38	57.89
Suicidal ideation	20/38	52.63
Aggressiveness	18/38	47.36
Fear of death	16/38	42.10
Guilt	12/38	31.57
Loss of libido	8/38	21.05
Irrelevant talk	8/38	21.05
Hallucinations	7/38	18.42
Delusion	7/38	18.42

Table 7: Social Support System of interviewed patients

Social Support System	No. of patients	Percentage(%)
Satisfied	14	28
Not satisfied	30	60
Not clear	06	12

Conclusion

1. Although tuberculosis is among the oldest and commonest diseases, studies regarding its psychiatric implications are rare and so are the references from physicians to the psychiatrist.
2. It was found that psychiatric morbidity was very high and study on bigger population is necessary to further evaluate it.
3. Generalised anxiety disorder (GAD) was the commonest psychiatric diagnosis followed by depression.
4. Most of the patients lack social support system and there was poor compliance for the diet also especially
5. Sympathetic attitude from the medical staff's are their hidden desire.
6. Proper and complete cure of these patients are our social responsibility, otherwise it will affect all of us.
7. Proper education and prevention, proper timely diagnosis and appropriate treatment for full duration along with professional, personal, social, moral, financial and vocational support to all tuberculosis patients will stop this epidemic from our country.

References

1. Aydin IO, Ulusahin A: Depression, anxiety co-morbidity and disability in tuberculosis and chronic obstructive

Table 6: Psychiatric diagnosis of interviewed patients

Disorder	No. of patients	Percentage(%)
G AD	16	42.10
Depression	15	39.47
Psychosis	02	5.26
Org. brain syndrome	05	13.15

Table 8: Opinion of patients on the Medical Support System

Opinion	No. of patients	Percentage(%)
Satisfied	20	40
Unsatisfied	30	60

- pulmonary disease patients: applicability of GHQ-12, Gen. Hosp. Psychiatry, 2001, Mar-April, 23(2):77-83
2. Aghanwa HS, Erhabor GE: Demographic/Socioeconomic factors in mental disorders associated with tuberculosis in South West Nigeria, J. psychosom Res. 1998, OCT, 45(4):353-60
 3. Bhatia MS, Bhasin SK, Dubey KK: Psychosocial dysfunction in tuberculosis patients, Ind. J. Med, Sept. 2000, 54, 171.
 4. Bhatia MS, Bhasin SK, Dubey KK, Narendra Sindhi: Psychiatric morbidity in tuberculosis patients, Ind. Medical Gazette 2000, 134/1, 5-6
 5. Bhatia MS, Bhasin SK, Dubey KK: Psychological reactions amongst patients, their family members and the community regarding hospitalized tuberculosis patients in Delhi, Psychiatry Today, 1998, 11, 30
 6. Bhatia MS, Bhasin SK, Dubey KK: Impact of Tuberculosis on sexual relationship amongst hospitalized patients, Indian Practitioner, 1999, 52, 680.
 7. Kaplan HI, Sadock BJ (2003) Synopsis of psychiatry.
 8. Lishman WA: Organic psychiatry, 3rd edition, Blackwell Oxford, 1996, 366-367.
 9. Mayou R, Hawton K: Psychiatric disorders in the general hospital, British Journal of Psychiatry, 1986, 149, 172-190.
 10. Moffic HS, Peykel ES: Depression in medical ill patients, British Journal of Psychiatry, 1975, 126, 346-353
 11. Moran MG: Psychiatric aspects of the tuberculosis, Adv. Psychosom. Med, 1985, 109-118.
 12. Purohit DR, Purohit SD, Dhariwal: Incidence of depression in hospitalized tuberculosis patients, Indian J. TB, 1978, 25, 147-151
 13. Park's text book of preventive and social medicine, 17th edition.

Fluorosis: From Case to Community

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Abstract

Following a diagnosis of fluorosis in a 25 year female patient from Hiresave village in Karnataka, a community survey was undertaken in the village of her residence to investigate the existence of Fluorosis among other residents

Objectives

1. To follow up an index case of fluorosis detected to the community of her residence
2. To detect any hidden cases of fluorosis in the population identified
3. To analyse the sources of water used for consumption for fluoride levels

Methodology

Study Design: Cross sectional study

Study Area: Hiresave village, Channarayapatna Taluk, Hassan District, Karnataka.

Study Population: All residents of the village

Study Methods: House to house visits with personal interviews

Study Period: December 2005.

Results

Clinical and dental examination of the residents of the community done revealed that none of them had any suspected signs of fluorosis. There were three water sources found in the village, all three being borewells which had been dug three years back. The fluoride level in samples from one of the water sources was found to be 1.21 mg/l, which is higher than permissible limits.

Conclusions

The area surveyed was not endemic for fluorosis. The case of fluorosis was an isolated one with no clear cut source of the fluoride responsible for her condition. Use of water

from the source with fluoride levels greater than permissible limits consumption was recommended to be discontinued. Rehabilitative measures for the index case were suggested.

Keywords

Fluoride, Fluorosis, Screening, Permissible Limits, India

Introduction

Excess fluoride in drinking water beyond a tolerance limit is responsible for the disease fluorosis, a serious public health problem in several parts of the world. Fluoride contamination of groundwater reserves has been reported from India, China, Sri Lanka, West Indies, Spain, Holland, Italy, Mexico, and North and South American countries¹. In India, its presence is widespread in several parts of Andhra Pradesh, Uttar Pradesh, Rajasthan, Tamil Nadu, Karnataka, Gujarat, Punjab, Haryana, Bihar and Kerala states^{1,2}.

The occurrence of very high levels of fluoride is seen in the eastern and southeastern region of Karnataka, covering districts of Gulbarga, Raichur, Bellary, Chitradurga, Tumkur and Kolar and scattered areas comprising of nearly 5% of the geographical area of the state¹.

In humans, high oral intake of fluoride causes physiological disorders, skeletal and dental fluorosis, thyroxine changes and kidney damage in humans³. The critical limit of fluoride is influenced by high ambient temperature, alkalinity, calcium and magnesium contents in the drinking water, wherein it may even cause toxicity at lower levels¹.

Though dietary patterns and nutrient intakes of foods high in fluoride can modify toxicity, they cannot over-ride the importance of the fluoride content of drinking water, a fact of crucial importance in the public health control of this critical problem⁴. Identification and mapping of fluorosis affected areas is the first step in the direction of mitigating and controlling the problem⁵.

The Department of Community Health at St. Johns Medical College, Bangalore received a referral from the Department of Orthopedics to opine on the provisional diagnosis of fluorosis in a 25 year old female patient from Hiresave village in Karnataka. Her complaints included paraesthesia in the feet since 19 years, difficulty and pain while walking since 14 years, white and yellow stains, chipping and blackish discoloration of teeth since 14 years, bowing of legs, polyuria and polydypsia since 10 years. The radiographs of the lower arms showed interosseous

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membrane calcification of the forearm bones, which is considered a gold standard finding in a case of fluorosis⁴. The radiographs of the spine showed increased density, of both the femurs showed bowing and stress fractures, and of the tibia/fibula showed exostoses. Serum calcium & alkaline phosphatase levels were also elevated. The test for Bence Jones proteinuria was negative. Skeletal changes as demonstrated in the screening tests for fluorosis⁶ reinforced the diagnosis. Blood and urine fluoride levels were however found to be within normal limits. The final diagnosis arrived at was that this was an old case of fluorosis.

Based on this diagnosis, and the fact that the patient hailed from a village located in the vicinity of a fluorosis endemic area in Karnataka¹, it was decided to undertake a community survey, to search for others in the village having fluorosis, and examine if the water sources used by the villagers for consumption had fluoride levels within permissible limits. The patient was taken to be the Index case in this survey to detect fluorosis.

The objectives of the study were

1. To follow up the hospital-detected index case of fluorosis to the community of her residence
2. To detect any hidden cases of fluorosis in the population identified, and
3. To analyze the sources of water used for consumption for fluoride levels

Materials and methods

It was a cross sectional study done in December 2005, covering all residents of Hiresave village, in Chennarayapatna Taluk of Hassan district, South Karnataka. The Community Health Centre (CHC) at Hiresave was contacted and the demographic profile of the area was noted. With the assistance of ANM's of the CHC, a house to house survey of 266 residents with personal interviews and clinical examination of all of them was done to find if any of them had symptoms of fluorosis.

Methods used in clinical examination to detect fluorosis in the community were those suggested and used by the Public Health Engineering Department, Assam & UNICEF⁶. The aspects covered included dental, skeletal and non-skeletal manifestations of fluorosis. In dental examination, discoloration of the teeth manifesting as mottling of teeth and other dental changes such as yellow/ brown/ black spots/ streaks on the enamel surface were looked for. For skeletal fluorosis, physical tests were done to see if they could touch the chest with the chin, bend forward and touch the toes without bending the knees and stretch their arms sideways, fold at the elbow and then touch the back of their head. The ability to perform these tests ruled out skeletal fluorosis. The presence of genu valgum was also looked for which is also a concomitant finding of skeletal fluorosis⁴. Symptoms of non skeletal fluorosis the subjects were asked a history of non-ulcer dyspeptic symptoms (loss of appetite, gas in stomach, pain in stomach and constipation), recurrent diarrhoea, headache, polyuria,

extreme weakness and still birth which have been seen to be present among affected in fluoride endemic areas⁷. Samples from the water sources accessed by villagers for consumption purposes were collected and the fluoride levels were estimated in the same at the Public Health Institute, Bangalore and at a private accredited laboratory.

Results and discussion

The medical officers at the CHC revealed that following the diagnosis of the index case, a community survey had been undertaken by them to look for signs of dental fluorosis. There had been no cases detected. With this information, the community search was undertaken to detect Skeletal and Dental Fluorosis.

A total of 88 houses with 456 residents were to be surveyed. A total of 76 houses with 398 persons were covered. The rest could not be surveyed as the houses were locked and residents could not be contacted even after 3 attempts to do so. Of 398 persons, 224 (56.28%) were males and 174 (43.72%) were females. There were 42 (10.55%) children aged below five years.

By the tests listed earlier, no cases of suspected fluorosis were detected in the community. However the other related morbidity detected by the survey included dental problems (caries, black discoloration and dental plaques attributed to practices of betel chewing and poor oral hygiene) in 98 (24.62%) persons, backache in 29 (7.2%) persons and bowing of legs in 4 (1%) persons. All these cases however did not demonstrate any concomitant symptoms or signs suggestive of fluorosis. Surveys done in other fluoride endemic areas have demonstrated subjects showing at least some signs with chronic fluoride toxicity⁷. Taking into consideration the long duration of symptoms of disease in the index case, other residents of the village should have demonstrated some symptoms or signs suggestive of fluorosis had the area been endemic for the same. In particular, it has been seen that children under 7 years of age show dental changes of fluorosis characteristically with increasing age^{8,9}. All residents of the village, with special emphasis on the children examined in this survey showed no dental signs of fluorosis. It has been observed in other studies that the prevalence of signs of fluorosis, particularly dental fluorosis and genu valgum or bowing of legs is high among household members consuming fluoride contaminated water⁶. The household members of the index case did not have any such findings. There were three water sources found in the village, all were borewells, dug 3 years ago. Water is pumped into mini tanks and sourced from taps located near tanks. Upon further inquiry, it was also found that the only source for nearly 25 years was a well which had dried up three years back. Samples of water were taken from the three borewells at source and at the collection points. No water sample could be obtained from the open well. Of the six samples, two samples (from a single source and the corresponding collection point) were found to contain levels of fluoride of 1.21 mg/ L which is higher than

permissible limits of 1 mg/L as recommended by the ICMR, by other studies¹⁰ and by the WHO¹¹. The other samples had fluoride levels of 0.79 mg/L and 0.71 mg/L respectively.

Conclusions

It was concluded from the findings of the survey that the area was not endemic for fluorosis. The case of fluorosis was an isolated one with no clear cut source of the fluoride responsible for her condition.

Two of the water sources had fluoride levels within normal limits and were safe for consumption. The third water source had fluoride levels greater than permissible limits and was thus not fit for consumption.

The cause of fluorosis in the index case was not the present water sources. It was further postulated that the old well water was not the cause for the same as other residents of the village who had consumed the water did not show signs or symptoms of fluorosis.

Recommendations

Our recommendations for the index case included disability limitation by taking precautions to prevent further skeletal damage due to stress fractures. Further investigations to look into the cause of fluorosis or an alternative/ missed diagnosis was considered and agreed upon by her, provided the finance and facility was made available. All other forms of Rehabilitation such as vocational, psychosocial and community based rehabilitation were suggested, considering that she had completed her pre-university education and was pursuing a bachelor's degree through correspondence. Vocational rehabilitation was suggested in the form of suitable employment. She was also been informed of the disability benefits provided by the state and for which she is eligible and has begun claim following our intervention.

The family was educated regarding the condition and encouraged to provide psycho social support.

The medical officers of the CHC and community elders were informed to discontinue the consumption of water

from the source found to contain fluoride levels greater than permissible limits.

References

1. Sumalatha S, Ambika S R, Prasad S J. Fluoride contamination status of groundwater in Karnataka. Sourced from the internet at <http://www.ias.ac.in/currsci/mar25/articles13.htm> on 22-12-2009
2. Susheela AK. Fluorosis management programme in India. *Curr Sci*, 1999; 77(10):1250-6.
3. Pareek A. A study on skeletal deformities due to fluorosis. *The Indian Journal of Nutrition and Dietetics*, 1994; 31: 121 – 125
4. Reddy D.R, Srikanth R.D. Skeletal Fluorosis. Sourced from the web at http://www.fluorosisinandhra.org/research_drrajareddy.htm on 22-12-2009
5. Apparao B V, Anitha P and Karthikeyan G. Mapping of fluorosis affected villages. *Proceedings of the 20th WEDC Conference: Affordable Water Supply and Sanitation; Colombo, Sri Lanka, 1994; 101 - 103*
6. Three Phased Programme of UNICEF. Sourced from the web at http://aphe.nic.in/three_phased_programme.htm on 22-12-2009.
7. Pushpa B, Annapoorna K, Meera R and Rama K N. Clinical Symptoms of Dental and Skeletal Fluorosis in Gadag and Bagalkot Districts of Karnataka. *J. Hum. Ecol.*, 2005; 18(2): 105-107
8. Park K. Endemic Fluorosis. In *Textbook of Preventive and Social Medicine*, 18th Edition, 2005; 467
9. Teotia S P S, Teotia M, Singh D P. Fluoride and calcium interactions, syndromes of bone disease and deformities (Human studies). *Proceedings of the International Symposium: Disorders of bone and mineral metabolism. Henry Ford Hospital, Michigan, USA. 1983; 502-3.*
10. Bulusu, K. R. and Biswas, S. K., *Water Quality and Defluoridation Techniques in Prevention and Control of Fluorosis*, 1994, vol. II, p. 61.
11. *Environmental health criteria for fluorine and fluorides; WHO Geneva, 1984; 1-136*

Prostatic intraepithelial neoplasia : Association with benign prostatic hypertrophy and carcinoma prostate

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Abstract

The search for the precursors of prostatic adenocarcinoma has focused on two lesions, prostatic intraepithelial neoplasia (PIN) and atypical adenomatous hyperplasia (AAH). The present study aims to identify PIN and to study its association with Benign Prostatic Hypertrophy (BPH) and adenocarcinoma. It also focuses on different architectural patterns of High grade PIN (HGPIN).

A total of 200 specimens were studied from August 2001 to July 2006. The prostate specimens in the form of biopsy, whole prostatectomy and transurethral resection of prostate were included. The tissue was routinely processed and stained.

PIN was seen in 36.6% of cases of BPH and 82.6% of cases of adenocarcinoma. Low Grade PIN (LGPIN) was more commonly associated with BPH (27.3%) and HGPIN with adenocarcinoma (66.6%). HGPIN is a most likely precursor of adenocarcinoma

The most commonly observed pattern of High grade PIN was tufting (40%). Pattern of PIN has no prognostic significance.

Keywords

Premalignant lesions, Prostatic Intraepithelial Neoplasia, Benign Prostatic Hypertrophy, Prostatic carcinoma.

Introduction

Premalignant lesions have been well documented in a number of organs including uterine cervix, endometrium, GIT and respiratory tract. In case of prostate it is a recent development. The search for the precursors of prostatic adenocarcinoma has focused on two lesions, prostatic intraepithelial neoplasia (PIN) and atypical adenomatous hyperplasia (AAH).¹

The term prostatic intraepithelial neoplasia (PIN) is characterized by severe cytologic changes within the pre-

existing ducts and acini, and Atypical adenomatous hyperplasia (AAH) is characterized by architectural changes, with the proliferation of small glands but without significant cytologic atypia.²

PIN represents the putative precancerous end of the morphologic continuum of cellular proliferation, within the ducts, ductules and acini. The lesion was first described by Mc Neal in 1965 and more precisely characterized in 1986 by Mc Neal and Bostwick, at which time the entity was called, 'Intraductal dysplasia.' The term PIN was endorsed by consensus at 1989 international conference. This consensus also proposed that PIN be divided into two grades (low grade and high grade), to replace the previous three grade system. (PIN 1 is considered Low grade and PIN 2 & PIN 3 are considered High grade).³

PIN 1 consists of an architecturally benign prostatic acini, ducts, or ductules, lined by cytologically atypical cells. PIN 1 is characterized by increased nuclear size with increased variability of nucleolar size, along with irregular, focal crowding and multilayering. In PIN 2 there are similar features of PIN 1 with the additional finding of hyperchromatism and occasional small prominent nucleoli. The hallmark of

PIN 3 is the finding of numerous large prominent nucleoli. The distinction between low and high grade PIN is the finding of prominent nucleoli in high grade PIN.⁴

A few studies have shown that PIN is the most likely precursor of prostatic adenocarcinoma than AAH. Foci of low grade PIN were seen in significant number of cases of nodular hyperplasia and high grade PIN mostly in cases of prostatic adenocarcinoma^{1,3}. The other lesion AAH has shown weaker association with carcinoma¹.

PIN displays various architectural patterns⁵, but there are very few reports on the architectural patterns of PIN.

Hence this study is conducted to identify PIN and to study its association with nodular hyperplasia and carcinoma prostate

Materials and methods

The present study consisted of 200 prostate specimens, received in the Department of Pathology, at BLDEA's Sri B.M.Patil Medical College, Bijapur, during the period from August 2001 to July 2006 (A four years retrospective and one year prospective study). Patients who underwent

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biopsy, TURP or Prostatectomy for BPH and Carcinoma, were included in the study and specimens with a diagnosis of acute prostatitis and prostatic abscess were excluded from the present study. Detailed clinical history was obtained and the findings of clinical examinations were noted in each case.

In the prospective study the specimen was examined for gross details and all of the tissue received was embedded. The tissue was routinely processed and stained by Hematoxylin and Eosin. Special stains like PAS & reticulin stain were performed whenever required. In the retrospective study, blocks and slides were collected for evaluation and studied similarly.

The specimens were extensively studied for the presence and association of PIN with nodular hyperplasia and carcinoma prostate. Gleason's grading system was used for carcinoma prostate. Set criteria were used for the diagnosis of PIN.

High grade PIN displays four architectural patterns; tufting, micropapillary, cribriform and flat.

Tufting pattern is characterized by stratified mounds and heaps of cells protruding into the lumina, usually not more than five layers in thickness. These tufts are evenly spaced around most involved glands, imparting an undulating appearance to the epithelium due to the convex luminal profiles⁵.

The micropapillary pattern is characterized by numerous slender finger like structures with bulbous tips projecting into the lumina, occasionally accompanied by delicate fibrovascular cores. In some cases the nuclei at the tips of the micropapillae were shrunken and hyperchromatic, suggesting degeneration and pyknosis.⁵

The cribriform or sieve like pattern is characterized by complex intraluminal proliferation of cells punctuated by multiple lumina varying from rigid, punched-out rounded

spaces to variably sized, ovoid to slit like spaces.⁵

The flat pattern is characterized by one or two layers of cells lining the glands without evidence of stratification.⁵

Results

A total of 200 prostate specimens received in the Department of Pathology, were taken up for the study.

They were placed into either of the following categories.

Category I: Nodular hyperplasia

Category II: Adenocarcinoma

Category III: Nodular hyperplasia with adenocarcinoma together.

All the cases were thoroughly examined for the presence of foci of PIN.

Out of 200 cases.

179 cases (89.5%) were in Category I

11 cases (5.5%) were in Category II

10 cases (5%) were in Category III

Out of 200 cases a total of 84 cases (42%) showed the presence of foci of PIN.

In category I, 65 cases (36.3%) showed presence of PIN where as category II revealed PIN in 9 out of 11 cases (81.8%). In Category III, Foci of PIN were observed in all 10 cases (100%) (Table 1).

Table 1: Frequency of PIN in various categories

Category	Total No cases	PIN		
		No of +ve cases	%	P. value
1	179	65	36.3%	<0.001
2	11	9	81.8%	
3	10	10	100%	
Total	200	84	42%	

Prostatic intraepithelial neoplasia (PIN): Diagnostic criteria.³

Features	Low grade PIN(Formerly PIN 1)	High grade PIN (Formerly PIN 2 and PIN 3)
Architecture	Epithelial cell crowding , and stratification with irregular spacing.	Similar to low grade PIN; more crowding & stratification 4 patterns; tufting, micropapillary, cribriform and flat
Nuclei	Enlarged with considerable size variation.	Enlarged; some size and shape variation.
Chromatin	Normal	Increased density and clumping.
Nucleoli	Rarely prominent.	Occasionally to frequently large and prominent, similar to Invasive carcinomas, sometimes multiple.
Basal cell layer	Intact.	May show some disruption.
Basement membrane	Intact	Intact.

Table 2 : Grades of PIN in cases of nodular hyperplasia and adenocarcinoma, placed in various categories

Category	Total No cases	LGPIN			HGPIN		
		No of +ve cases	%	P. value	No of +ve cases	%	P. Values
I	179	49	27.3%	>0.05	16	8.9%	<0.001
II	11	3	27.2%		6	54.5%	
III	10	2	20%		8	80%	
Total	200	54	27%		30	15%	

Thus, PIN was found to be more closely associated with carcinoma. Statistically the association of PIN with carcinoma was found to be highly significant ($P < 0.001$). Out of 65 cases of nodular hyperplasia with PIN (Category - I), 49 cases (27.3%) were of low grade PIN (Fig 1) and 16 cases (8.9%) were of high grade PIN. Out of 11 cases of carcinoma in category II low grade PIN was seen in 3 cases (27.2%) and high grade PIN in 6 cases (54.5%). In category III, out of 10 cases of nodular hyperplasia with associated carcinoma 2 cases (20%) showed low grade PIN and 8 cases (80%) showed high grade PIN. (Table 2).

Thus, low grade PIN was more commonly associated with nodular hyperplasia and high-grade PIN with carcinoma. High grade PIN revealed 4 morphological patterns, i.e Tufting, Micropapillary, cribriform and flat, all with nucleomegaly and prominent nucleoli.(Table 3)

These patterns merged with each other from gland to gland although fields with one single pattern were observed occasionally. Tufting was the commonest pattern observed (40%), second commonest patterns were micropapillary and flat (26.6%) and the least was cribriform (6.8%).

Various other lesions were also identified with some normal anatomical structures that constituted as a differential diagnosis for PIN. These included portions of seminal vesicles, basal cell hyperplasia, atrophy associated hyperplasia, cribriform hyperplasia, squamous metaplasia, transitional metaplasia etc. Out of these, foci of basal cell hyperplasia was most commonly observed lesion seen in 73 cases (40.7%) in category I and 2 cases (20%) in category III.

Discussion

Early diagnosis of prostate cancer is an important issue among urologists and pathologists. A multidisciplinary approach using digital rectal examination (DRE), transrectal ultrasound and prostate specific antigen (PSA) assay has been adopted for early detection of prostate cancer. Despite these efforts, 33% of the patients still present with advanced stage of the disease.¹ Identification of premalignant lesions assume importance in this context. Lately, PIN and AAH have been recognized as putative premalignant lesions of prostate. However the supportive evidence for PIN is much greater than AAH, with High grade PIN being the most likely precursor, arising in the peripheral zone⁶.

Association of PIN with BPH & adenocarcinoma

A wide variation in the incidence and prevalence of PIN in nodular hyperplasia has been reported in the world literature, ranging from 12.8% to 43% in different studies^{1,7,8}. The association of PIN with adenocarcinoma has always been observed to be higher, as is evident from earlier studies, where it was observed to be 76-100%^{1,8}. Our study revealed an intermediate frequency of PIN in BPH cases (36.3%), between the lowest and highest observed results.

Earlier studies⁹ have reported low grade PIN in 14-81% cases of nodular hyperplasia and a higher grades of PIN in carcinomatous prostates. In the present study, low grade PIN was the most commonly observed grade in cases of nodular hyperplasia. This was consistent with other studies. The present study also showed higher grades of PIN in cases of adenocarcinoma of the prostate reflecting the greater possibly of high grade PIN as a precursor lesion to carcinoma prostate. The percentage of HGPIN in carcinoma in the present study could be compared to other studies. However in 2 cases, carcinoma was diagnosed on biopsy specimen where foci PIN could not be identified.

Rekhi B et al¹ observed a significant association (88.2%) of HGPIN with cases of nodular hyperplasia and adenocarcinoma. The present study also revealed a similar association of HGPIN with cases of nodular hyperplasia and carcinoma (Category III). This possibly indicates the existence of 'field' effect that the carcinoma casts on the adenomatous zone.¹

High grade PIN has a high predictive value as a marker for adenocarcinoma and its identification in biopsy specimens warrants a further search for concurrent invasive carcinoma. Davidson et al¹⁰ found adenocarcinoma in 35% of subsequent biopsies from patient with previous diagnosis of PIN, compared with 13% in a control group without PIN. HGPIN, patients age and serum prostate specific antigen (PSA) concentration are all highly significant predictors of cancer, but PIN alone increases the risk 15 fold above those patients without PIN and provides a highest risk ratio. Others have reported a high predictive value of PIN for cancer ranging from 38-100%. These data underscore the strong association of PIN and adenocarcinoma and indicate that, diagnostic follow up is needed³¹.

Therapeutically a marked decrease in the prevalence and extent of high grade PIN has been observed in patients

Table 3 : Architectural patters of High grade PIN

Category	Tufting		Micropapillary		Cribriform		Flat	
	No of cases	%	No of cases	%	No of cases	%	No of cases	%
1 [16]	6	37.5%	5	31.25%	1	6.25%	4	25%
2 [6]	3	50%	1	16.6%	0	0%	2	33.3%
3 [8]	3	37.5%	2	25%	1	12.5%	2	25%
30	12	40%	8	26.6%	2	6.8%	8	26.6%

with androgen deprivation therapy (ADT) as compared to untreated patients. Thus dysplastic epithelium is hormone dependent ADT reduces proliferation and enhances apoptosis.

Biopsy remains the only definitive method for detecting PIN and early invasive cancer. If all procedures fail to identify co-existent carcinoma, close surveillance and follow up are indicated³¹. However identification of PIN in the prostate should not influence or dictate therapeutic decisions¹¹.

Architectural patterns of high grade PIN

PIN exhibits variety of architectural patterns, although four patterns

are common; Tufting, Micropapillary, Cribriform and Flat. In a study by Bostwick DG et al⁵ and Qian J et al¹², Tufting was the commonest pattern and flat and cribriform pattern were of least common type respectively. In the present study, tufting pattern was the commonest (40%) and cribriform was the least common type, which was consistent with the above two studies.

However in a study by Wilcox G et al¹³ and Rekhi B et al¹, cribriform pattern was the most common type and they also found another pattern ie, comedo pattern alone (10% Rekhi B et al) or in combination with solid pattern (7% or cribriform / comedo 4% Wilcox G et al). Comedo-necrosis was more commonly seen in cases of HGPIN with higher Gleason's grading and this pattern is considered to represent cancer¹³. However in other studies^{1,5,12} Gleason's grade of tumour did not correlate with the pattern of high grade PIN, suggesting that currently there are no recognized prognostic differences

between the architectural patterns of HGPIN and their recognition appears to be only for diagnostic utility¹².

In the present study also Gleason's grade of the tumour did not correlate with the pattern of HGPIN.

Other associated lesions

Basal cell hyperplasia

Several other associated lesions and normal anatomical structures entered as a differential diagnoses, like a portion of seminal vesicle, foci of basal cell hyperplasia, squamous & transitional metaplasia etc. According to Rekhi B et al¹, the two common associated lesions were, basal cell hyperplasia and chronic prostatitis. In the present study also, basal cell hyperplasia was the commonest associated lesion. Bostwick and Srigley have given a detailed account of such lesions. They also stated that, basal cell hyperplasia commonly merges with areas of nodular hyperplasia¹⁴. However according to Grizzle.W basal cell hyperplasia could have a role as a precursor of adenocarcinoma, on the basis of sequential changes¹⁵. Thus, these views seem to be opposite points on horizon with a gap to be filled or

at least suitably bridged & interconnected.¹ Other studies also share the idea of considering basal cell hyperplasia as an important precursor lesion to prostate carcinoma basaloid type¹⁶. In the present study, basal cell hyperplasia as the commonest other lesion in 37.5% cases implies that, it could have a role as a precursor to adenocarcinoma, as it can be explained on the basis of sequential changes of basal cell hyperplasia → low grade PIN → High grade PIN → Cancer¹.

High grade PIN has a high predictive value as a marker for adenocarcinoma and its identification in biopsy specimens warrants a further search for concurrent invasive carcinoma. Davidson et al¹⁰ found adenocarcinoma in 35% of subsequent biopsies from patients with previous diagnosis of PIN, compared with 13% in a control group without PIN. HGPIN, patients age and serum prostate specific antigen (PSA) concentration are all highly significant predictors of cancer, but PIN alone increases the risk 15 fold above those patients without PIN and provides a highest risk ratio. Others have reported a high predictive value of PIN for cancer ranging from 38-100%. Therapeutically a marked decrease in the prevalence and extent of high grade PIN has been observed in patients with androgen deprivation therapy (ADT) as compared to untreated patients. Thus dysplastic epithelium is hormone dependent and ADT reduces proliferation and enhances apoptosis.

These data underscore the strong association of PIN and adenocarcinoma and indicate that, diagnostic follow up is needed³¹.

Biopsy remains the only definitive method for detecting PIN and early invasive cancer. If all procedures fail to identify co-existent carcinoma, close surveillance and follow up are indicated. However identification of PIN in the prostate should not influence or dictate therapeutic decisions¹¹.

Conclusions

PIN is seen both in cases of BPH and adenocarcinoma. Low grade PIN is more commonly seen in cases of nodular hyperplasia. High grade PIN is more commonly seen in cases of adenocarcinoma of prostate. Other studies have also found association of HGPIN with carcinoma quite consistently, which suggest that HGPIN may be a precursor of prostatic carcinoma and HGPIN has high predictive value for adenocarcinoma. Hence HGPIN is a most likely precursor of adenocarcinoma. Pattern of PIN has no prognostic significance. Basal cell hyperplasia could have a role as a precursor to adenocarcinoma and must be treated with respect.

The presence of HGPIN in biopsy specimens warrants a further search for the concurrent invasive carcinoma and patients need a close follow up observations and investigations to rule out existence of carcinoma especially in the peripheral zone.

Legends

Fig 1. A microphotograph of LGPIN showing stratification, nucleomegaly and variation in nuclear size.(H & E x 400)

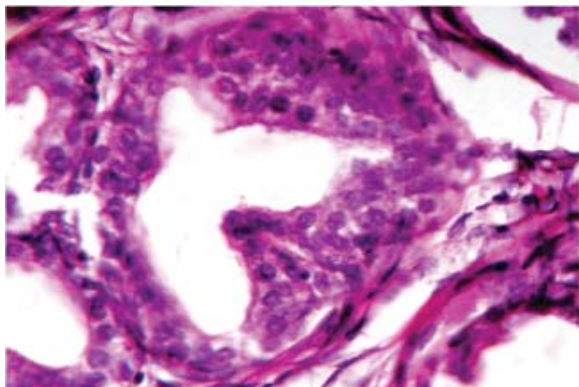


Fig 2. A microphotograph of HGPIN showing tufting pattern, nucleomegaly and prominent nucleoli(arrow). (H &E x 400)

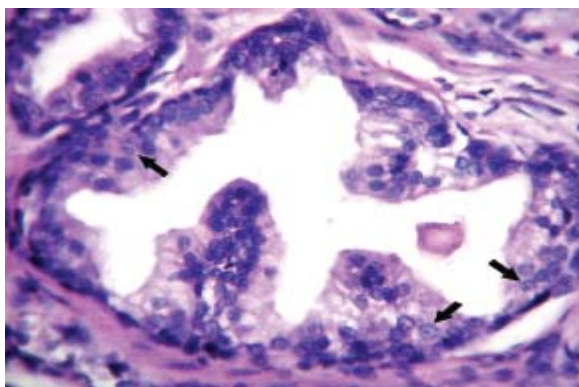
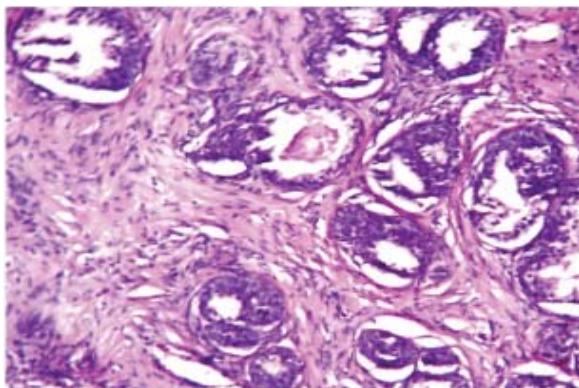


FIG 3. A microphotograph of HGPIN showing flat pattern. (H & E x 200)



References

1) Rekhi B, Jaswal TS, Arora B. Premalignant lesions of the prostate and their association with nodular

hyperplasia and carcinoma prostate. *Indian J Cancer* 2004;41(2):60-62.

- 2) Bostwick DG, Amin MB. Prostate and seminal vesicles. In: Linder J, Damjanov I. Eds. *Anderson's pathology*. Vol 2. 10th edition. Missouri: Mosby; 1996:2207-2215.
- 3) Drago JR, Mastifi FK, Lee F. Introductory remarks and workshop summary. *Urology* 1989;6:2-3.
- 4) Bostwick DG, Brawer MK. Prostatic Intraepithelial neoplasia and early invasion in prostate cancer. *Cancer* 1987;59:788-794.
- 5) Moore CK, Karikehalli S, Nazeer T, Fisher HAG, Kaufman RP and Mian BM. Prognostic significance of high grade neoplasia and atypical small proliferation in the contemporary era. *J Urol* 2005;173(1):70-72
- 6) Jones EC, Young RH. The differential diagnosis of prostatic carcinoma: Its distinction from premalignant lesions of the prostate gland. *Am J Surg Pathol* 1994;101:48-64.
- 7) Sakr WA, Haus GP, Cassin BJ, Pontes JE and Crissman JD. The frequency of carcinoma and intraepithelial neoplasia of the prostate in young male patients. *J urol* 1993; 150: 379.
- 8) Mc Neal JE, Bostwick DG. Intraductal dysplasia: A premalignant lesion of the prostate. *Hum Pathol* 1986;17:64-71
- 9) Brawer MK. Prostatic intraepithelial neoplasia: A premalignant lesion. *Hum Pathol* 1992; 23 :242-248.
- 10) Hausser O, Epstein JI, Amin B, Heitz PU and Hailemariam S. Cell proliferation, apoptosis, oncogene and tumour suppressor gene status in adenosis with comparison to Benign prostatic hyperplasia, prostatic intraepithelial neoplasia and cancer. *Hum Pathol* 1999;30: 1077-1086.
- 11) Bostwick DG. Prospective origins of prostate carcinoma: Prostatic intraepithelial neoplasia and Atypical adenomatous hyperplasia. *Cancer* 1996;78: 330-336.
- 12) Srigley J Toth P, Hardwick RWJ, Atypical histological patterns in cases of benign prostatic hyperplasia. *Lab Invest*; 1989;60:90A.
- 13) Wilcox G, Sob S, Chakraborty S, Scardino RT, and Wheeler TM. Patterns of high grade prostatic intraepithelial neoplasia with clinically aggressive prostate cancer. *Hum Pathol* 1998;29: 1119-1123.
- 14) Srigley JR, Bostwick DG. Premalignant lesions. In: Bostwick DG, Roth LM, Editor. *Contemporary issues in surgical pathology No 15, Pathology of the prostate*. London: Churchill Livingstone. 1990. p37-59.
- 15) Grizzle W. Prostatic intraepithelial neoplasia: Will it help doctors pin-point prostate cancer? *J Natl Cancer Inst* 1996;88:1023-1024.
- 16) Bankoff H, Stein V, Romberg K. Multidirectional differentiation in the normal, hyperplastic and neoplastic human prostate: Simultaneous demonstration of cell specific epithelial markers. *Hum Pathol* 1994;25:42-46.

Effect of examination stress on red blood cells

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Abstract

The effect of psychological stress can alter the blood cells parameters such as red blood cells in healthy individuals. Estimations of red blood cells were carried out in both absence and presence of examination stress. Comparison of pre-examination results to the results taken during exams was done in both males and females. It was observed that found that there are only little changes in red blood cell count as a result of psychological stress. The variation of RBC production as a result of psychological stress in males and females needs to be further investigated.

Keyword

Red Blood Cell Count, Psychological Stress, cortisol and Erythropoiesis.

Introduction

Stress refers to conditions that arouse anxiety or fear. In the body, the stress response is mediated by the hypothalamic-adrenal-pituitary axis, or the HPA-axis for short. When the body perceives stress, the HPA axis, along with the sympathetic nervous system which is famously known as "fight of flight" response, is activated together. Body in response to stress releases hormone known as cortisol.

It is a corticosteroid hormone or glucocorticoid produced by the zona fasciculata of the adrenal cortex, which is a part of the adrenal gland. The increased cortisol stimulates the erythropoiesis.^(1,2)

Erythropoiesis is the process by which red blood cells (erythrocytes) are produced. The red blood cell number is sufficient to sustain adequate tissue oxygen levels. Erythropoietin stimulates the erythropoiesis and is produced in the kidney and liver in response to low oxygen levels. In addition to erythropoietin there are numerous other factors which are responsible for RBC production.⁽²⁾ A Red Blood Cell count is the number of red blood cells per volume of blood, and is reported in either millions in a micro liter or millions in a liter of blood. Levels of RBCs out of the normal range (higher or lower) can be an indication of certain conditions. Polycythemia is the presence of an elevated RBC count and decreased RBC count is called anemia. There are various reasons for increase or decrease

in red blood cell count. This article explores the various factors involved in erythropoiesis and effect of psychological stress on red blood cell count and its variation in both males and females.⁽²⁾

Material and Methods

The present study was conducted at Department of physiology, S.S.Institute of medical sciences and research center, Davangere.

Sample size: 150 students which included 76 students and 74 female students.

Procedure:

Out of 200 students enrolled, 150 students were selected. The study was conducted at department of physiology, S.S.Institute of Medical sciences and research center, Davangere, India.

Selection was done 5 months prior to first terminal examination; they were subjected to preliminary medical checkup including blood pressure and temperature recordings. The students receiving long term medications are excluded from the study.

As the life span of RBC is 120 days, the gap between two sample collections was after 120 days. The first blood sample was taken from students 3 months prior to their external examination.

They were of ages between 18 to 20 years (mean-19). The sample of blood was collected under aseptic conditions between 8 am - 8.30 am & 1.2 mg of anhydrous salt of E.D.T.A. per milliliter of blood was used as an anticoagulant. Counting of red blood cells, was done by visual means making use of improved Neubauer counting chamber.⁽³⁾ Red blood cells were counted making a 1:200 dilution of blood in formal citrate solution. Compound microscopes were used throughout the study. The record of various blood cells was entered in specially designed tables.⁽³⁾ Similar procedure was repeated on the day of practical and oral part of the exam after 120 days. Values obtained during examinations were compared with those taken before exams to find out any changes of cell counts.

Normal values of red blood cells:⁽¹⁾

- Women: 4.2 to 5.4 million/uL
- Men: 4.7 to 6.1 million/uL

Results and discussion

Table 1: "Distribution of study population according to sex"

Sl no	Sex	Number of cases	Percentages
01	Males	76	50.66%
02	Females	74	49.33%
	Total:	150	100%

Table 3 : "Distribution of study population according to R.B.C counts in Females in the absence of examination stress"

Sl no	R.B.C.Count (in million/uL)	Number of cases	Percentages
01	Less than 4.2	22	29.72%
02	4.2 to 5.4	51	68.91%
03	More than 5.4	01	1.35%
	Total:	74	100%

Table 5 : "Distribution of study population according to R.B.C counts in females during examination stress"

Sl no	R.B.C.Count (in million/uL)	Number of cases	Percentages
01	Less than 4.2	17	22.97%
02	4.2 to 5.4	53	71.62%
03	More than 5.4	04	05.40%
	Total	74	100%

Table 7 : "Correlating of males with decreased value of R.B.C counts in absence of stress (n=28) to the variation in R.B.C. counts examination stress"

Sl no	R.B.C.Count (in million/uL)	Number of cases	Percentages
01	Less than 4.7	02	7.14%
02	4.7 to 6.1	16	57.14%
03	More than 6.1	10	35.71%
	Total:	28	100%

Table 9 : "Correlating of females with normal value of R.B.C counts in absence of stress (n=51) to the variation in R.B.C. counts examination stress"

Sl no	R.B.C.Count (in million/uL)	Number of cases	Percentages
01	Less than 4.2	10	19.60%
02	4.2-5.4	40	78.43%
03	More than 5.4	03	
	Total:	51	100%

Observation

In the present study out of 150 students, 76 students were male and 74 students were female accounting to 50.66% and 49.33% of the study population respectively. Out of 76 males, 43 students (56.57%) showed normal RBC count followed 28 students (36.84%) who showed

Table 2: "Distribution of study population according to R.B.C counts in Males in the absence of examination stress"

Sl no	R.B.C.Count (in million/uL)	Number of cases	Percentages
01	Less than 4.7	05	6%
02	4.7 to 6.1	43	56.57%
03	More than 6.1	28	36.84%
	Total:	76	100%

Table 4 : "Distribution of study population according to R.B.C counts in males during examination stress"

Sl no	R.B.C.Count (in million/uL)	Number of cases	Percentages
01	Less than 4.7	06	7.89%
02	4.7 to 6.1	41	53.94%
03	More than 6.1	29	38.15%
	Total	76	100%

Table 6 : "Correlating of males with normal value of R.B.C counts in absence of stress (n=43) to the variation in R.B.C. counts examination stress"

Sl no	R.B.C.Count (in million/uL)	Number of cases	Percentages
01	Less than 4.7	04	9.30%
02	4.7 to 6.1	20	46.51%
03	More than 6.1	19	44.18%
	Total:	43	100%

Table 8 : "Correlating of males with increased value of R.B.C counts in absence of stress (n=05) to the variation in R.B.C. counts in examination stress"

Sl no	R.B.C.Count (in million/uL)	Number of cases	Percentages
01	Less than 4.7	00	0%
02	4.7 to 6.1	04	80%
03	More than 6.1	01	20%
	Total:	05	100%

Table 10 : "Correlating of females with decreased value of R.B.C counts in absence of stress (n=22) to the variation in R.B.C. counts examination stress"

Sl no	R.B.C.Count (in million/uL)	Number of cases	Percentages
01	Less than 4.2	04	18.18%
02	4.2-5.4	12	54.54%
03	More than 5.4	06	27.27%
	Total:	22	100%

increased RBC counts by in the absence of exam stress. While analysis of RBC count of same 76 male students during the stress showed, 41 students (53.94%) showed normal counts while 29 students (38.15%) showed increased in RBC counts. In contrast out of 74 females during absence of examination stress, 51 students (68.91%) showed normal

RBC counts while 22 (29.22%) students showed decreased counts. While during examination stress, 53 students (71.62%) showed normal levels of RBC and 17 students (22.97%) showed decreased in counts.

When males with normal value of R.B.C counts (n=43) in absence of stress was compared to the variation in R.B.C. counts examination stress, in 20 students (46.51%) RBC count was in normal level while in 19 students (44.18%) it was increased. Similarly when male students who showed decreased value of R.B.C counts in absence of stress (n=28) were compared to the variation in R.B.C. counts during examination stress, it was found that in 16 students (57.14%) RBC counts were in normal limits and 10 students (35.71%) there were increase in the counts. In Toto there was increase in 26 (10 +16) students.

Where as In Females, when students with normal value of R.B.C counts in absence of stress (n=51) to the variation in R.B.C. counts examination stress, 40 students (78.43%) showed RBC count in normal level while in 10 students (19.60%) showed decrease in the counts. Similarly, correlating of females with decreased value of R.B.C counts in absence of stress (n=22) to the variation in R.B.C. counts examination stress, 12 students (54.54%) showed RBC count in normal level while in 06 students (27.27%) showed decrease in the counts.

When of 5 male students and one female who had Polycythemia in the absence of stress was compared to effect of stress. Four male students showed normal counts where as in remaining one, counts remained high. In contrast in female student showed decrease in count.

Discussion

Under stress, the hypothalamus secretes corticotrophin-releasing hormone (CRH), and this provokes the release of adrenocorticotrophic hormone (ACTH) from the pituitary. ACTH triggers the secretion of glucocorticoids from the adrenal cortex. In humans, the main glucocorticoid is cortisol. Cortisol is predominantly (90–95%) bound to binding proteins in blood, only 5–10% of the total plasma cortisol circulates as biologically active, unbound, "free" cortisol. The HPA axis responses to physical exercise appear not to differ between men and women most psychological stress studies revealed that there are (a) no significant sex differences or (b) higher cortisol responses in young men than in young women after exposure to acute real-life psychological stress (e.g., academic exams) or controlled laboratory stress tasks (e.g., free speech, mental arithmetic, harassment);⁽⁵⁾

Interestingly, ACTH and free cortisol increases in men were up to twice as high as in women and the sole anticipation of an upcoming psychosocial stress task led to a significant free cortisol response in men only In subjects with higher compared to lower chronic stress levels, observed lower plasma cortisol levels during recovery from acute stress.⁽⁵⁾ It is known that Stress of academic examinations also significantly affects the erythron variables. There is increase

in number of large red blood cells with increased hemoglobin which may be due to stress induced pro-inflammatory cytokine production may stimulate the proliferation of hemopoietic cells. The sex related difference in the RBC production may be attributed to cortisol stimulation as increase in corticosteroid which increases the RBC production directly. Hence the increase in the RBC count may be attributed the fact that stress increases the cortisol level in males and which in turn increases the RBC production. In female, the decrease in the RBC production could be due to decrease in cortisol synthesis when compared to males and presence of Estrogen which is an inhibitor of erythropoiesis.^(6,7)

Conclusion

It is also said that estrogen is an inhibitor while testosterone is a stimulator of erythropoiesis and psychological stress also decreases the femoral bone marrow iron along with serum iron and erythropoietin. Both males and females handle stress differently. There is increase in cortisol levels in males where as in females there is decrease in cortisol levels. Likewise the Effect of psychological stress such as academic exams also varies in both the sexes. Though this article explores the effect of psychological stress on the RBC production and it is found that increase in RBC production in males and decrease in RBC production in females. As there are numerous factors are involved in stress and its effect on RBC production. The variation of RBC production as a result of psychological stress in males and females needs to be further investigated.

Reference

1. Aiyaz qureshi, Jane alam, Masood ahmad khan and ghazala sheraz "Effect of examination stress on blood cell parameters of students in a Pakistani medical college" journal of ayub med coll abbottabad, 2002; 14(1) pp 20-22.
2. Chaunlan Wei et al " Effect of psychological stress on serum iron and erythropoiesis" International of journal of haematology, 2008(88): 52-56
3. Dacie J.V, Lewis S.M. (1991), Practical Hematology, 7th Ed. Page 77.
4. Marshall GD, Agarwal SK. "Stress, immune regulation and immunity: Applications for asthma" Allergy Asthma Proc 2000 Jul-Aug; 21(4):241-6.
5. William F.Ganong, Review of medical physiology, 21st edition, the McGraw-Hill book company, north America, pages 534-539
6. Brigitte M. Kudielkaa and Clemens Kirschbaum "Sex differences in HPA axis responses to stress: a review" Biological Psychology 69 (2005) 113–132
7. Kenneth L.Becker, Lippincott, William and Wilkins "principles and practice of endocrinology and metabolism" page 1934.
8. Tripathi.M.D. "The essentials of medical pharmacology" 5th edition, Jaypee publication, New Delhi, page 287.

Provisional natural tooth pontic using fiber reinforced ribbon- A Case Report

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Abstract

The loss of anterior teeth can be psychologically and socially damaging to the patient. Despite a wide range of treatment options available, traumatized teeth may be inevitably lost on certain occasions. Although an anterior tooth has mechanical functionality, it is the compromised facial esthetics associated with tooth loss that is the patient's primary concern. Immediate esthetic replacement of the missing tooth is required in such cases. This replacement can be temporary, semi-temporary or permanent in nature. The abutment teeth can be conserved with minimal or no preparation, thus keeping the technique reversible, and can be completed at chair side thereby avoiding laboratory costs. It can be used as an interim measure or a definitive prosthesis. This paper describes the replacement of a right mandibular lateral incisor using a glass fiber reinforced ribbon with the avulsed natural tooth crown as a pontic.

Keywords

Trauma, Avulsion injury, Fiber splint, Resin bonding, Interim fixed bonded prosthesis, Natural tooth pontic.

Introduction

The sudden loss of an anterior tooth is a catastrophic event for a patient. Traumatic damage to anterior teeth is a common form of injury, particularly in children and adolescents. Patients presenting with traumatized or lost anterior teeth require immediate attention for restoration of esthetics and function. Depending on the many clinical and economic factors, a course of treatment can be decided upon by the patient and dentist.

Although a permanent replacement, such as a metal framework removable partial denture, may be planned after the tissues have healed, the options available for a good esthetic temporary prosthesis are limited. A transitional prosthesis may vary between simple removable tissue supported dentures; temporary full coverage fixed partial dentures and bonded fixed partial dentures. Prefabricated acrylic denture teeth used as a pontic bonded to the adjacent teeth can present challenges in regard to matching color, size and shape, and often require substantial modifications to achieve an acceptable appearance.

Using the natural tooth as a pontic offers the benefits of right size, shape, color and psychological value. When the

crown of the tooth is in good condition, it can be temporarily bonded easily to the adjacent teeth with light-cured composite resin¹. Materials such as a preimpregnated braided glass fiber system (Interlig, Angelus) used with resin bonding techniques is available for quick repairs. This report illustrates use of an avulsed tooth as a pontic bonded to teeth on either side of the edentulous space with a preimpregnated fiber reinforced ribbon by composite resin.

Case report

A 35 year old male patient reported to the Out Patient Department of Prosthodontics at Sardar Patel Post Graduate Institute of Dental and Medical Sciences, Lucknow with the chief complaint of missing lateral incisor in the lower right front region of mouth. The patient gave a history of tooth avulsion due to bottle opening ten days back. The patient had preserved the avulsed tooth.

Extraoral examination revealed no abnormality. On intraoral examination the avulsed mandibular right lateral incisor (42) site revealed healing socket. Examination of other teeth revealed generalized gingival recession. Mandibular anterior teeth were crowded. General physical examination revealed no abnormality.

Radiographic examination revealed complete bone loss with respect to the avulsed tooth site.

The patient expressed a strong desire for his avulsed tooth to be used in any possible way.

Treatment plan

Since the avulsed tooth revealed no deterioration it was planned to immediately restore the patient's esthetic appearance and functionally stabilize the compromised arch.

The patient was motivated for receiving a single visit, glass fiber impregnated splint using the crown portion of the avulsed tooth as a natural tooth pontic.

Technique

1. The avulsed tooth site was evaluated (Fig 1). Diagnostic impressions were made and cast poured. The avulsed tooth was measured with a periodontal probe to the length needed. The root was cut from the crown and shaped with a flame-shaped finishing bur.
2. The remaining coronal root canal and pulp chamber were cleaned and sealed with a composite resin.

Figure 1: Preoperative view: Missing right lateral incisor due to avulsion



3. The positional relation and the length of the prepared avulsed tooth was checked using the diagnostic cast. The occlusion was carefully evaluated and adjusted to ensure proper contact relations with opposing teeth.
4. The natural tooth pontic and the selected abutment teeth (31,41,43) were prepared with a horizontal lingual groove to accommodate the glass reinforced ribbon. The groove was approximately 1.5 to 2 mm wide and 0.5mm deep (Fig 2).

Figure 2: Lingual grooves prepared on abutment teeth



5. The pontic was evaluated for fit and proper relationship with the healing extraction site and abutment teeth. Final shaping was done for an ovate pontic design.
6. The length of glass reinforced ribbon (Interlig, Angelus) was determined by placing a piece of dental floss from the distal surface of canine (43) to the distal of the central incisor (31), and a piece of the glass ribbon was cut to this length².

7. The pontic and the abutment teeth were etched with 37% orthophosphoric acid (Fig 3).

Figure 3: Natural tooth pontic etched with 37% orthophosphoric acid



8. The ribbon was prepared for bonding by first wetting it with a bonding agent (Single Bond; 3M ESPE). A small amount of flowable composite resin (Tetric Ivoceram, Ivoclar Vivadent) was injected into the groove. The ribbon was bonded to the lingual surfaces of the abutment teeth. A layer of composite resin, approximately 0.5 mm thick, was placed on top of the ribbon to secure it in place. The natural tooth pontic was bonded in place with additional flowable composite resin under isolation. The restoration was light-cured for 40 seconds (Fig 4).

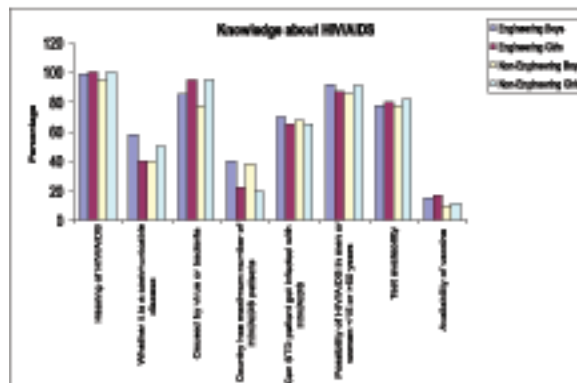
Figure 4: Fiber ribbon bonded to lingual surfaces of pontic and abutment teeth with composite



9. Occlusal interferences were evaluated. The lingual aspect of the provisional restoration was polished with an abrasive impregnated rubber finishing system.
10. The pontic was kept in contact with the healing gingival tissue to simulate a correct emergence profile

and gingival contour. The opposing teeth were kept out of contact with the pontic at rest or in function (Fig 5).

Figure 5: Post-operative view of natural pontic replacing missing right lateral incisor (42)



Discussion

In the past there have been a number of different techniques described in the restorative dentistry literature for splinting teeth and adding a natural tooth pontic, denture tooth, or composite resin tooth pontic. These pontics were connected to the adjacent teeth with adhesive composite resins, wire, metal mesh, nylon, mesh and cast metal frameworks bonded to the adjacent teeth. The inherent problems with these materials when placing a tooth pontic fixed to the adjacent teeth when replacing a missing tooth were their inability to be chemically incorporated into the dental resin. Another problem associated with the placement of composite resin splints with submerged wires and mesh grids that in order to protect against breakage more bulk and thickness of composite resin was necessary. This overbulking of the restoration led to an increase in food and plaque retention resulting in making it more difficult to clean around the restoration and maintain good oral health³.

The challenge to place a thin but strong, bonded composite resin-based single visit bridge was met with the introduction of a high strength, bondable, biocompatible, esthetic, easily manipulated, fiber ribbons that could be embedded into a resin structure.

The advantages of this technique over traditional methods include better bonding, an esthetic appearance, greater translucency, less chair-side time. Also, this technique is

not labor intensive. Another added feature was the shape given to the pontic to simulate a correct emergence profile and gingival contour. One problem with glass fiber reinforcement material, is that the glass fibers break and pull out of the composite resin when the composite develops a crack that propagates to the glass fibers. Another system (Connect; Kerr Corp) based on a different type of polyethylene fiber could also be used to achieve similar results. Alternative designs utilize a plasma-treated woven polyethylene fiber (Ribbond, Ribbond Inc, Seattle, Wash.)⁴. Other systems using glass or ceramic fibers, such as Vectris (Ivoclar Vivadent, Amherst, NY) and GlasSpan (GlasSpan Inc, Exton, Pa), are possible material system options.

Summary & conclusions

Resin-bonded fixed partial dentures (FPDs) have been used for dental treatment for many years. Although early resin-bonded FPDs were associated with a high frequency of premature failure, better understanding of preparation design and improved bonding techniques have led to significant improvements in their long-term survival⁵. A case report has been presented, demonstrating the use of fibre splint as a substrate, and modified natural tooth, as pontic, to rehabilitate the traumatized patient with a bonded prosthesis, hence restoring form, function and boosting the patient's self esteem. The primary reason for prescribing a fiber reinforced ribbon-based provisional FPD, was the desire to have a metal free restoration in the mandibular anterior region and to meet the patient's expectations.

References

1. James Kretzschmar. The natural tooth pontic- A temporary solution for a difficult esthetic situation. JADA, Vol. 132, November 2001.
2. Daniel C. N. Chan et al. Provisional anterior tooth replacement using nonimpregnated fiber and fiber-reinforced composite resin materials: A clinical report. J Prosthet Dent 2006;95:344-8.
3. Howard E. Strassler, David Taler, and Luis Sensi. Single Visit Natural Tooth Pontic Bridge with Fiber Reinforcement Ribbon. Oral Health Journal, July 2007.
4. Samadzadeh A et al. Fracture strengths of provisional restorations reinforced with plasma treated woven polyethylene fiber. J Prosthet Dent 78:447-50, 1997.
5. el-Mowafy O, Rubo MH. Resin-bonded fixed partial dentures—a literature review with presentation of a novel approach. Int J Prosthodont 2000;13: 460-7.

Knowledge, belief & attitude about HIV/AIDS among engineering and non-engineering students in Himachal Pradesh

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Abstract

This study was design to assess the current level of knowledge, belief and attitudes among the engineering and non-engineering students about the HIV/AIDS in Hamirpur district of Himachal Pradesh. For this purpose 900 students (300 boys and 150 girls from engineering 300 boys and 150 girls from non-engineering) were selected. The data was collected through a pre-tested close ended questionnaire. It was found that overall knowledge is much more among engineering students than non-engineering. Girl students were found to have better knowledge regarding the transmission and prevention of HIV/AIDS than the boys. It is interesting to note that misconceptions still prevails pertaining to mode of transmission and preventions in both groups. It has also been found that the students are having substantial negative attitude towards HIV/AIDS positive patients.

Keywords

Knowledge, belief, attitude, high risk behaviour, mode of transmission, vulnerability.

Introduction

The acquired immuno deficiency syndrome (AIDS) epidemic is in its third decade and has become a pandemic disease that threatens the whole world. Human immunodeficiency virus (HIV) /Acquired immunodeficiency syndrome (AIDS) is becoming the worst human disaster ever. It affects entire body systems, the mental health as well as social relationships of carriers and asymptomatic patients. The countries most heavily affected by HIV has reduced life expectancy by more than 20 years, slowed economic growth, and deepened household poverty. The natural age distribution in many national populations, specifically in sub-Saharan Africa has been dramatically skewed by HIV, with potentially perilous consequences for the transfer of knowledge and values from one generation to next (Global AIDS epidemic report, 2008, UNAIDS). In Asia, where infection rates are much lower than Africa, HIV causes a greater loss of productivity than any other disease, and is likely to push an additional 6 million households into poverty by 2015 unless national responses are strengthened (Commission on AIDS in Asia, 2008). According to the United Nations Development Programme (UNDP), HIV has inflicted the "single greatest reversal in human development" in modern history (UNDP, 2005).

Above all, the dimensions of the epidemic remain staggering. In 2007, 33 million [30 million–36 million] people were living with HIV, 2.7 million [2.2 million–3.2 million] people became infected with the virus, and 2 million [1.8 million–2.3 million] people died of HIV related causes. Young people aged 15–24 accounted for an estimated 45% of new HIV infections worldwide. A survey conducted in India in the year 2006 revealed that 33 percent of males and 24 percent of females in the age group of 15-24 year , both correctly identify the ways of preventing the sexual transmission of HIV and rejected the major misconceptions about HIV transmission (Global AIDS epidemic report, 2008, UNAIDS). The number of people living with HIV worldwide continued to grow in 2008, reaching an estimated 33.4 million [31.1 million–35.8 million]. In 2008, an estimated 2.7 million [2.4 million–3.0 million] new HIV infections occurred. It is estimated that 2 million [1.7 million–2.4 million] deaths due to AIDS-related illnesses occurred worldwide in 2008, UNAIDS (2009). An estimated 430 000 [240 000–610 000] new HIV infections occurred among children under the age of 15 in 2008.

In Asia, an estimated 4.7 million [3.8 million–5.5 million] people were living with HIV in 2008, including the 350 000 [270000–410000 million] people who became newly infected in the past year. Approximately, 330 000 [260 000–400 000] died from AIDS-related illnesses in 2008 (AIDS epidemic update, 2009, UNAIDS&WHO). In India, approximately, 2.27 million people were living with HIV in the year 2008-09 (NACO annual report, 2010).

Statistics shows that out of five patients affected by AIDS, one is in his 20s, HIV/AIDS surveillance Rep (1993); Smith et al. (1993). Given the long incubation period of HIV, it is clear that many older adolescents and young adult with AIDS were infected as younger teenagers Brooks, G.J. (1990). There are several factors that are contributing to the higher risk of HIV infection among young people e.g. first sexual experiences, the higher proportion of sexually transmitted diseases, addiction that begins usually at this age, and so on, Sechrist (1997). On the other hand, there is a chance to establish protective health behaviour patterns in young people, which might endure into adulthood, since there are uncontrolled sexual contacts, high prevalence of addiction, absence of sex education and higher marriage age, longer separation from the partners, youth are counted as a high risk group for HIV infection. It is obvious that against such a background the risk of HIV infection increases. Accordingly, the current HIV/AIDS

situation and the fact that antiretroviral drugs are not affordable and available for treating vast numbers of HIV-positive individual's makes primary prevention of HIV infection seen the most important concept in controlling the epidemic, Stratigos and Tzala (2000).

The most tragic aspect is that about half of the infected victims are in the most productive age group of 15-24 years (Shah and Sushil, 2005). This reveals that the Youth form the major victim of this dreaded disease. They fall victims because of their emotional curiosity and lack of proper social control or due to lack of proper education. This prompts them to indulge in abnormal sexual behaviour, which in turn makes them susceptible to AIDS. Hence, it is very essential to plan an educational programme by assessing the amount of knowledge the student posses.

In 1991, it was found that 25% of the world's HIV cases were in their 20s indicating the fact that it must have been acquired during their Adolescents as potential resources for prevention of HIV transmission, which has resulted the inclusion of HIV/AIDS education in school curricula and devising special drives for teenage education all over globe. But, our AIDS prevention and control efforts remained largely concentrated on groups already practicing high risk behaviour (like commercial sex workers, intravenous drug users and long route drivers etc.) Thus, the other potential risks groups like older school children, adolescents and young adults, who because of their vulnerability deserved simultaneous attention, continued to remain as a low priority. Because, this is a period of great physical, mental and emotional turmoil and this target groups, in search of their identity, very often start experimenting with intravenous drugs or sex, both making them vulnerable to contracting HIV/AIDS. Many adolescents and young adults are less aware of HIV/AIDS and the modes of its transmission. Since, "prevention is better than cure" is the only way of getting rid of the disease. But empowerment of youth with knowledge about high risk behaviour and its ominous relation with HIV/AIDS is a most effective tool to contain this pandemic.

Hence, planning an appropriate HIV awareness programme for college going students must be relevant to its needs, and can be designed only after determining the existing knowledge, belief and attitude and practice pattern of the target group. A number of knowledge, belief and attitude studies have been conducted in different parts of India reveal widespread ignorance and misconceptions among this vulnerable age group. No such assessment has ever been attempted in Himachal Pradesh (H.P.). In Himachal Pradesh 19.1 percent of the total population lie in the age group of 15-24 years (Statistical outline of H. P. 2007-08). Thus present study was undertaken to assess the extent of nature of beliefs, knowledge and attitude of the students of Engineering and Non-Engineering institution towards HIV/AIDS and its affected persons, due to three reasons: i) The sample comprises of students in engineering institution which belong to the different districts of the state and different

states of India ,whereas in the non-engineering institution the students mainly belong to Hamirpur district ii) Engineering students are considered as a cream of the nation as compared to other students and iii) The first case in the Hamirpur district was detected in the year 1992, The number of HIV+ve cases has grown to 705 i.e. 23.16 percent of the total case in the state and AIDS cases to 114 i.e. 20.39 percent of the total AIDS cases in the state respectively up to 31st July, 2008 (State AIDS Control Society).

Key Components used in this study

Though, various scholars have tried to define these key terms in different ways. In the following paragraph we have given working definition of these terms.

Knowledge

One factor contributing to rapid epidemic spread among youth is ignorance, they are not told how to protect themselves and ignorance of the disease and its causes is rampant. Indian AIDS Expert Siddhartha Dube argues that prevention campaigns centered on slogan like "Love Carefully" don't provide the detail information sexually active people need to protect themselves. Hence the knowledge about HIV/AIDS transmission is must for the youth.

Knowledge includes students' knowledge and awareness about various aspects of the HIV/AIDS, mode of transmission, diagnosis, treatment, source of information and its protective method. Though better knowledge does not necessarily leads to behavioural changes, Rubin, etal. (1992); Brown and Fritz (1988). But we believe that repeated talks with teachers and advisors in the class room about this important subject would have some influence upon a certain percentage of the students.

Belief

Belief seems to play an important role in determining why some groups of people engage in risky behaviour. To illustrate this point, consider a study of Hingson and his colleagues (1990). These researchers assessed whether beliefs about AIDS and about condom use were related to the frequency of unprotected sex among sexually active adolescents. After completing the belief questionnaire, all participants were asked to estimate the number of sex partners they had during the past year and the frequency with which they engaged in unprotected sex-definitely a risky proposition. The results showed that beliefs are a very important determinant of behaviour. Adolescents who believed (1) they were highly susceptible to AIDS, (2) There is no cure for AIDS and (3) condoms are effective in preventing AIDS were more likely to report the consistent use of condoms than teenagers who did not share these beliefs. The results of these studies, and related research, provide valuable information regarding the beliefs and attitudes associated with risky behaviours. Researchers

have now begun using such knowledge to develop interventions aimed at changing the behaviours of persons at risk for contracting the HIV/AIDS.

Attitudes

Individual may have strong feeling and reaction to the HIV/AIDS infected persons. For such reactions we call it attitudes. There are many definitions of this term, but the fact remains that when we tend to evaluate many aspects of the HIV/AIDS infected and affected person, that will reflect in the attitude of the students. Indian attitudes towards HIV/AIDS which is associated with cultural taboo, (sex education violate cultural taboo). These are serious attitudinal problems aroused by lack of education about AIDS and need to be addressed. Richard Holbrook says that in China and India, all the discussion of cultural taboos “were really about the fact that men felt uncomfortable talking about empowering women”. Basir, G. etal. (2003) found that one fourth of the respondents have never heard of HIV/AIDS. Misconceptions about the routes of transmission were common. There was substantial intolerant attitude towards AIDS and HIV positive patients. Ignorance of various risks groups within the society was also very much wide spread.

Material and methods

The study was conducted from September to November, 2008. 900 students, comprising of 300 boys and 150 girls from engineering institution and 300 boys and 150 girls from non-engineering institution were selected from District Hamirpur of Himachal Pradesh. The selection of the students was done through purposive random sampling. The data was collected by self-administered anonymous questionnaire. The original questionnaire comprises of 65 questions. Two epidemiologists, a specialist in infectious disease and a general physician reviewed the questionnaire. It was pre-tested one month prior to the study. Only 44 close ended questions were judged as valid and included in this study. The questions covered the following categories: knowledge about HIV/AIDS including modes of transmission, preventive methods, source of knowledge, belief about the disease and attitudes towards HIV/AIDS patients. The questionnaire was filled by the students in the class in the presence of investigators. The students were given 30 minutes to complete the questionnaire without mutual consultation.

Observations/Results

It is interesting to note that 97 percent boys and 100 percent girls have heard of HIV/AIDS. Among those aware nearly 52 percent feels that it is a communicable disease. Most of the students i.e. 86 percent were not aware about availability of the vaccine (see figure-1). Knowledge about transmission of disease, majority of the students had an idea about modes of transmission (see figure-2). Only 42.67 percent of the boys and same percentage of the girls of

Figure 1:

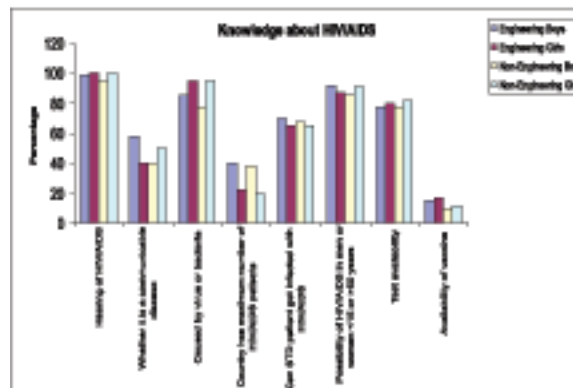
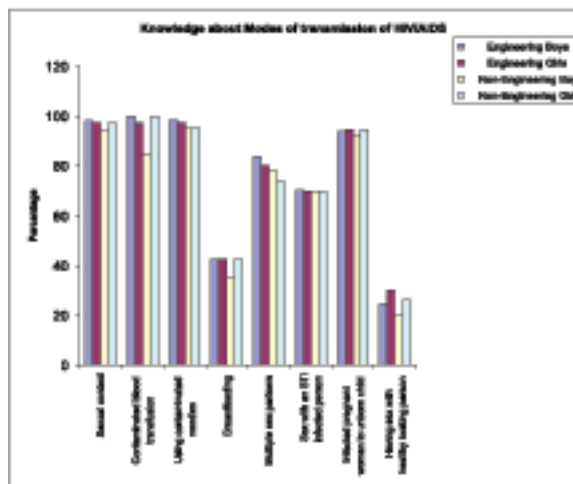


Figure 2:



engineering blamed it due to breastfeeding and 24.67 percent of boys and 30 percent of girls to having sex with healthy looking person, whereas this percentage stood 35 percent and 42.67 percent respectively for the boys and girls for breastfeeding and 20 and 26 percent respectively in case of boys and girls for sex with healthy looking person for non-engineering students. Students were aware that it can be transmitted from sexual contact, contaminated blood transfusion, contaminated needles, multiple sex partners, sex with STI infected person and infected woman to unborn child. Pertaining to preventive measures, girls were found more aware than the boys (see figure-3). Those with correct knowledge of various preventive measures to be used to prevent this disease, majority of boys named using condoms (98.33 percent of engineering , 100 percent of non-engineering) followed by using disposable syringes (93.79 percent); avoiding unsafe blood transfusion (98.33 percent for engineering and 95.33 percent for non-engineering) and girls almost 100 percent. It was also found that majority of boys feels that it is not necessary to avoid extra marital sex and remain faithful to one partner as a

Figure 3:

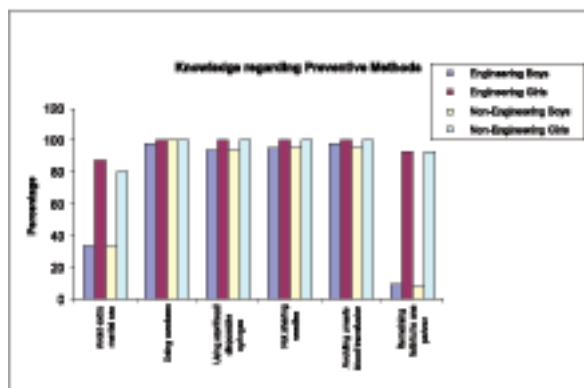


Figure 4:



preventive measure for HIV/AIDS. These feelings were different among the girls.

Akande (1994), Dekin (1996), Fabiyi (1993), Johnson et al. (1992), Ramsum et al. (1982) and Teka (1993), Oyaziwo Aluede (2005) has also reported high knowledge in their studies. Green (1991), Madhok et al. (1993) and Brook (1999) revealed that women were more knowledgeable about the dangers of HIV/AIDS.

The chief source of information about HIV/AIDS to the vast majority of the boys respondents of engineering and other was Television (98.33 percent) followed by print media (94.33 percent). Radio, the other source provides knowledge to 18.67 percent boys and 27.33 percent for girls of engineering, whereas for non-engineering students this percentage was 38 and 55 percent respectively for boys and girls respondents (see figure-4). 88.33 percent of the engineering boys and 92.67 percent of the girls believed that the religious leaders are not effective in imparting the knowledge about HIV/AIDS, this percentage stood 96 percent in case of boys and 90 percent in case of girls for the non-engineering students, even the Government awareness programmes about this disease through hoardings could not impress the youth i.e. 67 percent of boys and 62.67 percent of the girls of engineering, 68 percent of boys and 64 percent of girls for non-engineering. This shows that student respondent of non-engineering institution has acquired much

knowledge from radio and hoarding as compared to engineering students. Studies conducted by Brook (1999) and Anahita Tavooosi (2004) has revealed that major source of knowledge was television and print media to the respondents.

Students have shown their ignorance about the causative agent. 19.33 percent of boys and 10 percent of girls blamed it to mosquito/insect bite; kissing 11 percent boys and 5.33 percent girls; eating from the same stuff 98 percent boys and 100 percent girls; touching infected person and sharing food 2 percent boys and 2.67 percent girls of engineering (see table-1), whereas 20 percent of boys and 12 percent of girls blamed it to mosquito bite; kissing 14.67 percent boys and 10.67 percent girls; eating from the same stuff 93.33 percent each for boys and girls; touching infected person and sharing food 4 percent boys and 5.33 percent respectively for the respondents of non-engineering institution. The student's ignorance about the causative agent differs among engineering and non-engineering students.

Fukuda (1993) in his study revealed that the most of the students have good knowledge of HIV/AIDS but misconceptions do exist. A small percentage of students identified mosquito bite, sharing of toilet and sneezing and coughing as possible transmission routes. WHO (1992) studies commissioned by global programme against AIDS in 1991, found that information regarding transmission and

Table 1: Belief about Communicability

	Engineering		Non-Engineering	
	Boys=300	Girls=150	Boys=300	Girls=150
	Yes	Yes	Yes	Yes
Through handshake & casual contact	6 (2.00)	0 (00.00)	4 (1.33)	0 (0.00)
Eating from same stuff	294(98.00)	150 (100.00)	280 (93.33)	140 (93.33)
Mosquito/insect bite	58 (19.33)	15 (10.00)	60 (20.00)	18 (12.00)
Sharing utensils	8 (2.67)	0 (0.00)	14 (4.67)	0 (0.00)
Kissing	33 (11.00)	8 (5.33)	44 (14.67)	16 (10.67)
Sharing shaving blade & tooth brush	215 (71.67)	67 (44.67)	220 (73.33)	68 (45.33)
Using common toilet, swimming pool,	15 (5.00)	15 (10.00)	25 (8.33)	30 (20.00)
Touching infected person & sharing food	6 (2.00)	4(2.67)	12 (4.00)	8 (5.33)

prevention, reached to a large segment of the world's population, misconception like transmission of the disease through insect bite and non intimate touch exist. Shailesh et.al (2004) in their study revealed 52.7 percent males and 62.03 percent females knew that AIDS is an infective communicable disease. Although, aetiology of HIV/AIDS was correctly known to nearly 58 percent of students, but, the misconception exist. The students felt that AIDS can be transmitted through kissing, common shaving blades, common tooth brushes and mosquito bite. Ratnakumari (2006) in their study revealed that, though the students have knowledge regarding the sources of HIV transmission, misconceptions like transmission of HIV by being bitten by mosquito, also prevailed.

When asked, whether the respondents ever discussed HIV/AIDS with someone, 96.67 percent of the boys and 82.67 percent of the girls admitted that they shared their feelings with their friends (see table-2), this percentage was 97.33 percent for boys and 93.33 percent for the girls of non-engineering institutions. Other persons with whom they have discussed about this disease: brother 36.67 percent boys and 10 percent girls; sisters 12.33 percent boys and 47.33 percent girls of engineering. This percentage was: brother 53.33 percent boys and 0.0 percent girls; sisters 4.67 percent boys and 65.33 percent girls for respondents of non-engineering institution. It is also interesting to note that nearly 37.16 percent of the respondents has discussed this with their teachers, where as very few students has discussed with their parents.

Majority of the respondents, 73 percent of the boys and 64.67 percent of girls of engineering expressed that HIV/AIDS patients must not be managed at home but should

be hospitalized. 91 percent of the boys and 97.33 percent of the girls believed that they should be treated in isolation (see table-3), whereas 78.33 percent of boys and 66.67 percent of girls of non-engineering institution were of the view that HIV/AIDS patient should be hospitalized and 96.67 percent of the boys and 100 percent of the girls believed that they should be treated in isolation. Most of the students were in the favour of giving necessary support but advocating isolation, ostracizing, and shunning, boycotting and even expulsion from the institute if positively identified. This reflects the negative attitudes of the respondents towards HIV infected individual.

Benora et al. (1992) have found that 58 percent students believed that one could get infection through oral route and 41 percent female students are of the opinion that AIDS patients should not be allowed to mix in the society. Maswana et al. (2000) in their study revealed that students have high knowledge concerning HIV/AIDS, but had considerable misconceptions and prejudices about the people living with HIV/AIDS. Padmavati and Ratnakumari (2006) in their study revealed that, though the students have knowledge regarding the sources of HIV transmission, misconceptions like transmission of HIV by being bitten by mosquito, also prevailed. The students also seem to have the misconception that the AIDS infected individuals should be isolated.

Majority of the respondents have expressed that the need for sex education and awareness programmes should be vigorously implemented and have also shown their willingness to attend these programmes (see table-4). All these points expressed will help the policy planner to combat with HIV/AIDS.

Table 2: Sources with whom ever this problem was discussed

	Engineering		Non-Engineering	
	Boys=300	Girls=150	Boys=300	Girls=150
	Yes	Yes	Yes	Yes
Friends	290 (96.67)	124 (82.67)	292 (97.33)	140 (93.33)
Brothers	110 (36.67)	15 (10.00)	160 (53.33)	0 (0.00)
Sisters	37 (12.33)	71 (47.33)	14 (4.67)	98 (65.33)
Father	54 (18.00)	26 (17.33)	20 (6.67)	6 (4.00)
Mother	44 (14.67)	52 (34.67)	8 (2.67)	44 (29.33)
Teachers	126 (42.00)	67 (44.67)	110 (36.67)	38 (25.33)

(Figures in parentheses show percentage to total)

Table 3: Attitude towards the patients of HIV/AIDS

	Engineering		Non-Engineering	
	Boys=300	Girls=150	Boys=300	Girls=150
	Yes	Yes	Yes	Yes
Hospitalization	219 (73.00)	97 (64.67)	235 (78.33)	100 (66.67)
Isolate	273 (91.00)	146 (97.33)	290 (96.67)	150 (100.00)
Treat as out patient with extra precaution	163 (54.33)	34 (22.67)	180 (60.00)	40 (26.67)
Ostracize/Shun/Abandon/Isolated/Boycott/Expel from the institute	285 (95.00)	150 (100.00)	185 (61.67)	130 (86.67)
Give necessary support	290 (96.67)	146 (97.33)	290 (96.67)	150 (100.00)

(Figures in parentheses show percentage to total)

Table 4: Education

	Engineering		Non-Engineering	
	Boys=300	Girls=150	Boys=300	Girls=150
	Yes	Yes	Yes	Yes
Felt need for sex education	269 (89.67)	142 (94.67)	230 (76.67)	110 (73.33)
Felt need for HIV awareness programmes	275 (91.67)	146 (97.33)	280 (93.33)	150 (100.00)
Will to attend such programmes	213 (71.00)	135 (90.00)	190 (63.33)	63 (42.00)

(Figures in parentheses show percentage to total)

Discussion

Adolescents form a sizeable proportion of the population. Adolescents is the most volatile period of life, with the children attempting to shed parental restriction while seeking new identity or making new contacts, peers and the friends from opposite sex become more important who seem to exert more influence than the previous role models (Parents and teachers). Experimentation with new friends, new behaviour with drug and even sex pose additional challenges for adolescents and parents alike. Girls suffer more acute and dramatic physical, mental and emotional changes; with a little support forthcoming from parents, families and teachers. Because of their greater vulnerability, they may fall prey to exploitation during this period, which may culminate into an unwanted pregnancy or a sexually acquired disease including HIV/AIDS.

It was found that young people aged 15-24 year account for an estimated 45 percent of new HIV infections worldwide (Global AIDS Epidemic Report, 2008) which shows that it must have been acquired during their adolescent period. That is why WHO advocated utilizing young children and adolescents as potential resource for prevention of HIV transmission. This resulted in the inclusion of HIV/AIDS education in school curriculum and in devising special drives for teenage education all over the globe. Already one and a half decade has passed and a dramatic progress in teenage education has been observed in many countries like Thailand and Sri Lanka. The Thai Ministry of education, programme for appropriate technology in health (PATH), and the horizon programme embarked on a study to examine the outcomes of a school-based HIV/AIDS programme. For this college student however has made a very slow progress.

Our AIDS prevention and control efforts remained largely concentrated on groups already practicing high risk behaviour such as commercial sex workers, intravenous drug users and among long route truck drivers. Thus, the other potential risk groups like older school children, adolescents and young adult, who, because of their vulnerability deserved simultaneous attention, continued to remain as low priority.

This is the first ever AIDS awareness study performed among the young adults/adolescents in Himachal Pradesh. The target group for the study was engineering and non-engineering students of district Hamirpur of Himachal Pradesh and their age ranges from 17 to 23. The sample was from urban boys and girls those belong to different

parts of the state and country for the engineering and for the non-engineering students which mainly belong to rural area.

However, the results revealed that the majority of the respondents were aware in some of the aspects of HIV/AIDS. However, 29.96 percent of boys and 11.23 percent of girls still believe that it is communicable disease. Majority of respondents have no idea about the availability of vaccine for HIV/AIDS patient.

The predominant route of HIV/AIDS transmission in India is heterosexual. However, our respondents have given a confused statement, on the one side they admitted that it is caused by sexual contact, on the other hand 77.67 percent of boys and 72 percent girl's advocates that it can't be transmitted if we have sex with healthy looking person. Most effective preventive measure which was reported by various studies, is avoiding extra marital sex and be remain faithful to one partner. Majority of our boys (respondents) revealed that these methods are contrary. Girls were having more knowledge about preventive measures than boys of HIV/AIDS. Our findings were also supported by the study, Green (1991), Madhok et al. (1993) and Brook (1999). The main source of HIV awareness for young students was television and print media (including books). This was consistent with the study Brook (1999) and Anahita Tavooosi et al. (2004).

Misconception about the spread of infection, too were widespread. There were 19.66 percent of the boys who believed that HIV/AIDS could be transmitted either by mosquito/insect bite, by kissing 12.83 percent and touching infected person and sharing food 3 percent, sharing shaving blade and tooth brush 72.5 percent, whereas only 45 percent girls believed that it can be transmitted through sharing shaving blade. The most important source of health education needs to be viewed in the background of the awful negative influence it can have on young adult. Our respondent blamed it directly for encouraging permissive behaviour which they perceive as a society. Friends, due to their own ignorance and misconceptions, could be extremely misleading. Discussions around HIV/AIDS were most frequently made with friends followed by brothers and sisters. Very ironically only 13 percent boys and 21.33 percent girls could discuss HIV/AIDS with their parents which reflected the prevalent parochial parental attitude. It means that matters pertaining to sex, sexuality and reproduction continue to be a taboo in our society. This percentage was different

among the engineering and non-engineering students. Thus, we found in our study that still misconceptions prevails and prejudices about the people living with HIV/AIDS. These results were consistent with the studies conducted by Benora et al. (1992) Maswana et al. (2000), Padmavati and Ratnakumari (2006).

Conclusion

The present study showed a mixed picture of HIV/AIDS awareness among the educated youth of engineering and the non-engineering institution, which indirectly points out that the awareness level is less among the rural counterparts. This mixed response among engineering and the non-engineering institution is a matter of serious concern and needs to be addressed appropriately through intensive HIV/AIDS awareness campaign in all schools, degree and professional colleges of the state, so that, young people which are more productive can be saved from this dreaded disease.

References

1. Akande, A. (1994). AIDS-related beliefs and behaviours of students: evidence from two countries Zimbabwe and Nigeria, *International Journal of Adolescence and Youth*, 43-4: 285-303.
2. Aluede, O., Imhonde, H.O., Maliki, A.E., Alutu, A. N.G. (2005). Assessing Nigerian University students knowledge about HIV/AIDS, *Journal of Social Science*, 11 (3): 207-13.
3. Anahita Tavoosi et al. (2004). Knowledge and attitude towards HIV/AIDS among Iranian students, *BMC publication*, 4:17.
4. Basir, G. et al. (2003). Knowledge, attitude and Belief on HIV/AIDS among the female S.S. students in Srinagar distt. of Kashmir, *Health and population: perspectives and issues* 26(3) 101-109.
5. Benora et.al. (1992) AIDS: Survey of knowledge, Attitude and Beliefs of undergraduate students of Delhi University, *Indian Community Medicine*, 17: 155-159.
6. Brook U (1999). AIDS knowledge and attitudes of pupils attending urban high school in Isarel, *Patient Educ and Couns*, 36:271-278.
7. Brooks-Gunn, J.Furstenberg, F.F. (1990). Coming of the age in the era of AIDS: Puberty, Sexuality and Contraception. *Milbank Q*, 68:59-84.
8. Brown, L.K, Fritz, G.K. (1988). Children knowledge and attitude about AIDS. *J.Am.Acad child adolsc psychiatry*, 27: 504-08.
9. Center for Disease control and prevention: U.S. AIDS Cases reported through June (1993). *HIV/AIDS surveill Rep*, 5:10.
10. Commission on AIDS in Asia (2005). *Redefining AIDS in Asia- Crafting an effective response*, Oxford University Press, Delhi.
11. Dekin, B. (1996). Gender differences in HIV-related self reported knowledge, attitudes and behaviors among college students, *American Journal of Preventive Medicine*, 124 Supplement: 61-66.
12. Fabiyi, A.K. (1993). An assessment of the knowledge of AIDS of undergraduates of Obafemi Awolowo University, Ile-Ife, Nigeria., *Nigerian Medical Practitioner*, 26(1-2): 14-17.
13. Fukuda, H. (1993). A role of dentist in management of HIV infected persons, *Hokkaido Journal of Medical Science*, 6, 627-629 (in Japanese with English abstract).
14. Green et al. (1991). Differences in general knowledge of AIDS its transmission and prevention among Israeli aged 18-19 years, *Eur J. Pub Hlth*, 75-78.
15. Hingson, R., Strunin, L., Berlin, B. Heeren, T., (1990). Belief about AIDS, use of alcohol and drugs and unprotected sex among Massachusetts adolescents, *American Journal of Public Health*, 80, 295-99.
16. Johnson, E.H., Y. Hinkle, D. Gilbert and L. M. Gant. (1992). Black males who always use condom: their attitudes, knowledge about AIDS and sexual behaviour, *Journal of the National Medical Association*, 84: 341-352.
17. Madhok, R., A. K. McCallum, R. McEwan and R.S. Bhopal (1993). Students knowledge and behaviour concerning safer sex: A UK study, *Journal of American College Health*, 42:121-125.
18. Maswanya, E., K. Moji, K. Aoyagi, Y.Yahata, Y. Kusano, K. Nagata, T. Izumi and T. Takemoto (2000). Knowledge and attitudes toward AIDS among female college students in Nagasaki, Japan, *Health Education Research , Theory and practice*, Vol.15 no.1, 5-11.
19. NACO (2010). *Annual Report on HIV/AIDS*
20. Padmavathi, K.V.S.S.G. and S. Ratnakumari (2006). Knowledge and opinion of undergraduate students towards reproductive health and AIDS, *Journal of Community Guidance & Research*, Vol.23 no.2, 250-253.
21. Ramsum, D.L., S. A. Marion and R. C. Mathias. (1992). Changes in university students' AIDS- related knowledge, attitudes and behavior, 1988-1992, *Canadian Journal of Public Health/ Revue Canadienne De Sante Publique*, 844: 275-278.
22. Rubin Stiffman, A., Earls, F. Dore P, Cunningham R: (1992), Changes in AIDS related risk behaviour after adolescence: relationships to knowledge and experience concerning HIV infection. *Pediatrics*, 89:950-66.
23. Sechrist, W. (1997). Personalizing HIV infection: moving students closer to believing..... "This could actually happen to me!" *J. HIV/AIDS Preven Educ Adoles child* 1 : 105-107.
24. Shah, B., Sushil , (2005). HIV/AIDS prevention: A challenge to humanity, *University News*, 43 (28) July11-17.
25. Shailesh J Kore, Anahita Padole, Yogni Nemade, Santosh Putharaya and VR Ambiye (2004). Attitude, knowledge, beliefs about HIV/AIDS in college going

- adolescents, http://www.bhj.org/journal/2004_4602_April/html/attitude-146htm
26. Smith, K.W., McGraw, S.A., Crawford, S.L., Costa, L.A., Mckinlay; J., (1993). HIV risk among Latina adolescents in two New England cities. *American Journal of Public Health*, 83:1395-1399.
 27. Statistical Outline of H.P.(2007-08). Department of Economics & Statistics, Himachal Pradesh.
 28. Stratigos, J.S, Tzala, E. (2000): Global epidemiology of HIV infection and AIDS, *Clin Dermato*, 18:381-87.
 29. State AIDS Control Society (2008). Status Paper on HIV/AIDS
 30. Teka, T. 1993. College student's attitudes and knowledge of AIDS, *Ethiopian Medical Journal*, 314: 233-237.
 31. UNAIDS (2008). Report on Global AIDS epidemic.
 32. UNAIDS&WHO (2009). AIDS epidemic update.
 33. UNDP (2005). Human Development Report, UNDP, New York
 34. WHO (1992). Global programme on AIDS, 1991 progress report, Geneva, 39-40.

A cross-sectional study to assess hearing impairment in school going children aged 6 to 10 years of Belgaum City

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Abstract

Hearing loss of any type or degree if occurs in infancy or childhood can interfere with the development of a child's spoken language, academic performance, reading and writing skills. The objective of the present study was to determine the prevalence of hearing impairment among school going children aged 6 to 10 years of Belgaum city and to identify the etiological factors of diminished hearing and their distribution patterns.

Keywords

Hearing impairment, Prevalence, School going children, Audiometry, CSOM

Introduction

Normal hearing is one of the important factors for the proper mental development of a child. Approximately 90% of a young child's knowledge can be attributed to incidental reception of language around him.¹

Hearing impairment acquires a special significance in children as a large percentage of the affected populations are children. As per WHO estimates of 1995 there were at least 120 million people in the world with disabling hearing impairment, with a global prevalence of 2.1%. Of this 78 million people were from developing countries, of which approximately 8 million were children and adolescents aged less than 18 years of age.² Children with hearing impairment often experience delayed development of speech and cognitive skills, which may result in slower learning and difficulty in progressing at school. The level and type of hearing impairment and the age of onset, especially if it begins before the age when speech normally develops also has an impact on the child's speech, language, education and social integration.³

The interventions to reduce development of communication disabilities with hearing impairments are most successful if affected children are diagnosed early.⁴

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The World Health Organization (WHO) suggests that in developing countries, children should be screened at school entry using a simple audiometer and that the external ear be inspected for the presence of discharge to study the extent of problem in the community.⁵ In the developed countries, there are annual screening programs for the detection of hearing impairment that do not exist in India. Information obtained from sporadic studies done in the past indicates that prevalence of hearing impairment among Indian primary school children is in the range of 5.4 to 21.63%.⁶⁻¹¹

There is no recent literature in India regarding prevalence of hearing loss among school children. Similarly, there is lack of data pertaining to prevalence of hearing impairment in school going children of the local population. Hence the present study was undertaken to determine the prevalence of hearing impairment among school going children aged 6 to 10 years of Belgaum city and to identify the etiological factors of diminished hearing and their distribution patterns.

Material and Methods

The study was carried out under the auspices of Department of Physiology, Jawaharlal Nehru Medical College, Belgaum on 810 school going children of 6 to 10 years age group selected from four schools of the city. The schools were selected from 208 schools by simple randomization method encompassing children from all socioeconomic backgrounds. Based on estimated prevalence of 12% from previous studies^{6,7,9} and allowable error of 20%, an estimated sample size of 733 school children was calculated. Taking into consideration the inclusion criteria, 847 children were recruited as study participants of which 37 children refused to participate and hence were excluded from the study. Thus, a total of 810 children were included in the study. The study was approved by J. N. Medical College Institutional Ethics Committee for Human Subjects Research. A written informed consent was obtained from parents / guardians. The study was carried out in 2 phases: (a) Examination of children in schools (b) Follow up examination.

(a) Examination of Children in Schools

A pre-designed and pretested questionnaire was used to record detailed birth, developmental and ENT history from the participants, guardians and teachers. Clinical ENT

examination was done followed by otoscopy with a portable otoscope and tuning fork tests with 512 Hz tuning fork, both of which were used as screening tests. If wax was present partially or completely blocking the view of the tympanic membrane, it was removed so as to visualize the same fully.

(b) Follow Up Examination

In case of perforation of tympanic membrane of any one / both ears or if the tuning fork tests yielded doubtful results, those children were reexamined in the ENT OPD of KLES Dr. Prabhakar Kore Hospital & Medical Research Centre, Belgaum. Those children who still had defective findings on follow up underwent Pure Tone Audiometry, which is the confirmatory test for hearing impairment, in a sound proof Audiometry room using a Siemens SD 50 Audiometer and the type and severity of hearing loss was determined. Tympanometry was done only in suspected cases of Otitis media with effusion (OME) using Madsen Impedence

Audiometer Z.S. 77MB model.

Data analysis was done using rate, ratio and proportions method to find out the prevalence rate, types and severity of hearing impairment in the school children. Chi-square test was used to compare categorical variables. Differences were considered significant at $p < 0.05$ level.

Results

A total of 810 children were examined of which 75 had hearing impairment i.e. a prevalence of 9.25%. The distribution of children as per age and gender is given in Table 1. Mean age of children was 7.63 ± 1.25 years and majority were girls (57.33%). The prevalence rate of hearing impairment was significantly more in girls as compared to boys ($X^2 = 13.265$, $df = 1$, $p = 0.000$). It was observed that as age progresses the prevalence of hearing impairment decreased and this was statistically significant (X^2 for trend = 6.77, $df = 1$, $p = 0.009$). There was a statistically significant inverse relationship observed between prevalence of

Table 1: Distribution of study participants with hearing impairment according to gender and age

Age (in years)	Boys			Girls			Total		
	Number examined	Hearing impaired	Percentage examined	Number examined	Hearing impaired	Percentage examined	Number examined	Hearing impaired	Percentage examined
6	80	7	8.75	117	21	17.90	197	28	14.21
7	89	4	4.49	98	13	13.26	187	17	9.00
8	75	2	2.67	116	12	10.34	191	14	7.30
9	82	4	4.00	101	9	8.90	183	13	7.10
10	18	0	0.0	34	3	8.80	52	3	5.70
Total	344	17	4.94	466	58	12.44	810	75	9.25

For gender difference, $X^2 = 13.265$, $df = 1$, $p = 0.000$; For age, X^2 for trend = 6.77, $df = 1$, $p = 0.009$

Table 2: Socioeconomic distribution of study participants and prevalence of hearing impairment

Socioeconomic status	Total number examined		Number with hearing impairment	
	Number	Prevalence (%)	Number	Prevalence (%)
Class I	81	10.00	00	0.00
Class II	271	33.45	06	2.21
Class III	128	15.80	13	10.15
Class IV	235	29.01	41	17.44
Class V	95	11.72	15	15.79
TOTAL	810	100.00	75	9.25

X^2 for trend = 42.035, $p = 0.000$

hearing impairment and socioeconomic status (X^2 for trend = 42.035, $p = 0.000$). (Table 2)

Of the 75 children identified with hearing loss; 73 had conductive hearing loss and 2 had sensorineural hearing loss. Mild degree hearing loss was the commonest type (84%) followed by moderate degree (14.7%) and moderately severe degree (1.3%) hearing loss. The distribution of children with hearing impairment according to causes of the impairment is depicted in Table 3. The most common causes were found to be Chronic suppurative

otitis media (CSOM) (60%) and Otitis media with effusion (OME) (18.66%).

Data were further analyzed to find out the prevalence of ear disease among children (Table 4 and 5). 320 out of 810 study participants had ear diseases of which impacted wax (43.4%) was the most common finding. The prevalence of hearing impairment among children with ear disease was 22.95%, with higher prevalence among those with

Table 3: Distribution of children with hearing impairment based on etiology of ear disease (n=75)

Causes of hearing impairment	No. of children with hearing impairment	Prevalence (%)
A. External ear causes (n=9)		
Otitis externa	03	4.0
Otomycosis	06	8.0
B. Middle ear causes (n=64)		
CSOM (n=45)	45	60.0
a) Only CSOM	40	53.3
b) CSOM + impacted wax	04	5.3
c) CSOM + Otitis externa	01	1.3
OME (n=14)	14	18.6
a) Only OME	13	17.3
b) OME + impacted wax	01	1.3
Eustachian catarrh	05	6.6
C. Inner ear causes (n=2)	02	2.6
TOTAL	75	100.00

CSOM: Chronic suppurative otitis media; OME: Otitis media with effusion

Eustachian catarrh (83.33%), OME (53.81%), CSOM (48.12%) and Otomycosis (20%).

Conclusion

Most of the etiological factors causing hearing impairment in children are treatable. Screening tests at school entry levels and ear health care education in community can minimize prevalence of ear pathologies and hence hearing impairment.

Discussion

The present study shows that hearing impairment and preventable ear diseases are largely unexplored problems in the community and appear to have a high prevalence

among school going children. A similar study carried out in rural South India on 284 children reported a prevalence of 11.9%.¹⁰ Information obtained from sporadic studies done in the past indicates that prevalence of hearing impairment among Indian primary school children is in the range of 5.4 to 21.63%. These studies have highlighted the fact that such hearing impairment is predominantly conductive in nature and thus, largely preventable.⁶⁻¹¹ The difference in prevalence of hearing impairment in different studies may be due to variations in the age groups, demographic distribution of study population and the exclusion criteria used in these studies.

Hearing loss appears to bear an inverse relationship with socioeconomic status in the present study. This is consistent with findings in many studies conducted in

Table 4: Prevalence of various types of ear pathologies among study participants (n=320)

Ear pathology	Number with ear pathology	Prevalence of ear pathology (%)
A. External Ear cause (n=185)		
Impacted wax	139	43.40
Otitis externa	12	3.75
Otomycosis	30	9.40
Foreign bodies	04	1.25
B. Middle Ear causes (n=133)		
CSOM	93	29.06
OME	26	8.10
Eustachian catarrh	06	1.80
Acute otitis media	08	2.50
C. Inner ear causes	02	0.62
TOTAL	320	100.00

CSOM: Chronic suppurative otitis media; OME: Otitis media with effusion

Table 5: Prevalence of hearing impairment among children with various ear pathologies

Ear disease status	Number of children with ear pathologies	Number of children with hearing impairment	Prevalence of hearing impairment (%)
A. External ear causes	(n=185)	(n=09)	4.86
Impacted wax	139	00	0.00
Otitis externa	12	03	25.00
Otomycosis	30	06	20.00
Foreign bodies	04	00	0.00
B. Middle ear causes	(n=133)	(n=64)	48.12
CSOM	93	45	48.40
OME	26	14	53.81
Eustachian catarrh	06	05	83.33
Acute otitis media	08	00	0.00
TOTAL	318	73 (CHL)	22.95
C. Inner ear causes	02	02 (SNHL)	100.00
GRAND TOTAL	320	75	23.43

India and Abroad.^{10, 12, 13, 14} Most of the diseases causing hearing impairment are acquired like Chronic suppurative otitis media (CSOM) and Otitis media with effusion (OME) and are commoner among the low socioeconomic population due to enhanced risk factors in them like lack of proper hygiene, poor nutritional status, poor or incomplete immunization, neglected upper respiratory tract infections, poor availability and utilization of medical facilities, indigenous methods for ear cleaning which are observed in them which may lead to trauma of tympanic

membrane and infectious external otitis.^{12,15}

The present study found that as age progresses the prevalence of hearing impairment decreases. It was highest in six year old children (14.2%) and lowest in ten year old children (5.7%). This could be attributed to reduction in size of adenoids and improved eustachian tube function with increase in age. Similar findings were reported in other studies as well.^{9,11}

Studies from the developing countries have documented impacted wax as the commonest otoscopic finding and

etiology of hearing impairment with prevalence rates of 7.4% to 63%.^{10, 16, 17, 18} In the present study though the prevalence of impacted wax was high (43.4%), after aural toilet, these children had normal otoscopic findings and tuning fork tests. Impacted wax being a silent condition, may go unnoticed unless it becomes painful. An otoscopic examination could easily detect this. This is especially important in lower socioeconomic classes where poor aural hygiene is largely found. Simple strategy of health education about ear hygiene and regular otoscopic examination could reduce this treatable cause of hearing impairment in the society especially in developing countries.

In the present study, CSOM was found to be the commonest (93, 29.24%) ear pathology which is consistent with findings of other investigators.^{6,9} Of these, 45 children (48.4%) had conductive hearing loss on audiometry. Considering the fact that majority of the children come from a lower socioeconomic class and the standards of hygiene are low, the higher prevalence of CSOM is not surprising. Also, of the 93 children with CSOM, four did not give a history of ear discharge. If regular screening is not performed, these cases which are treatable could have been missed.

OME is also an important middle ear disease in children and recurrent upper respiratory infections are commonly found in most children with OME. The inadequately treated OME occasionally leads to adhesive otitis media and so it is certainly preventable to a great extent by early detection and proper treatment. This condition has been reported to be a potent cause of mild to moderate but usually temporary hearing impairment in childhood.^{8, 15} In the present study, 26 (8.1%) children were found to have OME. Of these, 14 (53.84%) had conductive hearing loss. This is in agreement with findings reported in other studies.^{9, 15} The present study thus emphasizes the fact that most of the etiological factors causing hearing impairment in children are easily identifiable by simple screening tools and treatable and hence can be prevented to a large extent if remedial measures are taken in time. The simple strategy of health education about aural hygiene, regular otoscopic examination, prompt and effective treatment of upper respiratory and ear infections can minimize the prevalence in the community. As per the WHO, Primary Ear and Hearing Care (PEHC) has a major role to play. It recommends that primary ear care education should be given to target groups like community and religious leaders, community councils, administrative authorities, school teachers, students, parents and patients. This will help in an earlier diagnosis and prevent the vulnerable children from developing hearing impairment and its resultant complications.

The present study, also stresses the need for a uniform pattern of school survey so that the quantum of hearing impairment in children can be identified which may help to implement national level school screening and prevention programs. Routine screening tests by trained

paramedical staff, especially of primary health centers, regular school health checkups and assistance of voluntary health organizations to conduct screening programs will go a long way in detecting and preventing this auditory handicap.

References

1. Flexer C. Facilitating hearing in young children. San Diego: Singular Publishing; 1999.
2. Smith AW. WHO Activities for Prevention of Deafness and Hearing impairment in children. [Online]. Available from: URL: <http://ftp.who.int/nmh/Blindness-Library/EN/Deafness/PDFdocs/ICPA3.pdf>
3. WHO. Deafness and hearing impairment. WHO factsheet N° 300. Geneva: World Health Organization. [Online]. Available from: URL: <http://www.who.int/mediacentre/factsheets/fs300/en/index.html> [cited March, 2006].
4. CDC. Serious Hearing Impairment among Children Aged 3-10 Years — Atlanta, Georgia, 1991- 1993 [Online]. 1997 Nov 14. *MMWR* 46(45); 1073-1076. Available from: URL: <http://wonder.cdc.gov/wonder/prevguid/m0049849/m0049849.asp>
5. Gell FM, Whilte EM, Newell K, Mackenzie I, Smith A, Thompson S et al. Practical Screening priorities for hearing impairment among children in developing countries. *Bulletin of the World Health Organization* 1992; 70(5): 645-55.
6. Mishra SC, Shukla G K, Bhatia N, Mishra A, Kandpal N. Ear health care and promotion of hearing amongst school children of slum areas. *Indian J. Otolaryngol.* 1992; 10: 18-23.
7. Kumar S, D'Mello J. Identifying children at risk for speech and hearing disorders A preliminary survey report from Hyderabad, India. [Online]. Available from: URL: <http://www.dinf.ne.jp/doc/english/asia/resource/apdrj/v172006/identify-children.html> [cited 2006].
8. Jacob A, Rupa V, Job A, Joseph A. Hearing impairment & otitis media in a rural primary school in South India. *Int J Pediatr Otorhinolaryngol* 1997; 39(2): 133-8.
9. Kalpana R, Chamyal PC. Study of prevalence and aetiology of the hearing loss amongst school going children. *IJO & HNS.* 1997; 49(2): 142-4.
10. Phaneendra Rao RS, Malvika A, Subramanyam N, Nair S, Rajashekhara B. Hearing impairment & ear diseases among children of school entry age in rural South India. *Int J Pediatr Otorhinolaryngol* 2002; 64(2): 105-10.
11. Tuli BS, Parmar TL, Kumar S. Incidence of Deafness in School Going Children. *Indian J Otolaryngol* 1988; 40: 137-8.
12. Pal J, Bhatia ML, Prasad BG, Dayal D, Jain PC. Deafness among the urban community -An Epidemiological Survey at Lucknow (U.P.). *Indian J Med Res* 1974; 62 (6): 857-68.
13. Mishra SC, Shah PK, Kandpal N. Hearing retardation amongst school age Bhutanese refugees. *Indian J*

- Otolaryngol 2002; 8(1): 5-8.
14. McPherson B, Holbrow CA. A study of deafness in West Africa: The Gambian hearing health project. *Int J Pediatr Otorhinolaryngol* 1985; 10: 115-35.
 15. Sharma H, Bhushan V, Dayal D, Mishra S. Preliminary study of hearing handicap in school going children. *Indian J Laryngol Otol Head Neck Surg* 1992; 1(3): 119-24.
 16. Olusanya BO, Okolo AA, Adeosun AA. Predictors of hearing loss in school entrants in a developing country. *J Postgrad Med* 2004; 50: 173-9.
 17. Lyn C, Jadusingh WA, Ashman H, Chen D, Abramson A, Soutar I. Hearing Screening in Jamaica: Prevalence of Otitis Media With Effusion. *Laryngoscope* 1998; 108: 288-90.
 18. Olusanya BO, Okolo AA, Ijaluola GT. The hearing profile of Nigerian school children. *Int J Pediatr Otorhinolaryngol* 2000; 55: 73-9.

Prevalence of tobacco use & its correlate factors among school going adolescents in rural areas of Haryana, India

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Abstract

Tobacco use is one of the major preventable causes of death and disability worldwide. WHO estimates that 4.9 million deaths annually are attributable to tobacco use.

Research questions

What is the magnitude of problem of tobacco users among school going adolescents in a rural block of Haryana?

Objectives

1. To study the prevalence of tobacco use
2. To assess the correlate factors of tobacco use.

Study Design

A cross-sectional descriptive type of study.

Setting

Schools of Beri block, District Jhajjar.

Participants

School going adolescents (10-19 years).

Simple size

Total sample size was 1260.

Study Variables

Age, Sex, Type of tobacco products, Influencing factors, Awareness about health problems.

Results

Overall prevalence of 'ever users' of tobacco products was 203 (17.4%). Prevalence of ever users among boys and girls was 197 (27%) and 7 (1.6%) respectively. Prevalence of 'current users' of tobacco products was 169 (14.5%). Majority 89.6% of current users had initiated smoking

between the age 10 and 14 years (median age 12 years). The differences in prevalence according to age ($p < 0.001$) was statistically significant while in relation to caste was found non-significant ($p > .067$).

Introduction

The prevention of tobacco use in young population appears to be a great opportunity for decreasing burden of non-communicable diseases in India as it is home to one sixth of the global population. Tobacco use is one of the major preventable causes of death and disability worldwide. WHO estimates that tobacco attributes to 4.9 million deaths annually and expected to rise to 10 million in 2020, with 7 million of these deaths will be occurring in developing countries, mainly China and India.¹

Currently about one-fifth of all worldwide deaths attributed to tobacco occur in India, more than 0.8 million people die and 12 million people become ill as a result of tobacco use each year. The deaths attributable to tobacco, in India, are expected to rise from 1.4% of all deaths in 1990 to 13.3% in 2020.² It is estimated that 5,500 adolescents begin consuming tobacco every day in India, joining the 4 million young people under the age of 15 who already regularly use tobacco. Tobacco users often take up use in their teens and the risks of tobacco use are highest among those who begin smoking early and continue for prolonged period.³

The Cigarettes and Other Tobacco Products (Prohibition of Advertisement and Regulation of Trade and Commerce, Production, Supply and Distribution) amendment Act, 2007 with a view to protect public health by prohibiting smoking in public places, banning advertisements of the tobacco products, banning sale of tobacco products to minors and near educational institutions, prescribing strong health warnings including pictorial depiction on tobacco products and regulation of tar and nicotine contents of tobacco products.

In Haryana state, a Global Youth Tobacco Survey (GYTS) was conducted in 2003 among school students in grades 7-10. A two-stage cluster sample design was used in GYTS to produce representative data for all of Haryana. They revealed that 7.4% of students had ever smoked cigarettes (Boys = 8.6%, Girls = 3.8%), 7.1% currently use any tobacco product (Boys = 8.1%, Girls = 3.7%), 3.4% currently smoke cigarettes (Boys = 4.3%, Girls = 0.6%) and 4.0% currently use tobacco products other than cigarettes (Boys = 4.1%, Girls = 3.1%).⁴

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The studies about tobacco use and its correlates like awareness, knowledge etc. among school students in Haryana are lacking. These factors may be specific to culture, traditions and other characteristics of the area. Identification of such factors may be potentially useful to formulate policy interventions needed towards Behaviour Change Communication (BCC) for prevention and control of tobacco use among school students. Therefore, the present study was carried out to assess the prevalence of tobacco use and its correlate factors among school going adolescents in rural areas of Haryana.

Material and Methods

Study Area

The study was conducted in the block, Beri (Jhajjar district) which had the population 1,49,604 as on 31st March 2008. This block is served by one General hospital (Beri), Two Community Health Centres (Dighal and Dubhaldan), Three Primary Health Centres and 25 Subcentres. General hospital, Beri and Community Health Centre, Dighal are internship training centres which are rural field practice areas of Department of Community Medicine, Pt. B. D. Sharma PGIMS, Rohtak. This block has 37 government schools and 25 private schools.

Study Design

A cross-sectional type of descriptive study.

Definitions of the Variables

Ever Users

Ever smoker or chewer was defined as one who had not smoked/chewed tobacco in the past 30 days preceding the survey but had tried in the past (even once or twice).

Current Tobacco User

Current smoker or chewer was defined as those who had smoked/chewed tobacco product on one or more days in the preceding month of the survey.

The tobacco use was mainly classified in two categories: smoking and smokeless. Tobacco was mainly smoked in the form of cigarette and bidi. Smokeless tobacco use in the form gutka (industrially manufactured tobacco product, contains areca nut, tobacco and other ingredients), betel quid, khaini and snuff which are also common in different parts of India.⁵

Sample Size Determination and Sampling Method

The sample size required for this study was 1215 considering the prevalence 7.4% according to GYTS, Haryana with allowable error 20% (CI-95%) by using formula $n = z^2 \frac{p(1-p)}{d^2}$. Therefore, it was proposed to

cover a total of 1250 children in the age group of 10-19 years.

Study Subjects

School children of age group 10-19 years i.e. class of 6th to senior secondary (10+2), were included in the study.

Data Collection

A list of all the government and private schools was obtained from the block education office of the block, Beri. Out of these, 10 schools were selected by systematic random sampling. The researchers contacted the principals of schools personally during January to June 2008. The objective and nature of the study explained and a verbal consent was sought to carry out the survey in the schools. All the students present at the time of visit were included for the survey and those, absent, were excluded.

The students of the selected classes were assembled in their class room. The purpose of the survey was explained and assurance, about the confidentiality of the information, was given to the students. After apprising, informed written consent was sought and informed that they were free to participate or not in the survey. Absence of the school personnel in the classrooms was ensured to encourage the students respond without reporting bias. All the information were collected on semi-structured pre-tested proforma.

Data Analysis

Data were analysed using SPSS (Statistical Package for Social Studies) version 17.0 for descriptive statistics.

Results

All the schools, included in the study, were responded to the survey giving a school response rate of 100%. Among the study subjects, a total of 1166 subjects completed the interview giving a response rate of 93.28%.

Demographic Characteristics

The median age of study subjects was 15 years (minimum 10 years and maximum 19 years). Among the participants, 729(62.52%) were males and 437(37.48%) were females. The male to female ratio was 1.67:1.

Prevalence of Tobacco Use

Overall prevalence of 'ever users' of tobacco products was 203(17.4%). Prevalence of ever users among boys and girls was 27%(197) & 1.6%(7) respectively. All tobacco users girls were ever users. Prevalence of 'current users' of tobacco products was 14.5%(169). Among current users cigarette & bidi smokers were 158(93.6%), smokeless products: 6(3.5%), both forms: 5(2.9%) (Table-I). The prevalence of 'current users' was observed highest in 17-19 years age group. The differences in prevalence according to age ($p < 0.001$) were statistically significant while in relation to caste

was found non-significant ($p > .067$).

Age at Initiation of Tobacco Use

Table 1: Type of tobacco use among current users

Type of tobacco	Number (%)
Cigarette & Bidi smoking	158 (93.6%)
Smokeless products	6 (3.5%)
Both forms	5 (2.9%)

(n-169)

Majority of current smokers (89.6%, 142/158) had initiated smoking between the age 10 to 14 years (median age 12 years) while two third (4/6) of smokeless tobacco users had initiated between the ages 13 to 17 years (median age 15 years). Among ever smokers, 68.4% (128/187) had initiated before 14 years of age and 75% (12/16) of ever smokeless users had initiated before 15 years of age.

Smoking Pattern and Access to Tobacco Products

Among the current cigarette/bidi smokers, 62.9% were smoking at least one cigarette/bidi per day, 22.7% were smoking once or twice a week and 14.4% once or twice in a month. The average number of cigarettes/bidi smoked in a day was 3.2. Most of them (66.8%) smoked in the shops or tea stalls followed by a 'secret place' (15.3%), home (7.1%) and other public places (10.8%) (Table-II).

Majority of current users (68%) had purchased tobacco products from a shop/tea stall or street vendor, 17.7% purchased through a friend and 10% borrowed from friends. Few users (4.3%) had stolen tobacco from their house.

Among the current smokeless tobacco users, 62.4% were using 'gutka', 28.4% 'pan masala' (tobacco with aromatic

Table 2: Place Of Smoking Among Current Tobacco Users

Place of smoking	Number
Shops or Tea stalls	113 (66.8%)
Secret place	26 (15.3%)
Home	12 (7.1%)
Other places	18 (10.8%)

(n-169)

spices), 12.2% 'jarda' (dried tobacco leaves for chewing), and the remaining were using combinations of different types of chewable tobacco.

The study also revealed that the current users had spent an average amount of 8 Indian rupees/day for tobacco products while only 39% of students had sufficient money

to buy tobacco products.

Almost half (46.2%) of the children were influenced by peer groups, 26 (15.4%) by family members or relatives, 11 (6.5%)

Table 3: Factors that influenced current tobacco users

Influencing factors	Number (%)
Peer groups	78(46.2%)
Family members/relatives	26(15.4%)
Enjoyment	23(13.6%)
Curiosity	20(11.8%)
Movies	11(6.5%)
Celebrities	8(4.7%)
Teachers	3(1.8%)

by movies, 23(13.6%) and 20(11.8%) for enjoyment and curiosity respectively. Celebrities (4.7%) and teachers (1.8%) were also major factors which influenced the consumption of tobacco among the adolescent students (Table-III).

Cessation

A larger proportion of the students who were either currently smoking (62.4%) or using chewable tobacco (76.3%) thought to quit, whereas a nearly half of current users (smokers, 45.5% and smokeless tobacco users, 48.9%) had actually tried to quit. However, current smokers and tobacco chewers (32.7% and 43.9%, respectively) had ever sought help to quit tobacco products and in most instances sought advice from peers group.

Table-V shows 84.7% of the tobacco users had knowledge about one or more health problems and of these cough

Table 5: Knowledge about health problems among tobacco and non-tobacco users

Health problems	Tobacco users n- 203	Non-tobacco users n-957
Cough	138(67.9%)	691(72.2%)
Tuberculosis	59(29.0%)	312(32.6%)
Heart problems	41(20.1%)	243(25.4%)
GIT problems	48(23.6%)	267(27.8%)
Cancer	49(24.1%)	216(22.5%)
Discolouration of teeth	37(18.2%)	129(13.5%)
Others	68(33.4%)	355(37.1%)
Don't know	31(15.3%)	130(13.6%)

(67.9%), tuberculosis (29%), GIT problems (23.6%), heart problems (20.1%), discoloration of teeth (18.2%), cancer (24.1%) and others (33.4%). Over 2/3rd of students considered smoking (66.1%) and chewing (65.3%) harmful

to health. Significantly more tobacco users reported that 'Smoking or Chewing is harmful to health' than never tobacco users.

Discussion

The purpose of the study was to estimate the prevalence of tobacco use and assess the correlate factors. The sample size was determined using data from GYTS, Haryana and obtained a representative sample from the rural area. This study was carried out among the school adolescent students of rural area. In our study, the median age was 15 years which was higher than that of GYTS surveys. Similar finding was also observed in a study conducted in 2000 by Sinha et al on tobacco use among students in Bihar (India).⁶

However, the prevalence of tobacco users in this study was less than that reported from Kerala.⁷ GYTS report Bihar⁶ and USA where nearly one-third of the students were currently using tobacco products.⁸ It is important to note the prevalence was low compared to western countries which have strict legislation, heavy taxes and massive information campaigns. Such difference was found in GYTS survey also.⁹ A community-based survey from Eastern Nepal reported a similar rate of prevalence in the age group 14–25 years. However, the study reported that the prevalence of smoking increased with age.¹⁰ Similar increasing trends of tobacco use with age was reported by WHO.¹¹

The study from Kerala revealed that the age at initiation appears to be declining, similar results was also observed from this study.⁷ The age at initiation for smoking was less than that for chewable products. This may be due to the growing popularity of the smoking products, easy accessibility and availability in rural areas. A small proportion (2.9%) of students was currently using both forms of tobacco. It appears that smoking is often preceded by the use of chewable tobacco. The widespread use of tobacco products among a substantial portion of adolescent school children could be an indication of a future increase in overall adult tobacco use.

Nearly half the students either tried to quit tobacco use or sought help to quit tobacco use from peer group. Therefore, counselling and quit-line programmes need to be started at the schools to help the current users.

Majority of students (more than two third) responded that tea stalls and shops are selling tobacco products and are easily available. Most students purchased tobacco products from street vendors or shops and were not denied by the virtue of their age. Although sale of tobacco products is banned in India but this is not properly implemented. The use of tobacco products among adolescents may deter by strict implementation of Cigarettes and other tobacco products (Prohibition of advertisement, and regulation of trade and commerce, production, supply and distribution) amendment act, 2007.

Average number of cigarettes smoked per day was about

three and approximate three-fifths of the students smoked one or two cigarettes per day. The common place of smoking was tea stalls, shops and other public places. Strict implementation of legislations like prohibition of sales of tobacco products and banning of smoking in public places might be helpful in curbing the tobacco use among adolescents.

The socioeconomic status was assessed during this study among these school students. It was observed that students from upper socioeconomic status may be getting higher pocket money and therefore they could afford to buy tobacco products. Current tobacco use was also associated with having pocket money. In this study the students were spending Rs.8 per day. Shah et al revealed among street children expense over 6 rupees per day on tobacco.¹²

Those students who had better knowledge of health risks of tobacco use were less likely to have 'ever used' any tobacco products. Similar observations were made in studies from Indonesia¹³ and Argentina,¹⁴ therefore, it may be beneficial to introduce separate lessons on health risks of tobacco use at schools and colleges.

Among the factors, students who reported that one or more family members smoking or chewing tobacco were more likely to be ever users of tobacco. As the number of family members using tobacco increased by a unit, the risk of tobacco used increased 1.5 times. Similarly having purchased tobacco products by children for a family member was also associated with tobacco use. About 35% of the children reported that at least one family member uses tobacco. The students those were consuming tobacco products were strongly influenced by peers, parents and teachers. Similar observations were also reported by studies from Kerala.⁷ Behaviour change communication should be imparted among school children by school teachers and health functionaries to change the behaviour towards tobacco use.

A recent report demonstrated an increase in oral cancer incidence among tobacco users in India.¹⁵ This is supported by a comparison of the age specific incidence rates of mouth cancers (ICD143-5) during 1983-1987 and 1995 which showed that the incidence had significantly increased in the younger population (< 50 years). The prevalence of chewing product use in Bhavnagar, Gujarat showing increasing trends among younger generations.¹⁶ These trends indicate that smokeless tobacco use and incidence of oral cancer are increasing among the younger population.

Conclusion

Tobacco use in any form (smoking or smokeless) is prevalent among the school students. Cigarette smoking was the most popular form of tobacco use. Knowledge of health risk, household asset, peer influences and social norms like tobacco use among teachers and family members, buying tobacco products for a family member were associated with tobacco use. Psychosocial factors

have an important role to play in initiation of this habit. It has been observed that a large number of adolescents pick up this habit from their family members, peers, teachers or the film heroes. Targeted school intervention strategies by counselling and education are necessary. Enforcement of regulations on sale of tobacco products may also be useful. Legislations on the use of tobacco products need to be strengthened to decrease availability, accessibility and affordability of tobacco products to these age groups.

References

1. World Health Organisation. Reducing Risks, Promoting Healthy Life. World Health Report, 2002. Geneva: WHO;2003.
2. Patel DR. Smoking and children. *Indian J Pediatr.* 1999; 66(6):817- 824.
3. Peto R, Zaridze D. Tobacco: A major international health hazard. Proceedings of an international meeting. Moscow, 4-6 June 1985. *IARC Sci Publ* 1986;74:1-319.
4. World Health Organisation, Centre for disease control and prevention. India-Haryana Global Youth Tobacco Survey (GYTS). Geneva: WHO;2003 [cited 2010 April 15]. Available from: http://www.searo.who.int/LinkFiles/GYTS_India_Haryana.pdf
5. Bhonsle RB, Murti PR, Gupta PC. Tobacco habits in India. In: Gupta PC, Hamner JE, Murti PR, editors. Control of tobacco-related cancers and other diseases, Proceedings of an international symposium, January 15-19, 1990. Mumbai: Oxford University Press; 1992:25-46.
6. Sinha DR, Gupta PC, Pednekar M. Tobacco use among students in Bihar (India) [serial on the Internet]. *Indian J Public Health.* 2004 [cited 2010 April 15]; 48(3):111-7.. Available from: http://www.searo.who.int/LinkFiles/GYTS_Rep_Bihar.pdf
7. Pradeepkumar AS, Mohan S, Gopalakrishnan P, Sarma PS, Thankappan KR, Nichter M. Tobacco use in Kerala: findings from three recent studies. *Natl Med J India.* 2005; 18:148-53.
8. Rigotti NA, Lee JE, Wechsler H: US college students' use of tobacco products: results of a national survey. *JAMA.* 2000; 284:699-705
9. Warren CW, Jones NR, Eriksen MP, Asma S. Global Tobacco Surveillance System (GTSS) collaborative group: Patterns of global tobacco use in young people and implications for future chronic disease burden in adults. *Lancet.* 2006; 367:749-53.
10. Niraula SR. Tobacco use among women in Dharan, eastern Nepal. *J Health Popul Nutr.* 2004; 22:68-74.
11. Pande B, Karki Y, Plant K. A study on tobacco economics in Nepal. In: Strong K, Bonita R, editors. The SuRF Report 1. Surveillance of Risk Factors related to Noncommunicable Diseases: Current status of global data. Geneva: WHO; 2001.
12. CDC. Effectiveness of School-Based Programs as a Component of a Statewide Tobacco Control Initiative — Oregon, 1999—2000. *MMWR Morb Mortal Wkly Rep.* 2001; 50(31):663-6
13. Martini S, Sulistyowati M. The Determinants of Smoking Behaviour among Teenagers in East Java Province, Indonesia. Health, Nutrition and Population (HNP) Discussion Paper. Paper No. 32. Washington: The World Bank;2005 [cited 2010 April 15]. Available from: <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/281627-1095698140167/IndonesiaYouthSmokingFinal.pdf>
14. Morello P, Duggan A, Junior AH, Anthony JC, Joffe A. Tobacco use among high school students in Buenos Aires, Argentina. *Am J Public Health.* 2001;91:219-24.
15. Gupta PC. Mouth cancer in India-A new epidemic? *J Indian Med Assoc.* 1999;97(9):370-373.
16. Gupta PC, Ray CS. Smokeless Tobacco Health in India and Southeast Asia. *Respirology.* 2003;8:419-31.

Relationship between government budget deficits and inflation in the Iran's economy

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Abstract

Government in the economy of a country is responsible for various duties and to do these tasks uses the budget and fiscal policy as a planning and control tools. Because the different goals of economic balance in macro level such as fixing prices and unemployment inhibit any economic program is the priority, so can the government is using funds that involve income and expenses of the government to direct economic in reaching their goals in macro level. In developing countries lacked the private sector are strong, the role of government and its dimensions are larger tasks. The aim of this thesis with regard to the above is the effect of budget deficits on money growth and inflation in the years 1965-2006 in the Iranian economy.

Key Words

Inflation, budget deficits, liquidity growth, Auto Regressive Distributed Lag (ARDL)

Introduction

Economic effects of government deficits depends on how the creation, how to finance the country's macroeconomic conditions. If the government budget deficit due to increased current expenditures (consumer spending) is given that these costs will only increase aggregate demand, it is possible to create inflation. But if the government budget deficits is due to run an active fiscal policy, in order to rid the economy from recession, increasing government spending and make their investments in the budget deficit acts as an expansionary fiscal policy and its economic effects in the long run will economy was directed towards employment. This type of budget deficits in developing countries today is considered as a policy tool. Overall, the supply of government deficit will be done three ways; borrowing from abroad, domestic borrowing (bonds release), and borrowing from the banking system.

If the deficit be met through borrowing from the banking system, because it increases liquidity and consequent increase in aggregate demand will work with the poor economy such as inflation. If the deficit through domestic borrowing (bonds release) which means the government demand for credit is available in society, increase interest rates in the community and followed by reduced private sector investment.

It should be noted that if the central bank interest rates in order to take over part of government debt to convert to cash, thereby increasing the money supply and inflation rises. Finally, if the deficit be met through foreign borrowing may lead to current account deficit and sometimes led to foreign debt crisis. Overall economic situation is another factor that affects how the impact on the deficit. If the economy is below full employment and the overflow level of liquidity and there is thus possible to increase employment and production, thus increasing the government deficit spending, particularly investment spending, can not be inflated. Moreover, the impact on inflation, budget deficits, inflation has an impact on the deficit. In this article we are looking for the amount of this effect on the swelling budget deficit to within four of the last decade.

For this important issue, spent the second part article examines the various theories about how to balance the budget and the influence on the swelling budget deficit, the next practical. In the third part is presented a statistical analysis of the trend rate of inflation and budget deficits of. At the end of stipulated order model is available for estimating and analyzing the results.

Evaluation of different theories about the government budget balance

Public sector economics old and new, than whether the government should balance the budget annually to maintain or not there are various theories can be divided into the following three groups:

1. The annual observance was quite balanced (classical theory)
 2. lack of balance in government budgets
 3. support of the budget balance, but not annually
- A) The annual observance was quite balanced (classical theory): the fans believe this theory, the government is obliged to balance its annual budget is adhered to the revenue expenditure. Reasons supporting the groups are:
1. As the budget balance is respected in the private sector economy good balance the annual budget such as private finance would be the appropriate thing.
 2. The state budget deficit will cause inflation and the budget imbalance makes the government fails to rein inflation.
 3. Force the government to observe the annual budget

will prevent uncontrolled growth of public sector and government spending (especially wasteful spending).

4. People of the political resistance to tax increases against the government for financial costs, so should not be allowed to be faced with budget deficits.
- B) imbalance in the budget: theory versus the annual budget, policy advocates a balanced budget, non-demanding tasks are the government's economic and believe, the most important duty of governments to create economic stability, through the budget and the economy is not anything to be noticed government budget balance or imbalance. In other words, there may need to imbalance in the budget and budget sometimes occurs randomly balanced budget. In summary, according to economic theory is Keynesian deficit by money in the hands of the people and businesses increases demand for goods and services in the community. So the economy is stimulated. On the surplus money pulled out of the economy and reduce aggregate demand for goods and services and thus limits the economy.
- C) Support the balanced budget, but not annual basis: attention to the issue of balance in the annual budget, is just the political aspect. There are also continuing a long-term imbalances in the budget may be works of disadvantage. So fans of the third approach, which compared with the middle mode are the two previous theories believe in a government budget should be balanced around this business a few years of impairments resulting from the annual budget balance, as well aware there are problems of imbalance long and demand situation that could create a deficit by the recession period to compensate for the excess period of prosperity. So they are demanding the government budget balance periodically.

Theoretical Foundations of the Impact of Inflation on the Deficit

Effect on the swelling budget deficit, has a lot depends on how the financing of it and transient or permanent deficit. Financing the deficit can be done several methods.

a) Change in taxes rate, b) get help from the banking system and increase the volume of money, c) Land Use reserves external, d) and borrowing from abroad by borrowing from the domestic bond release. There is always the question of whether the deficit has consequences and how inflation is controlled and whether the relationship between budget deficits and inflation can be found or not? Various theories are presented about the relationship between budget deficits, inflation and money and their related policies. Such that they can be cited and fans to Opinion Keynesian school money. Keynesian for inflation is recommended in the drastic reduction of government deficit and pro-school money but led Milton Friedman for this purpose has emphasized precise control over money

supply. Therefore, theories and fans Keynesian school money be considered factors in determining prices, the economy.

In this connection, knowledge of the relationship between budget deficits, money and inflation in determining monetary and fiscal policies the government has a great importance. Considering that one of the causes of inflation, money growth is there and in chronic deficit, need be considered on deficit impact of money growth and inflation impact on the deficit, independent of money growth.

Experimental Studies Performed

Importance because several studies have been conducted in developing countries and industry, including: Francis W. Ahking and Stephen Miller in 1985, has done another study as the relationship between government deficits, money growth and inflation. His own model of a correlated, three-variable, used and period (1947-1980) to be divided into three smaller comparison of the results for the three stated that inflation has three effects on the growth of monetary base, Also, the government deficit also affected the growth of monetary base is that eventually lead to inflation. So in general can be expressed as a significant cause of indirect relationship between variables.

óóAris A. Protopadakis (1987) entitled "Do money growth and inflation is related to the state budget deficit?" For the economy made for 10 industrial countries from 1983 to 1952 period. His theoretical study examines the non-parametric models are discussed, and reaches the conclusion that there is a significant relationship between debt growth of the money during 32 years of growth desired.

Aghevli, Bijan and Mohsin Khan. (1978) have studied in an article entitled "Government Deficit and Inflationary Process in Developing Countries", causal relationship between money supply and prices for several countries. They began by offering a dynamic model to describe the process of inflation in these countries. The estimate concluded that the average delay is the time for taxes over government spending and thus interrupt the inflationary conditions, government spending increased faster than nominal incomes and additional costs will increase the money supply that comes with higher prices them.

Barow (1977) presented a model on the budget issue, money growth and inflation as follows. $DM = F(NN-1, FEDV, DM-1)$

In the above model, DM is the money growth and unemployment U. Positive response of money growth in the unemployment rate is, in fact, represent the actions of monetary policy in the opposite direction of the economy, FEDV changes in the logarithm is real central government spending. Moreover, if the government uses tax money from the printing costs for the least financial spending, Variable government spending and money growth will positively impact.

Jafari Samimi (1992) in the bilateral relationship between

budget deficits and inflation in the economy during the period (1971-1991) came to this conclusion using ordinary least squares (OLS), a two-way communication exists between the deficit Government and inflation. Increasing the deficit through monetary and supply base raises the inflation rate, and increasing inflation in turn is leading to the nominal state budget deficit.

Abbas Alavi Rad (1998) in the review entitled "Budget deficits and the inflationary process approach in VAR" during the period 1963-1996 is a model that includes variables deficit, consumer price index, monetary base, the official exchange rate and net debt State Central Bank. Contract review and reached the conclusion that the deficit has direct effect on inflation. And after the monetary base has the greatest impact on the deficit swelling.

Kasmaee free Mousavi (1999) using a model taking his back (VAR) relationship between government budget deficit has examined economic growth and inflation. His model for the period 1963-1996 are estimated and analysis using the shock response function and variance decomposition. Results show that the deficit in the short term policies can provide increased field production and lead to increased economic growth, but in the long term only leads to inflation and no effect on economic growth.

Budget Deficits and Inflation in Iran's Economy

In the years after 1988, the deficit in income levels the government has hidden costs. The reason for this corporate government out of the table and putting them in the budget notes that the central bank will pay the required credit to such devices. I.e. in the years before 1989 the deficit in public companies as well as statistics would reflect the state budget deficit. But then the figures were not considered in the state budget deficit. As a result of the 1989 budget deficit than the government, is severely reduced GDP. After about four times, to increase oil prices in 1974, the Government part of their extra oil revenue before the deadline for settlement of foreign debts, put to use. But the rapid growth of government spending over the decade and increased 50 deficits, forced the government to be financed through deficit and foreign borrowing. In the years after the Islamic Revolution, despite contractionary fiscal policies, due to reduced oil revenues, the government deficit increased strongly, so that amount in 1988 reached 2111.7 billion Rials. From 1989 onwards the government's efforts to reform the budget structure in 1991 to 3,698.5 billion rials in 2006 and reached 147,431.15 billion rials.

Inflation in Iran, the decade in 1961 with a slow ascending trend began in the early decades of the 50th, but due to increased oil revenues and lack of proper use of petrodollars increased by inflation. More quickly and after the revolution, war, exchange rates, devaluation of national currency, reduce production and eventually increase the demand by the people and lack of appropriate policy implementation, inflation rate, so far risen from 1% in 1965

to its maximum i.e. 49% in reached 1995 and then has continued its upside remains nearly enough. Inflation in 2006 reached to 13%.

Methodology

The effects of budget deficits on inflation can be checked two modes, an indirect effect of the deficit through money supply on inflation, the second direct effect on the swelling budget deficit, in this study we are looking for a direct effect on the swelling budget deficit. To this end, following the pattern has been observed.

That in the variables including:

$$\text{LnCPI} \nabla_1 = \alpha_0 + \sum_{j=0}^{n1} \alpha_{1j} \text{LnGDPR}_j + \sum_{j=0}^{n2} \alpha_{2j} \text{LnM}_2_{t-j} + \sum_{j=0}^{n3} \alpha_{3j} \text{BDT}_{t-j} + \delta \text{DM}_t + u_t$$

Ln is the sign of logarithm

CPI76: consumer price index, constant prices 1997

Ratio of deficit to GDP over the market price and current price following:

GDPR: GDP, market prices and constant prices, 1997

$$\frac{BD}{GDP} = BDT$$

M₂: Size liquidity

DM: the virtual variable includes: (D1994), policies exchange rate unification in 1994, and (D1978), the revolution in 1978.

Moreover, long-term coefficients, the error correction model to examine how moderate, short-term imbalance offers long-term equilibrium. Check convergence and long-term relationship between the deficits has been used in the volume of liquidity and inflation period (1965-2006) Isotropic ARDL technique for the natural logarithm of variables. To estimate the statistical model has been used time series 1965-2006 for the Iranian economy. The first step is necessary to estimate the model. We examined the variables consider the cointegration and the stationary relationship between the variables, and then pay the estimated coefficients and long-term correction factor.

Using traditional methods in econometrics to empirical work, is based on the variables is reliable. But surveys show performed in this field. In the case of many time series, this assumption was incorrect and these variables are more unstable. Therefore, one theory of convergence, it is essential to ensure than the reliability of variables. For this we use test Unit Root Dickey - Fuller generalized test results Dickey - Fuller generalized level variables respectively marked a and B show has been presented in the following table.

As you can see all the variables except the deficit ratio to GDP (BDT) is the static, the rest are the variables have unit roots and making a difference once these variables become unstable to the stable variables. ARDL method includes two stages is estimated coefficients for the long term. Firstly there long-term relationship predicted by economic theory examines the issue between the

Table 1: Test results Dickey - Fuller generalized level variables

M	LnCPI97		LnM ₂		BDT		Ln GDP	
	Statistics	Critical	Statistics	Critical	Statistics	Critical	Statistics	Critical
A	1.21	2.94	1.01	-2.94	-4.29	-2.94	-1.25	-2.95
B	-2.23	-3.35	-1.85	-3.35	-4.48	-3.53	-2.25	-3.55

variables. If diagnosed and long-term correlation, in the second stage are estimated coefficients and the long term. Here for the long-term relationships we use error correction model as follows.

Computational statistics F is the amount equal to F (LCPI76

$$\Delta LCPI76 = \alpha_0 + \sum_{i=1}^n b_i \Delta LCPI76_{t-i} + \sum_{i=1}^n c_i \Delta LM_{t-i} + \sum_{i=1}^n d_i \Delta BDT_{t-i} + \sum_{i=1}^n e_i \Delta LGDPR_{t-i} + \gamma_1 LCPI76_{t-1} + \gamma_2 LM_{t-1} + \gamma_3 BDT_{t-1} + \gamma_4 LGDPR_{t-1}$$

/ LM, BDT, LGDPR) = 8.8387. That is larger than the upper range of critical value in the five percent significant level 3.34. And so is zero not being rejected based on the long relationship period. Here can be repeated for other states dependent variable move the test. And realized a number of long-term relationships. Now that was approved long-term relationship. Equation (1) we estimate using the estimated ARDL (m, n, p, q). The results of this estimate are expressed in Table (2).

Also check the stability of model coefficients is done Cumulative Sum Tests and Cumulative Sum of Square. The results are shown in Figure (a) and (b). The results of the

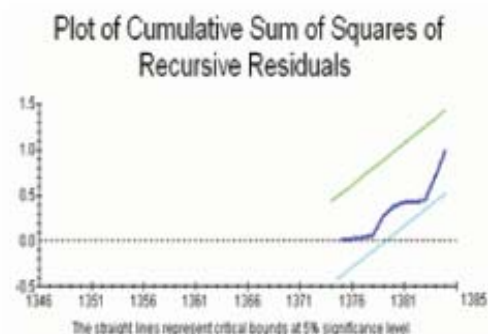
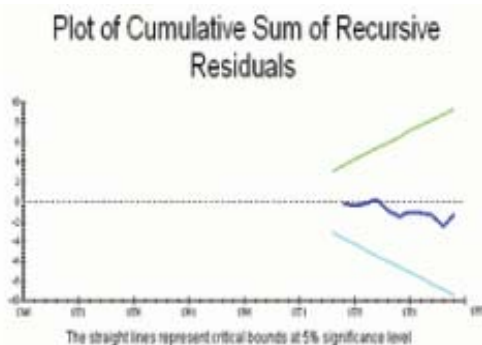
Table 2: Model estimation results ARDL (1, 0, 0, 1)

Variable	Coefficient	t statistic
LCPI76(-1)	1.23	8/6542**[/0010]
LCPI76(-2)	-2.24	-1/987**[/0020]
LM	0.189	3/654**[/0001]
LGDPR	-0.191	-2/3673**[/0000]
LGDPR(-1)	0.1721	1/003**[024]
BDT	0.028	/0564*[324]
BDT(-1)	0.087	2/542**[/0001]
D78	0.0492	-1/964**[/0010]
D94	0.31	4/721**[/0002]
R-Squared = 0.99	DW-statistic = 2.05	

Source: research findings * Significant in the level 10% ** Significant at the level %5

fact that the expression pattern of coefficients estimated over the period studied are stable. It should be noted that these diagrams, straight lines represent critical bounds is significant at the five percent level.

The existence of long-term equilibrium relationship in the first stage estimated coefficients can be long-term. If you



can see in Table (3), coefficients of variables are in accordance with the principles of macroeconomic theory. Relationship between the ratio of deficit to GDP and size monetary inflation is positive. But the impact of the deficit ratio to GDP is higher than the inflation impact of monetary volume. So that a percent change in the ratio of deficit to GDP inflation changes 1.82 percent. But a percentage change in logarithmic volume alter monetary inflation rate of 0.96 percent. Rate of real GDP is also marked as Theoretical negative. Animal variables, the revolution and unification of exchange rates are a positive influence on inflation.

Conclusion

Relationship between budget deficits and inflation in the economy shows that budget deficits are swelling the country's economic problems. An important point regarding the deficit is financing methods that have been conducted in Iran by borrowing from the banking system mainly. In most developing countries the central bank is controlled by the central government in these countries and therefore provides an easy way government deficit by creating money. In this paper based on the control of obtained, if the deficit changed to a percentage rate,

Table 3: Long-term coefficients based on ARDL model

Regressor	coefficient	T-Ratio (prob)
LM	/0964	12/325**[/0001]
LGDP	-.05421	-6/231** [/010]
BDT	1/821	2/418** [.028]
D78	-.07264	2/572** [/0009]
D94	/0436	2/994** [/0013]

Source: research findings, * Significant in the level 10%
 **: Significant at the level %5

inflation rate will change to 1.82 percent. Of course, other factors such as size are effective monetary liquidity on inflation. So the Central Bank of Iran can not have independent monetary policy and the inflationary policies. So in terms of reducing inflation any solution must be accompanied by controlling and reducing the actual deficit.

References

1. Guess, G, and Koford, K. "Inflation, Recessions and the Federal Budget Deficit (or, Blaming Economic Problems on A Statistical Mirage)", *Policy Sciences*, Vol 17, PP385-402, 1984
2. Ott, D and Attiat, "Budget Balance and Equilibrium in com". *Journal of finance*, vol 20, pp230-264, 1972
3. Aghevli, Bijan and Mohsin Khan. "Inflationary Finance and the Dynamics of Inflation: Indonesia", *American Economic Review*, Vol 67.No 3 .(1977).
4. Aghevli, Bijan and Mohsin Khan. "Government Deficit and Inflationary Process in Developing Countries", I.M.F. Staff Paper, (1978).
5. Olin Liu and Olumuyiwa S. Adedegi, "Determinants of Inflation in the Islamic Republic of Iran... a Macroeconomic Analysis", IMF Working Paper/00/127, July 2000
6. Bahmani-Oskooee, Mohsen. "Source of Inflation In Post -Revolutionary Iran", *International Economic Journal*, Vol 9, No 2, Summer 1995.
7. Darrat Alif, "Are Budget Deficits Inflationary? A Reconsideration of the Evidence", *Applied Economics Letter*, pp591-596, 2003
8. Ayca Tekin-Koru "Budget Deficits," *Money Growth and Inflation: the Turkish Evidence*, *Applied Economics Letter*, pp591-596, 2003.
9. Gerge Honderoyiannis and Evangelia Papapetrou, "Are Budget Deficits? Co integration Approach" *Applied Economics Letter*, vol 4, pp493-496, 1997
10. Barro, R, "Are Government Bonds Net Wealth?", *Journal of political economy*, 1974
11. Kia AMIR "Deficits, debt financing, monetary policy and inflation in developing countries: Internal or external factors? Evidence from Iran" *Journal of Asian Economics*, No 17, PP879-903, 2006.

Awareness regarding tuberculosis in an urban setting of Varanasi, Uttar Pradesh

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Abstract

Research Question

What is the extent of knowledge about tuberculosis and different components of RNTCP among people residing in an urban area of Varanasi?

Objectives

1. To assess the knowledge of residents of study area regarding tuberculosis and different component of RNTCP.
2. To identify socio-demographic correlates influencing the knowledge of population about tuberculosis and RNTCP.

Study Design

Community based cross sectional study.

Setting

The Study was carried out in an urban area of Varanasi district.

Results

A total of 667 subjects were interviewed. It was found that about one third of the study subjects were not aware about the correct cause of tuberculosis as germs. The study reveals that 85.8% study subjects had knowledge of DOTS centre and 52.6% knew about DOTS provider. Duration of treatment of tuberculosis ranged from 6 to 9 months was known to 47.0% subjects while 32.0% had no idea about it. Majority (64%) mentioned/ reported that stigma is the main reason for delay in seeking treatment. Still stigma associated with TB is widely prevalent. Approximately 88.0% of them knew that tuberculosis is curable.

Conclusion

Overall knowledge of population of urban area was found to be fairly good. Community based efforts are also required to identify the DOTS provider as major change agent in the demand generation as well as service provision. As the programme is based on passive surveillance, IEC strategies should be tailor made & suited to all the needs of a sub population.

Key Words

Awareness, DOTS provider & Stigma

Introduction

Tuberculosis is viewed as a problem of suffering of the individual, of the family and of the community & can rightly be classified as one of the biggest public health problems, especially in the under-served areas of country. India has the highest burden of tuberculosis in the world and it accounts for nearly one-fifth (20%) of the total global burden of disease. In terms of mortality, the disease is responsible for more than one thousand deaths per day. TB programmes all over the world are based on the DOTS strategy. Its objectives are to achieve 85% treatment success and 70% case detection. The annualized total case detection rate still remained high at 203 smear positive cases per 1,00,000 population. The TB control programmes have recognized and addressed those system components in which knowledge and behaviour of not only the patient, but also the general population are the key issues which have a profound influence on the treatment seeking behaviour and completion of treatment. Under the RNTCP, case detection of tuberculosis mainly relies on the passive reporting of symptoms which to a large extent is dependent on voluntary presentation and motivation of an individual for recognizing the symptoms as well as cultural and social factors. It has been well documented that poor health education and awareness about tuberculosis of the patients and health care providers are one of the fundamental problems which adversely affect the current strategy of tuberculosis control. Lack of adequate information plays a key role as one of the major barriers to treatment compliance. In those settings where high cure rates had already been achieved, community health education was observed to be highly relevant. Studies reveal that most of the patients are reluctant to admit that they have TB because they fear stigma, and they prefer not to discuss the disease in the presence of family or neighbours. This has been recorded more so in urban than in rural areas. Family support for treatment was more frequent among cured patients than among those who had defaulted. The IEC activities under RNTCP are fashioned as a response of the health system towards such behaviour. They aim to promote better understanding of TB and its cure (KAP), improve the quality of TB patient care (patient-friendly), and to reduce stigma. It is understood

that IEC activities at the national and state levels are complementary. While mass media activities are planned at the national level, state-level activities are more specific and need-based, with emphasis on sensitization of the health provider, production of state-specific IEC material, and dissemination of this material to local levels and optimum use of folk media at the district levels. Effective, regular and consistent IEC activities are expected to enhance the performance of the RNTCP.

Based on information collected primarily from 667 people, this paper has tried to discuss some of the important issues related to disease & its program i.e., (i) the current awareness regarding causation, (ii) knowledge regarding delay in seeking the treatment, and (iii) information concerning DOTS centre and DOTS provider in their area.

Material and methods

This is a cross sectional community based study that was carried between July-September, 2009 in the field practice area of Urban Health and Training Centre, Sundarpur under the auspices of department of Community Medicine, IMS, BHU, situated at the distance of 2.5 Km. Head of the family or an adult member from every house hold was interviewed with the help of Pre-designed & semi-structured questionnaire. Verbal consent was taken from the subjects before starting the interview. A total of 679 households have been identified in the study area. Due to inaccuracy/ and or unreliability of information, 12 cases are excluded from the analysis. Thus this study deals with 667 persons only. Detailed information has been taken on the socio-economic & demographic characteristics, knowledge of the respondents regarding tuberculosis and other components of RNTCP. The data thus collected was coded and entered into computer in *SPSS version 16 software* package worksheet and analyzed accordingly. The likelihood association of the variables as mentioned above is examined across some important socio-economic and demographic explanatory variables through chi-square statistics.

Results & Discussions

Socio - demographic profile of respondents

In the study area, all the interviewed respondents were male. Out of the total 667 interviewed persons, about 45% of respondents were of 30-45 yrs of age followed by 35.5% belong to 46-60 years. All of them were Hindus, majority were OBCs, 16% of the head of the family of respondents were illiterate & only 9.9% were graduate and above. The household income of majority (>80%) of respondents was between Rs 225-1499 & only 17% were having more than Rs 1500 per capita per month. Majority (34.6%) of interviewed head of household were skilled workers only 3.6% were unemployed & 16.2% were professionals.

Awareness about the cause of TB

No clear pattern was observed between different age group & awareness level about correct cause of TB (Table 1.) although it was found to be more in 31-50 years of age groups of the respondents. The awareness about right cause of TB was not found associated with age of the respondents ($X^2=8.86$; d.f.=4). So far as awareness according to caste is concerned, a higher percentage of the people having the correct knowledge were found higher up in the caste hierarchy. Correct knowledge about the cause of TB was found to be significantly associated with caste ($X^2=26.97$; d.f.=2). It was observed that majority of those who has per capita income of Rs >1500/ month were well aware of right cause of TB in comparison to the lower income group (Rs <225/month) i.e. percentage of unawareness was reported less with increased per capita income of the family. This difference was also found to be significant ($X^2=45.55$; d.f.=5). This is in accordance with other studies which show that low socio-economic-status group subjects had either no knowledge or incorrect knowledge about tuberculosis & RNTCP (Purohit et.al., 1988).

Impact of education cannot be ignored in assessing and measuring the awareness level of a person because adequate educational attainment is related to 'acceptable' social behaviour (Basu and Basu, 1987). Awareness about correct cause of TB was observed more (83 percent) in educational categories of graduate & above in comparison to other categories. This is well supported by the study of Purohit et. al., 1988 (in which nearly 85 to 92 per cent of illiterates were either unaware or had mis conceptions about tuberculosis whereas this phenomenon was witnessed in 18 to 29 per cent of the literate group) & Malhotra et. al., 2002. Like educational status, awareness status of the respondents was found to be associated with the occupation ($X^2=33.62$; d.f.=8). The respondents who were involved either in professional or semi-professional jobs possessed comparatively better awareness compared to others.

Awareness about DOTS centre & DOT Provider

The study highlighted that about three-fourth of the total respondents irrespective of their age, caste, income, occupation & educational status knew about the DOTS centre. This may be due to that the existence of DOTS centre in the study area. The education of head of the household and per capita income of the household was found to be associated with the awareness level ($X^2=24.2$; d.f.=5 & $X^2=17.77$; d.f.= 5 respectively) . This is not in coherence with the findings of Base line KAP study by Swami R.K. (2003) & another study on Social assessment of RNTCP,ORG-MARG (2001-04) done in the general community.

On the contrary, only half of the interviewed respondents knew about DOT providers (table 2). Majority (91.1%) of

Table 1: Awareness of respondents about the cause of TB with some selected socio-economic & demographic variables

Variables	Awareness about the correct cause (as Germs)			x ² value
	Yes (1)	No (2)	Don't Know(3)	
Age				
<30	38(52.8)	19(26.4)	15(20.8)	8.86d.f.=4
31-40	110(65.9)	32(19.2)	25(15.0)	
41-50	129(64.2)	32(15.9)	40(19.9)	
51-60	71(52.2)	34(25.0)	31(22.8)	
>60	55(60.4)	11(12.1)	25(27.5)	
Caste				
SCs/ST	48(42.1)	36(31.6)	30(26.3)	6.97***d.f.=2
OBC	308(62.2)	88(17.8)	99(20.0)	
Others	47(81.0)	4(6.9)	7(12.1)	
Per capita Income				
<225	14(37.8)	7(18.9)	16(43.2)	5.55***d.f.=5
225-374	37(41.6)	24(27.0)	28(31.5)	
375-564	87(54.7)	35(22.0)	37(23.3)	
565-749	56(62.9)	16(18.0)	17(19.1)	
750-1499	118(65.2)	36(19.9)	27(14.9)	
>1500	91(81.2)	10(8.9)	11(9.8)	
Education of the head				
Illiterate	42(43.3)	31(32.0)	24(24.7)	4.18***d.f.=5
Literate/ Primary	69(51.1)	26(19.3)	40(29.6)	
Middle	63(49.6)	28(22.0)	36(28.3)	
High School	91(66.9)	25(18.4)	20(14.7)	
Inter mediate	57(77.0)	8(10.8)	9(12.2)	
Graduate & above	81(82.7)	10(10.2)	7(7.1)	
Occupation of the head				
Unemployed	5(20.8)	8(33.3)	11(45.8)	3.62***d.f.=7
Unskilled	62(54.9)	32(28.3)	19(16.8)	
Semi- skilled	28(56.0)	7(14.0)	15(30.0)	
Skilled	133(57.3)	48(20.7)	51(22.0)	
Shop owner	54(65.1)	15(18.1)	14(16.9)	
Farm owner	22(64.7)	2(5.9)	10(29.4)	
Semi-professional	15(65.2)	3(13.0)	5(21.7)	
Professional	84(77.8)	13(12.0)	11(10.2)	
Total	403(60.4)	128(19.2)	136(20.4)	

x² values calculated after merging the column (3) into (2) Figures in parenthesis are the percentages; ***p<0.001

respondents having per capita income more than Rs.1500 per month heard about DOT provider as compared to those whose per capita income was less than Rs. 225 per month i.e.70.3%. Education shows positive effect on the knowledge of DOT provider, substantial difference was observed with graduate & above (about 70%) as compared to illiterate (40%) head of households. This difference was found to be statistically significant. Occupation was also found to be associated with the knowledge about DOT provider. It was found that percentage of the respondents having knowledge was more in semi professionals & professionals (>60%) as compared to unemployed (25%).

Awareness regarding cure of tb & reason/ s for delay in treatment

Table 3 shows that majority (87%) of the respondents feels that TB is completely curable irrespective of their age, caste, per capita income, education & occupational status. This is in concordance with the Base line KAP study by Swami R.K. (2003) & study on Social assessment of RNTCP, ORG-MARG (2001-04). It was found that majority of the respondents in the age group (31-40) and belonging to general caste category had the view that TB is curable. However, caste of the respondents shows no association ($\chi^2=4.76$; d.f.=2). So far as the association with the knowledge & per capita income of the household is concerned, only about half of the respondents (whose per capita income of the household was less than Rs. 225), higher percentage of respondents reported knowing that TB is curable with more than Rs 1500 ($\chi^2=57.48$; d.f.=5). Education of the respondents was also found to be associated with the information that TB is curable ($\chi^2=23.26$; d.f.=5). More than 95% of the respondents having their education 'graduate & above' be acquainted with that

Table 2: Distribution of respondents according to awareness about DOTS centre & DOT provider

Variables	DOTS Centre (%)	DOT Provider (%)	Total (N)
Age			
<30	84.7	45.8	72
31-40	87.4	53.9	167
41-50	85.1	54.7	201
51-60	87.5	52.2	136
>60	82.4	52.7	91
X ² value	1.69; d.f.=4	1.80; d.f.=4	
Caste			
SC/ST	78.9	45.6	114
OBC	87.1	51.7	495
Others	87.9	75.9	58
X ² value	5.25; d.f.=2	14.97**, d.f.=2	
Per capita income			
<225	70.3	27.0	37
225-374	79.8	41.6	89
375-564	83.0	49.1	159
565-749	85.4	51.7	89
750-1499	91.2	59.1	181
>1500	91.1	66.1	112
X ² value	17.77**, d.f.=5	26.11***, d.f.=5	
Education of head of the household			
Illiterate	78.4	48.5	97
Literate/Primary	77.0	43.0	135
Middle	85.8	45.7	127
High school	90.4	54.4	136
Intermediate	89.2	60.8	74
Graduate & above	95.9	71.4	98
X ² value	24.20***, d.f.=5	24.26***, d.f.=5	
Occupation of head of the household			
Unemployed	75.0	25.0	24
Unskilled	82.3	39.8	113
semiskilled	82.0	44.0	50
Skilled	85.8	56.0	232
Shop owner	86.7	54.2	83
Farm owner	91.2	55.9	34
Semi-profession	87.0	69.6	23
profession	90.7	63.9	108
X ² value	-	25.72**, d.f.=7	
Total	85.8	52.8	667

***p<0.001; **p<0.01

the TB is curable as compared to about 79 percent in 'illiterate' category.

When respondents were enquired about the reasons of delay in seeking treatment of tuberculosis, stigma was found to be the most common reported reason for the same irrespective of age, caste, occupation & education of head of household & per capita income. The other reasons 'services are not easily accessible,' 'money problem' etc were also reported in the study. About 74% and 65% of the respondents in the age group of (31-40) and < 30 years respectively reported that the stigma is the main reason of delay in seeking treatment of tuberculosis. Caste of the respondents was also found to be associated with the main

reason (social stigma) for delay in seeking treatment ($\chi^2=12.47$; d.f.=2). Surprisingly, social stigma is more prevalent in general caste category (about 85 %) as compared to OBC (62.2%) and SC/ST (58.8%). Findings revealed that more than 90% of the respondents whose per capita income of the household was more than Rs. 1500 reported social stigma as a most important reason for delay in treatment. Social stigma was also found to be significantly associated with per capita income ($\chi^2=15.1$; d.f.=5). In our study, stigma as a reason was reported more in the respondents found having their education 'Intermediate & above' as compared to less educated. However 'social stigma' was not found to be significantly

Table 3: Distribution of respondents according to the knowledge that TB is curable & Social Stigma as main reason for delay in treatment

Variables	TB is curable(%)	Social Stigma as a main reason (%)	Total(N)
Age			
Less than 30	86.1	65.3	72
31-40	92.5	73.7	167
41-50	86.6	59.2	201
51-60	89.7	59.6	136
61-70	79.1	59.3	91
X ² value	11.18*, d.f.=4	10.72*, d.f.=4	
Caste			
SC/ST	83.3	58.8	114
OBC	87.9	62.2	495
Others	94.8	84.5	58
X ² value	4.76, d.f.=2	12.47**, d.f.=2	
Per Capita Income of the household			
Less than 225	51.4	54.1	37
225-374	83.1	47.2	89
375-564	88.1	64.8	159
565-749	86.5	69.7	89
750-1499	93.9	68.0	181
>1500	94.1h	93.8	112
X ² value	57.48***, d.f.=5	15.1*, d.f.=5	
Education			
Illiterate	79.4	59.8	97
Literate or primary	81.5	63.0	135
Middle	87.4	63.0	127
High School	89.7	66.2	136
Intermediate	93.2	68.9	74
Graduate & above	98.0	61.2	98
X ² value	23.26**, d.f.=5	2.18, d.f.=5	
Total	87.2	63.3	667

***p<0.001; p<0.01; *p<0.05

associated with educational status of the respondents ($\chi^2=2.81$; d.f.=5). Stigma associated with TB is widely prevalent even in an urban area. Corroborative with the findings of the study conducted in general community by ORG-MARG (2001-2004).

Conclusion & Recommendations

Some misconceptions about the disease is still prevalent even in an urban community but awareness about the causation of disease & information concerning RNTCP program i.e., DOTS centre, DOT provider is fairly good. Households with less per capita income, less educated, unemployed & lower caste needs to be informed on priority basis. Stigma related to disease is still widely exists in the community.

Community based efforts are required to identify the DOT provider as major change agent in the demand generation as well as service provision. As the programme is based on passive surveillance, IEC strategies should be tailor made & suited to the needs of a sub population.

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References

1. Baseline KAP Study Under RNTCP Project Submitted to Central TB Division, Ministry of Health and Family Welfare, Government of India, Submitted by R. K. Swamy, BBDO Advertising Pvt. Ltd. In Association with CMS.
2. Malhotra, R., Taneja, D. K., Dhingra, V.K., Rajpal, S., Mehra, M. (2002). "Awareness Regarding Tuberculosis in A Rural population of Delhi", *Indian Journal of Community Medicine*, XXVII, 2.
3. Park's Text Book of Preventive & Social Medicine : K. Park, 20th Edition.

4. Purohit, S. D., Gupta, M. L., Madan, Arun, Gupta, P. R., Mathur, B. B., & Sharma, T. N. (1988). "Awareness about Tuberculosis among General Population: A Pilot Study", *Indian Journal of Tuberculosis*, 35, 183.
5. Sharma, N., Nath, A., Taneja, D. K., Ingle, G. K. (2008). "A Qualitative Evaluation of the Information, Education & Communication (IEC) Component of the Tuberculosis Programme in Delhi, India", *The International Journal of Tropical Medicine*, 4, 2.
6. Social Assessment Study for RNTCP Submitted to Central TB Division, Ministry of Health and Family Welfare, Government of India, New Delhi, ORG Centre for Social Research

Alternatives in the management of single arch edentulous patients – A three case report

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Abstract

Complete denture opposing a complete / partial dental arch of natural teeth is a common clinical situation. The occlusal plane is dictated by the lower teeth, and it usually has a series of unfavorable tooth inclinations due to, elongation of teeth that have not had opposing contacts. These unfavorable inclinations will promote undesirable directions of force on the upper denture. Sliding type forces often result in the resorption of the bone underlying the denture or an inflammatory reaction of the basal seat tissues. To withstand the undesirable forces without fracture, use of metal denture base is most acceptable and to obtain a functional occlusion without early wear out of denture teeth use of resin teeth with metal occlusion and / or anatomic teeth with amalgam stops can lead to greater wear resistance of denture teeth. The three different cases reported here portray different approaches to manage the peculiar set of problems in a single complete denture.

Key Words

Metal base, Thermal conductivity, Flexure of denture, Balanced occlusion, Metal Occlusal Surface, Amalgam stops, Stability of denture.

Introduction

Many patients become edentulous in one arch while retaining some or all of their natural teeth in the opposing arch. Several difficulties are encountered in providing a successful, single complete denture treatment. Regrettably, this service is envisioned as only half as difficult and time consuming as the construction of opposing complete dentures. The purpose of this article is to discuss the various oral situations in which single complete dentures are indicated, and to specify the requirements such dentures must fulfill. Three clinical procedures are described which aims at establishing a functional occlusion to restore and maintain the patient's oral health.

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Case Report => 1 :

A 57 years old male patient reported to the Out Patient Department of Prosthodontics, Sardar Patel Post Graduate Institute of Dental and Medical Sciences, Lucknow, with clinical findings of completely edentulous maxillary arch and completely dentulous counterpart mandibular arch. The findings were evaluated carefully and a single maxillary complete denture with cast metal base using cross linked acrylic teeth with bilateral balanced occlusal scheme was planned for the rehabilitation of edentulous maxillary arch. After the final impression making, the maxillary master cast was poured. A wax spacer was adapted on the ridge area with few small openings for metal tissue stops. Thereafter, the master cast was duplicated to make a refractory cast for metal casting procedures. A complete palatal coverage metal base with posterior palatal seal incorporating inside the metal base, alongwith open lattice type of minor connectors on the ridge was designed. Then, the metal base was cast with chromo- cobalt (Cr-Co) alloy. The cast metal base was then finished, polished and seated on the master cast. Occlusal rim was fabricated on the metal base to record the jaw relations. A trial denture was prepared on the established centric relation. After try in, the denture was cured and occlusal adjustments were carried out by remounting the single maxillary complete denture on the semi-adjustable articulator. The denture was seated in patient's mouth and instructed to report for post insertion follow up.

On post-insertion visits, the patient reported good thermal conduction on the palate and no significant discomfort.

Discussion

The objectives of complete denture prosthesis are: ¹ stable and retentive bases ² physiologic stimulation of, and compatibility with the tissues by the denture bases³ accurate border placement of the denture bases ⁴ pleasing esthetics ⁵ true centric relation and vertical dimension relationships ⁶ minimal tissue changes beneath the denture bases ⁷ processing accuracy (freedom from warpage) and ⁹ a minimal postinsertion adjustment for the mutual satisfaction of the patient and the dentist.

Polymers are the dominant material for the fabrication of denture bases. However, there are instances in which these bases fail because of poor denture base adaptation. Woelfel, Paffenbarger, and Sweeney¹ reported that no resin denture accomplished this because, "Once a denture is

removed from the gypsum cast on which it has been cured, the denture, when replaced on the cast, will not fit it." Failure may also be caused by excessive masticatory forces. In general, it is established that all resins receive some internal strain during processing, which may be released, as warpage, when placed in service. In those situations metal alloys have been used to strengthen the bases and prevent fracture. A Metal based denture is one in which a portion of the denture body is made of a substantial metal casting rather than all plastic (acrylic resin PMMA). Metals and metal alloys used in denture bases display excellent strength-to-volume ratios²⁻⁴ and may be cast in thin sheets maintaining rigidity and fracture resistance⁵. Thinner metallic denture bases decrease interference with phonation⁶. Metal bases also display desirable dimensional characteristics and may be cast accurately⁷. High thermal conductivity also has been deemed a significant advantage and some practitioners feel that this characteristic is responsible for enhanced health of tissues in contact with metal bases.⁸

Campbell⁴ reported a technique in 1923 using the aluminum alloy as a cast denture base material. The cast aluminum test denture with the poorest adaptation in the palatal region had less discrepancy than the best-fitting acrylic resin test denture.

Cast gold alloys (type IV), and later cast chrome base alloys, completed the armamentarium for complete denture metal bases. Grunewald², 1964 defined the advantages of gold alloy bases, whereas Lundquist³ elaborated use of aluminium alloy as metal bases in the year 1963.

Faber⁹ has given the following advantages and certain disadvantages of metal bases.

Advantages of the cast metal base :

1. The metal base prevents acrylic resin warpage during processing.
2. The metal base is stronger than acrylic resin and is subject to less breakage.
3. The metal base is more accurate than acrylic resin and tissue detail is reproduced more faithfully.
4. Less tissue change will occur beneath a metal base.
5. Metal is a better thermal conductor than acrylic resin.
6. A metal base is less porous than other materials. Porosity leads to bacterial fermentation.
7. Dentures with metal bases show much less lateral deformation in function. Regli and Kydd⁵ have shown the metal base denture to be eight and one-half times more resistant to lateral deformation in function than the plastic base denture

Disadvantages of the technique :

1. The cost of the denture is greater than that of one with a plastic base.
2. The technique is more time-consuming than those for making plastic base dentures.

However, due to the uniformity and excellence of results,

the advantages seem to outweigh the disadvantages.

Case Report =>2

Fig 1: Waxed up master cast and refractory cast.



Fig 2: Finished metal denture base on master cast



Fig 3: Occlusal rim fabricated on metal denture base



Fig 5: Intraoral photograph of finished denture



Fig 6: Pre operative intraoral photograph.



Fig 7: Post operative intraoral photograph



A 52 year old male patient reported to the Outpatient Department of Prosthodontics of Sardar Patel Post Graduate Institute of Dental and Medical Sciences, Lucknow, with, clinical findings of completely edentulous maxillary arch and partially dentulous opposing mandibular arch. The findings were evaluated carefully and a single maxillary complete denture with metal occlusal

surface was planned for the rehabilitation of edentulous maxillary arch.

After the final impression making the master cast was poured. This was followed by the fabrication of occlusal rims and recording of jaw relations. The casts were now mounted on a semi adjustable articulator and teeth arrangement was completed. After try in a putty index made of the occlusal surfaces (posterior teeth) of acrylic teeth were made. In lay wax was then poured into the impression surface and sprue formers were attached to it. Casting was completed and divested. The occlusal metal surfaces, thus obtained were finished. The acrylic posterior teeth were now reduced to half of its dimensions occluso-gingivally. And diatoric in each tooth were made. These holes were made to fit the knob like structures present on the casting which would further help in mechanical retention.

The casting surface and the acrylic teeth were locked to each other using tooth coloured self cure acrylic resin. The try in was repeated to verify the jaw relation records. The denture was now finally ready for acrylisation.

The patient was observed for function, esthetics and comfort during the recall visits.

Discussion

The natural teeth which will oppose a complete denture¹⁰ almost always require recontouring to some degree to provide for a harmonious occlusion. The reasons for this are: (1) the inclination of the occlusal plane is usually unfavorable, (2) the individual teeth may be malpositioned and may have assumed positions that present excessively steep cuspal inclinations, and (3) the buccolingual width of the natural teeth may be too wide. Failure to alter these conditions will often pre-vent the development of a bilateral balanced occlusion in eccentric positions.

According to Keohne and Morrow¹¹, when providing prosthodontic service, the use of gold occlusal surfaces on the teeth of a prosthesis can contribute to its clinical success. This may-be necessary¹ when constructing a complete denture to oppose a reconstructed dental arch made up of gold occlusal surfaces,² when constructing complete or removable partial dentures with a functionally generated path concept where considerable modification of the denture teeth is necessary to place the occlusal surfaces and the core in harmony, and³ when special wax carving techniques are completed on a fully adjustable articulator for the development of a functional occlusion. According to Schultz¹² acrylic teeth with cast gold occlusal surfaces do give-chewing efficiency comparable to that of porcelain teeth without the shock ex-perienced in the occlusion of porcelain. The use of gold occlusal surfaces on acrylic posterior teeth is of practical value also in preserving the chewing efficiency established, a factor which is soon destroyed by wear in some cases where all acrylic teeth are used. Sowter & Bass¹³ stated that selecting posterior teeth to oppose natural teeth, especially those with extensive metallic restorations, poses several

problems. Porcelain teeth will provide efficiency but may also cause extensive wear on the opposing restorations. Resin teeth eliminate the problem of wear on the natural teeth but, clinically, they seem to be less efficient. The patients using them complain of dull and unnatural sensations when chewing. A solution to these problems is the use of metallic occlusal surfaces.

The use of gold or chrome-cobalt anatomic occlusal surfaces has been described previously¹². It has been stated that this type of anatomic occlusal surface provides the efficiency of porcelain teeth and the comfort of resin teeth¹³. These custom-made occlusal surfaces require laboratory techniques that are relatively simple but are time consuming.

The method is contraindicated¹⁴ when the desired jaw movements and the necessary record base stability are not possible, the denture space is inadequate, and the physical or mental condition of the patient seriously compromises effective cooperation.

Fig 1: Post try in occlusal surfaces of posterior teeth marked for sectioning.



Fig 2: Acrylic pattern with attached sprue formers.



Fig 3: Patterns after casting



Fig 4: Occlusal surfaces of posterior teeth after finishing



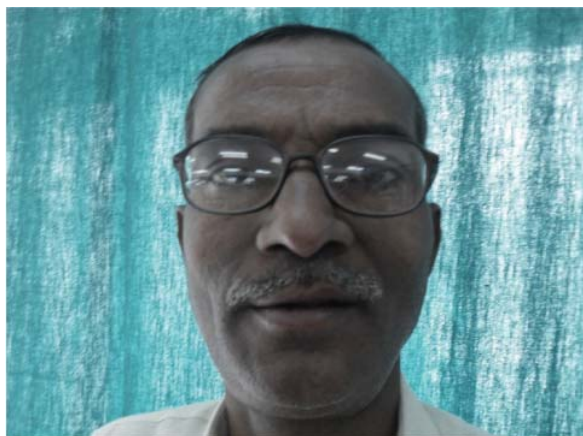
Fig 5: TryIn done after metal occlusal surfaces placed in denture



Fig 6: Finished maxillary denture with metal occlusals



Fig 7: Post operative extra oral photograph



CASE REPORT => 3

A 45 years old male patient presented to the Out Patient Department of Prosthodontics, Sardar Patel Post Graduate Institute of Dental and Medical Sciences, Lucknow, with a completely edentulous mandibular arch and completely dentulous maxillary arch. A single mandibular complete denture was planned and a bilateral balanced occlusal scheme using cross linked acrylic teeth on a semi-adjustable articulator. At the time of denture delivery a new centric interocclusal relation recorded and occlusal adjustment was carried out by remounting single complete denture on semi-adjustable articulator. Occlusal equilibration was achieved by selective grinding procedure on the remounted denture. Class I cavity (1.5-2mm) was prepared in premolar and molar denture teeth, using round, straight and inverted cone bur. Amalgam was triturated according to the manufacturer's directions and then condensed into the cavity with help of condenser. The articulator was closed and the amalgam was carved in centric and eccentric movements. In this situation, the vertical relation at occlusion was maintained by unprepared borders of tracing areas excess amalgam removed. The denture was seated on the patients's mouth and patient was instructed to repeat all functional movements of the jaw until amalgam sets. Then denture was delivered and post insertion instructions were given.

The patient was recalled after 24 hrs, then amalgam stops were polished by amalgam polishing kit.

Discussion

The major disadvantage of acrylic teeth used in single complete denture opposing natural dentition is rapid wear¹⁷⁻¹⁹ on occlusal surface . rate of wear depends upon patients functional and parafunctional habits¹⁸ which affects the vertical dimension of occlusion and tooth relationships and their associated sequelae. Inserting amalgam stops into the resin occlusal surfaces slows down and controls this wear¹³.

The amalgam stops can be carved either on the programmed articulator¹⁸ directly in the patients mouth. The amalgam stops generated on programmed articulator can be carved according to the articulator movements guided by condylar and incisal guidance. The functionally generated^{15,16} path technique, described in this article , carved the amalgam in plastic stage .

A simplified technique which proved to be effective is to use silver amalgam to develop metallic surfaces. R. E. Ogle and I. F. Ortman²⁰ developed an apparatus that uses twin cameras for stereo-imaging has been developed to measure accurately in vivo wear of artificial teeth in complete dentures. The new measuring technique is called close-range photogrammetry.

Fig 1: Intraoral pre operative photograph showing edentulous mandibular arch



Fig 2: Class I cavities prepared on the posterior denture teeth after curing of denture.



Fig 3: Posterior denture teeth cavities restored with Amalgam.

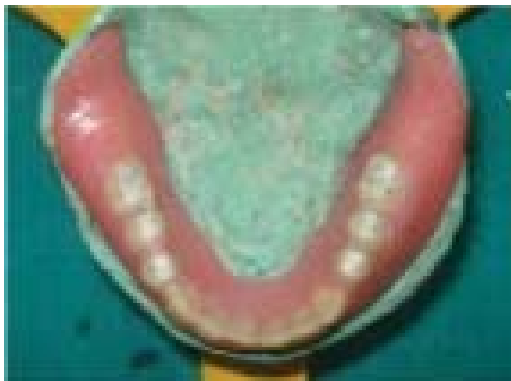


Fig 4: Post operative intraoral photograph.



Summary And Conclusion

The development of a harmonious occlusion is most critical to the success of a single complete denture treatment. Achieving this desirable characteristic is usually much more difficult than arranging artificial teeth for opposing complete dentures. The physical properties of the denture, durability and a functional and stable occlusion are the prime considerations for fabrication of single arch complete denture.

1. Metal denture bases can aid in conserving the supporting tissues of the denture bearing area (basal seat) as this shows minimum warpage and least lateral deformation, so resulting in better tissue contact, whereas in resin denture base due to high biting force of the natural teeth there will be lateral flexing of the base and thus causing midline fracture. Metal base is superior in physical properties compared to any resin denture base, which is highly required for single complete denture opposing natural occlusion. Metal denture base is preferred in maxillary single complete denture because of its superb thermal conductivity and in case of mandibular single complete denture it shows negligible lateral deformation.
2. It is sometimes appropriate to employ denture teeth having metal occlusal surfaces. In addition to the inherent physical properties of the metal, include adaptability to unusual opposing occlusion problems. An effective technique is presented which permits

denture teeth to be constructed with metal occlusal surfaces. The technique permits the construction of duplicate teeth with minimal additional time and materials.

3. In respect to maintain vertical dimension and to establish balanced occlusion, use of amalgam stops is very effective, less expensive and less time consuming with no or few post insertion adjustments.

Our article focuses various treatment options to manage such patients. The best judge is the dentist himself to select the appropriate treatment modality after considering all aspects.

References

1. Woelfel, J. B., Paffenbarger, G. C., and Sweeney, W. T.: Dimensional Changes Occurring in Dentures During Processing, *J. A. D. A.* 1960; 61; 413.
2. Grunewald AH. Gold base lower dentures. *J Prosthet Den*, 1964; 14; 432-41.
3. Lundquist DO. An aluminum alloy as a denture-base material. *J Prosthet Dent* 1963; 13; 102-10.
4. Campbell DD. The cast waxed aluminum denture base. *J Am Dent Assoc* 1935; 22: 2082-9.
5. Regli, Carl Phillip, and Kydd, William L.: A Preliminary Study of the Lateral Deformation of Metal Base Dentures in Relation to Plastic Base Dentures, *J. Prosthet Dent* 1953; 3; 26-330.
6. Allen LR. Improved phonetics in denture construction. *J Prosthet Dent* 1958; 8; 753-63.
7. Roth GJ. An analysis of articulate sounds and its use and application in the art and science of dentistry. *Am J Orthod* 1940; 26; 1-23.
8. Rothman R. Phonetic considerations in denture prosthesis. *J Prosthet Dent* 1961; 11; 214-23.
9. Faber BL. Lower cast metal base denture. *J Prosthet Dent* 1957; 7; 51-4.
10. Ellinger C.W, Rayson J.H & Henderson.D: Single complete dentures *J. Prosthet. Dent* 1971; 26; 4-10.
11. Koehne C.L and Morrow R.M: Construction of denture teeth with gold occlusal surfaces, *J. Prosthet. Dent.* 1970; 23; 449-455.
12. Schultz A.W: Comfort and chewing efficiency in dentures. *J. Prosthet. Dent* 1951; 1; 38-48.
13. Sowter J.B. and Bass R.E: Increasing the efficiency of resin posterior teeth. *J. Prosthet. Dent* 1968; 5; 465-468.
14. Rudd K.D and Morrow R.M: Occlusion and the single denture. *J. Prosthet. Dent* 1971.; 30; 4-10,
15. Pravinkumar G. Patil, Rambhar D. Parkhedkar. Functionally Generated Amalgam Stops For Single Complete Dentures : A Case Report. *Dent .Res J* 2009 ; 6; 51-54.
16. Akihiko Shibh, Toshio Hayashi, Jiro Yoshida .Functionally Generated Amalgam Paths For Complete Dentures. 1981 ,46, 494-97.
17. D.B. Boyer; Mercury Vaporization From Corroded Dental Amalgam. *Dental Material* 1988; 4; 289-93.

18. Lanciello F R., Articulator Generated Amalgam Stops For Complete Dentures. J Prosthet Dent 1979;41;16-20.
19. Kunlian And EF .Stathios I Meletis Dental Materials 1996; 12 ; 146-153.
20. R.E.Ogle and L.F.Ortman, Measuring wear of artificial teeth with stereography;Part I; J Prosthet Dent 1985; 53; 807-12.

Head injuries in road traffic accident and its presentation in emergency room: A Retrospective Study

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Introduction

Road traffic accident is one of major cause of death in modern era. The WHO in 1996 had estimated that in the rank order of leading causes of death due to road accidents would change from being the 9th leading cause in the world in 1990 to the 3rd most major cause by 2020.¹ Unfortunately it involves most productive age group and impose an enormous burden to national resources, in terms of health care cost and man-power of country. Trauma patients occupy more hospital beds than all patients from heart diseases, and four times more than patients with cancer². Increase in population and industrialization leading to relatively fast life, more traffic with less safety measures and ultimately more number of road traffic accidents (RTA) specially in developing countries.

The incidence of major trauma is around 340– 522 in one million inhabitants per year, and mortality is still high^{3,4}. The rate of preventable trauma deaths in the literature is 30% in nontrauma hospitals, and 1 – 5% in trauma centers. 1.2 million people Die every year due to Road Traffic Accidents (RTA). Road Traffic Accidents cause injury to about 50 million people in the world. Although India has only 1% of the world's motor vehicles, but it accounts for 6% of the total global RTA deaths. Trauma related death occurs in India every 1.9 minutes⁵.

In spite of recent advancement of technology and medical sciences death and deformities following road-traffic accident is yet to be controlled successfully rather incidences of RTA has been increasing at an alarming rate throughout the world. Most often are locomotor injuries, but the main cause of death is head trauma⁶⁻⁸.

Head injury is an important cause of mortality worldwide as head is the most vulnerable part of the body involved in fatal road traffic accidents. According to the World Health Organization, traumatic head injury is the main cause of fatal and non-fatal injury in RTA⁹. In poor countries, economic losses caused by head injury due to expenditure for prolonged treatment, loss of productivity or income due to disability or death leading to further vicious cycle in development of nation¹⁰. There are very less number of hospital-based or community epidemiological data on traumatic head injuries in RTA. However, it is likely that the burden caused by head injury to the country is significant. This study is designed to analyze head injury cases due to Road Traffic Accident and their presentation in emergency room.

Material & Method

This is a retrospective study conducted in department Of General Surgery, Saraswathi Institute of Medical Sciences, Hapur Ghaziabad from Jan 2009 to June 2010 on patients who were presented as RTA in emergency room. We had analyzed 834 cases, and its correlation with the clinical findings and radiological report. We had included all patients of RTA. In this study head trauma by other cause are excluded. Data including age, sex, symptoms, physical signs and radiological findings were recorded in subject proforma.

Results

Base line characteristics

Head injuries due to road traffic accidents occur in 67%. Males comprised 63 % and females 37 % of the total victims. The age groups of the victim were grouped into 10 year intervals ranging from 0-70 years. The youngest victim was a male child aged 7 months and the oldest was a 73 years old female. The age distribution of study sample is shown in Table 1. Highest numbers of victims were found in the 21 - 30 years group (27 %) then 31-40 years of age which constitute 18% and least in the >70 years group (2%). Of the total cases, 12 % of victims died on the spot, while 20 % of the victims were treated surgically.

Radiological Findings of Cranio - cerebral

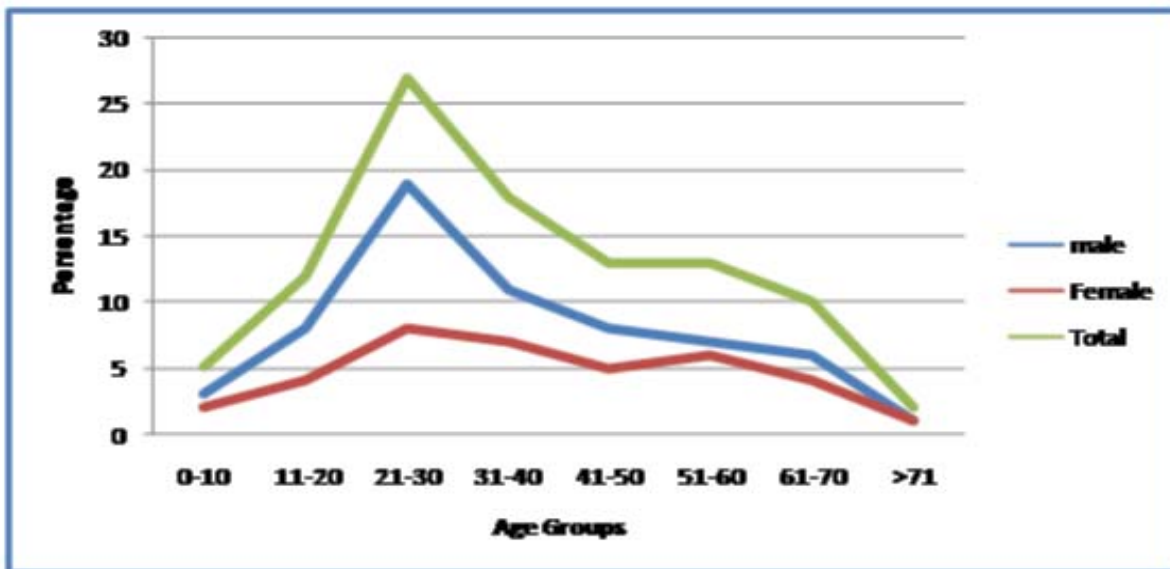
Table 1: Distribution of male and female head trauma patients

Age Group	Male %	Female %	Total %
0-10	3	2	5
11-20	8	4	12
21-30	19	8	27
31-40	11	7	18
41-50	8	5	13
51-60	7	6	13
61-70	6	4	10
>71	1	1	2

Trauma

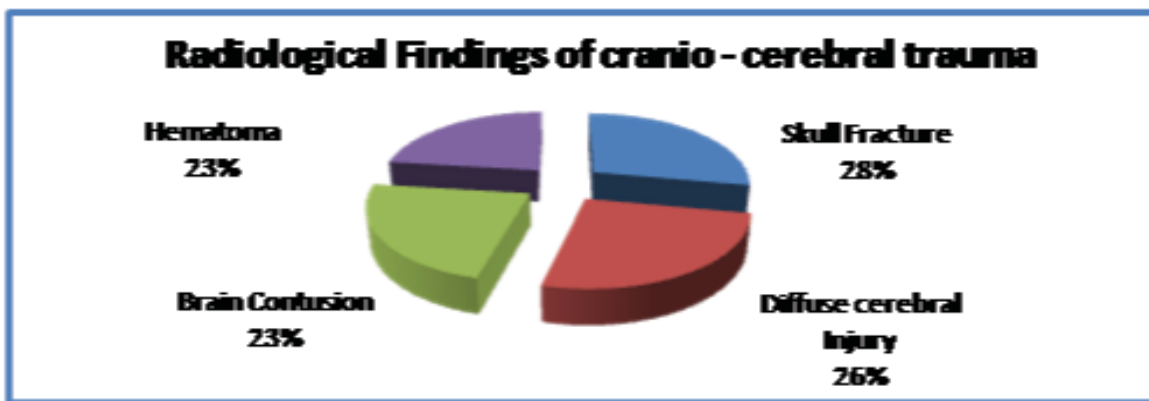
Head injury was associated with other severe trauma or major bone fracture in other body regions. 16% had lacerated wounds in the scalp and the radiological

Fig 1: Distribution of male and female head trauma patients



examination revealed nothing. The remaining patients, the radiological findings varied from skull fracture, brain contusion, hematoma and diffuse brain injury (Fig.2). More

than one radiological finding also present.



Site of Skull-Fracture and Intra-cranial Hemorrhage

The sites of skull fractures are shown in table 2. Frontal bone, parietal bone and temporal bone were the commonly involved areas in fracture, which corresponds to 33 %, 29 % and 21 % respectively. Less involved area in fracture was the occipital bone (11 %) and facial bone

Table 2: Site of Skull Fracture

Site	Percentage of cases
Frontal bone	33
Parital	29
Temporal	21
Occipital	11
Face bone	6

fracture (6%). Table 3 explains the type of intracranial hemorrhages seen. Subdural hemorrhage (45 %) was observed most commonly, followed by subarachnoid hemorrhage (31%). Whereas extradural and intracerebral hemorrhages were found in comparatively less number of

cases viz, 14%, 8 % respectively. Combination of all hemorrhages was seen only in 2 % of cases.

Table 3: Site of Intra-cranial Hemorrhage

Site	Percentage of cases
Subdural hemorrhage	45
Subarachnoid hemorrhage	31
Extradural	14
Intracerebral hemorrhages	8
combination	2

Discussion

All over the world the RTA are still remaining as one of the major problems in health and social issues in general and the leading cause of death worldwide. Despite of tremendous progress in all fields of life, RTA continues to be the major cause of morbidity and mortality specially in developing countries. In the present study, males are largely involved in the accidents; this shows the male dominance in the moving population especially on the roads and in vehicles. In our study, 21 - 30 years was the

most common and those above 70 years was the least common age group involved in accidents. This corresponds with other studies¹¹⁻¹⁵. The reason behind that young and middle aged groups largely consist of students and working people in various outdoor activity, who usually travel by either own vehicles, buses or walk. This results in the involvement of young adults more commonly in road traffic accidents.

In the present study, head injury was present in 67 % cases. This is comparable to studies done Chandra et al¹²(72 %). From the above facts, it appears that head is the most vulnerable part of the body involved in road traffic accidents, which alone accounts for most of the fatalities. Skull fractures were found in 28 % of RTA victims presented in emergency room, most of fracture involved frontal(33%) and parital bone(29%) followed by temporal bone(21%). The incidence of subdural hemorrhage (45%) and subarachnoid hemorrhage (31%) was maximum in the victims of RTAs while intracerebral hemorrhage (8%) was observed in the least, which coincides with observations of others¹⁶⁻¹⁷.

Conclusion

This study shows that accidents occur more frequently in certain age groups and more incidences in male. Young adults between 21 - 30 years, the most productive age group are more vulnerable to accidents, incurring heavy loss of valuable man-power and human resources. Fatal head injuries are commonly associated with skull fractures. Subdural hemorrhage is the commonest intra cranial bleed.

Purpose of this study to make an awareness about RTA because it directly on indirectly affect the development of nation in spite of being a preventable cause possibly by preventive measures such as helmets in motor cyclists and seatbelts in automobiles and improving traffic conditions and road conditions. Finally more studies and research also needs to be done to provide a better understanding of the epidemiology of RTAs.

References

- Murray CJL, Lopez AD (1996) *The Global Burden of Disease*. Geneva, World Health Organization, Harvard School of Public Health, World Bank.
- Pickering SAW, Esberger D, Moran CG: The outcome following major trauma in the elderly. Predictors of survival. *Injury Int J Care Injured* 1999, 30:703-706.
- Di Bartolomeoa S, Sansonb G, Micheluttoa V, Nardic G, Burbad I, Carlo Francescutti C, Lattuada L, Sciane F: Epidemiology of major injury in the population of Friuli Venezia Giulia-Italy. *Injury Int J Care Injured* 2004, 35:391-400.
- Frutiger A, Ryf C, Bilat R, Rosso R, Furrer R, Cantieni R, Ruedi T, Leutenegger A: Five years follow-up of severely injured ICU patients. *J Trauma* 1991, 31:1216-1226.
- Madan VS, Road Traffic Accidents: Emerging Epidemic, *Indian Journal of Neurotrauma (IJNT1)* 2006, Vol. 3, No. 1, pp. 1-3.
- Joose P, Soedarmo S, Luitse JSK, Ponsen KJ: Trauma outcome analysis of a Jakarta university hospital using TRISS method: validation and limitation in comparison with Major trauma outcome study. *J Trauma* 2001, 50:134-140.
- Chiara O, Scott JD, Cimbanassi S, Marini A, Zoia R, Rodriguez A, Scalea T: Trauma deaths in an Italian urban area: an audit of pre-hospital and in-hospital trauma care. *Injury* 2002, 33(7):553-562.
- Clark DE, Cushing BM, Bredenberg CE: Monitoring hospital trauma mortality using statistical process control methods. *J Am Coll Surg* 1998, 186:630-635.
- Peden M, Scurfield R, Sleet D, Mohan D, Hyder AA, Jarawan E, Mathers C. *World report on road traffic injury prevention*. Geneva: WHO; 2004.
- WHO *Designing health financing systems to reduce catastrophic health expenditure*. Technical briefs for policy makers, WHO/EIP/HSF/PB/05.02. Geneva: WHO; 2005.
- Patel NS. Traffic fatalities in Lusaka, Zambia. *Med. Sci. Law* 1979; 19 (1): 61- 65.
- Chandra J, Dogra TD, Dikshit PC. Pattern of Cranio-intracranial injuries in fatal vehicular accidents in Delhi 1966-76. *Med. Sci. Law* 1979; 19 (3): 186-194.
- Akang EEU, Kuti MAO, Osunkoya AO et al. Pattern of fatal head injuries in Ibadan - A 10 year review. *Med. Sci. and Law* 2002; 42 (2): 160-166.
- Gautam Biswas, Verma SK, Jag Jiv Sharma, Aggarwal NK. Pattern of Road Traffic Accidents in North-East Delhi. *Journal of Forensic Medicine and Toxicology* 2003; 20 (1): 27-32.
- Nilambar Jha, Srinivasa DK, Gautam Roy, Jagdish S. Epidemiological study of Road traffic accident cases: A study from South India. *Indian Journal of Community Medicine* 2004; 29 (1): 20-24.
- Goyal M. The correlation of CT scan and operative findings in cases of head trauma. *J Indian Acad Forensic Med.* 2003; 25(4): 125-132.
- Singh H. Pattern and distribution of injuries in fatal Road Traffic Accidents in Rohtak. *J Indian Acad Forensic Med.* 2004; 26(1): 20-23.

Anti - CCP- A promising early diagnostic tool for rheumatoid arthritis

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Abstract

Rheumatoid Arthritis is a mutilating disease. Acromutilation can be prevented by early diagnosis & treatment. Rheumatoid factor becomes positive in fairly advanced disease. It is also positive in normal as well as in some unrelated diseases. Anti-CCP can diagnose Rheumatoid Arthritis relatively accurately even pre-clinically as shown in this study.

Key Words

CCP=citrulline containing protein epitope
 Anti-CCP=antibody against citrulline containing protein
 PAD=peptidyl arginine deamine
 RA=rheumatoid arthritis

Introduction

Early diagnosis of Rheumatoid Arthritis is key for prevention of complications. Rheumatoid Factor becomes positive when the disease already started degenerative changes in the joints. It is also positive in some other no-related conditions as well as in normal elderly individuals. Anti-citrullinated protein antibodies directed to citrulline containing epitopes have greater clinico-pathological potential for diagnosis of Rheumatoid Arthritis.

Material & Methods

Citrulline is a non-standard amino acid generated by post-translational modification of arginine residue by the enzyme peptidyl arginine deiminase (PAD)-this process is referred to as citrullination.

Anti CCP1 vs Anti CCP2

ANTI CCP1	ANTICCP2
Employed in the first generation of anti-CCP tests.	Used in the new generation of anti-CCP tests.
Highly specific for RA but only moderate sensitivity.	Similar specificity but superior sensitivity.

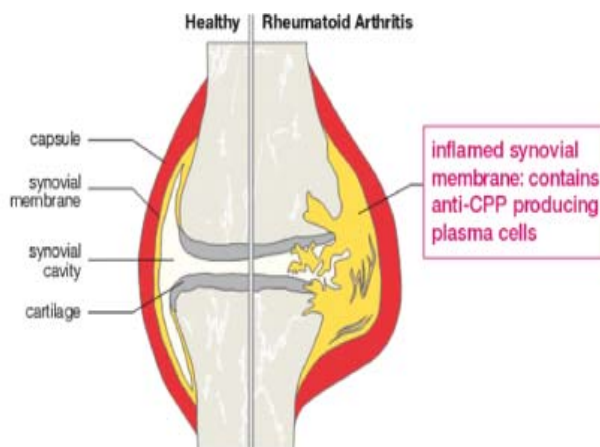
ANTI-CCP vs RHEUMATOID FACTOR

Although RF is found in the majority of RA patients, it lacks

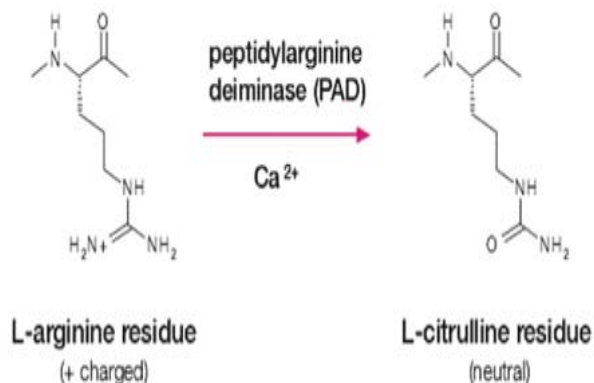
specificity as it is positive in many other diseases as well as in healthy elderly individuals. Furthermore, RF is negative in so called sero-negative RA. Many extensive studies have confirmed that Anti-CCP2 test has superior diagnostic accuracy over the RF test.

RA	CONTROL GROUP	SENSITIVITY	SPECIFICITY
N=2946	N=4544	74%	95%

Anti-CCP can be detected several years before the first symptom of RHEUMATOID ARTHRITIS. Predictive value of Anti-CCP antibodies is tremendous. Anti CCP at presentation can also predict future development of complication of RA.



Citrullination is an example of protein modification



Results

In this study, cases were randomly selected from a group of patients presenting with joint pain, pain & restriction of movements of the neck, knee-swelling & pain, low-back pain, polyarthopathy of one or both knee joints or painful arc syndrome of one or both shoulder joints.

Three cases of seropositive arthritis showed negativity (level of anti-CCP was 0.8U/ml & 1.0U/ml).

Patients having pain in both knees for 3 weeks to 5 months also showed negativity (anti-CCP 1.9 to 2.7U/ml).

Low back pain for 7 days to 2 months also showed negative values (ANTI-ccp 1.5 TO 2.7u/ml).

Cases having >9.0U/ml were taken as positive.

Here 12 cases were positive, two of them showing high positivity (772.5U/ml & >200U/ml respectively)-the first one having a past history of cervical cancer presented with asymmetrical polyarthopathy and clinically RHEUMATOID ARTHRITIS. The other having bilateral knee joints pain & bowing of both lower limbs with difficult gait.

The moderately positive patients (approx. 24.2U/ml) had pain on walking & swelling of one or both knee joints or painful arc syndrome of one or both shoulder joints, three cases of seropositive arthritis showed negativity (anti-CCP level 0.8 to 1.0U/ml).

Patients having pain both knees for 3 weeks to 5 months also showed negativity (anti-CCP 1.9 to 2.7U/ml) Low back pain for 7 days to 2 months duration showed negative values (anti-CCP 1.5 to 2.7U/ml).

Discussion

Seropositivity in light of RA factor is negative if criteria of anti-CCP is judged. Many early cases (as low as of 7 days onset) gave positive results. Painful arc syndrome of upper extremity may be the presenting features of RA. But

majority of the patients came with knee joint pain are sero-negative for anti-CCP.

Summary

Anti-CCP helps early diagnosis of Rheumatoid Arthritis preventing morbidity from this disease.

Conclusion

Further study encompassing large group of patients over a prolonged period is necessary, though this short study proves anti-CCP is a promising early diagnostic tool for Rheumatoid Arthritis.

References

1. Schellekens G.A., Visser H., de Jong B.A. (2000) *Arthritis Rheum* 43:155-163.
2. van Venrooij W.J., Zendman A.J., Pruijn G.J. (2006) *Arthritis Rheum* 48:2741-2749.
3. Contaert T., Derycke L., Bongartz T. (2006) *Arthritis Rheum* 54:3381-3389.
4. Zendman A.J., van Venrooij W.J., Pruijn G.J. (2006) *Rheumatology (Oxford)* 45:20-25.
5. Coenen D., Verschueren P., Westhovens R., Bossuyt X. (2007) *Clin. Chem.* 55:498-504.
6. Rantupai-Dahlqvist S., de Jang B.A., Berlin E. (2003) *Arthritis Rheum* 48:2741-2749.
7. van Gaalan F.A., Linn-Rasku S.P., van Venrooij W.J. (2004) *Arthritis Rheum* 50:709-715.
8. van der Helm-van Mil A.H., Huizinga T.W. (2006) *Future Rheumatol* 1:79-89.
9. Johansson M., Arlestig L., Hallmans G., Rantapää-Dahlqvist S. (2005) *Arthritis Res Ther* 8:R-19.s

Potential for the use of GIS and spatial analysis techniques in nutrition science

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Abstract

GIS provides excellent means for visualizing and analyzing epidemiological data, revealing trends, dependencies and inter-relationships. It can acquire, store, manage, and geographically integrate large amounts of information from different sources, programmes and sectors. Nutrition is one of the many areas of possible application of GIS methodologies. Public Health Nutrition in emergencies has only recently discovered the potential. Almost any nutrition survey aiming at defining the nutritional status in a certain area can be enhanced by a GIS presentation. This article study on the potential benefits, resource needed and constraints of applying Geographical Information Systems (GIS) analysis to a conventional nutritional survey dataset in a developing country.

Key Words

Nutrition survey, Geographic Information System (GIS), GPS, Management

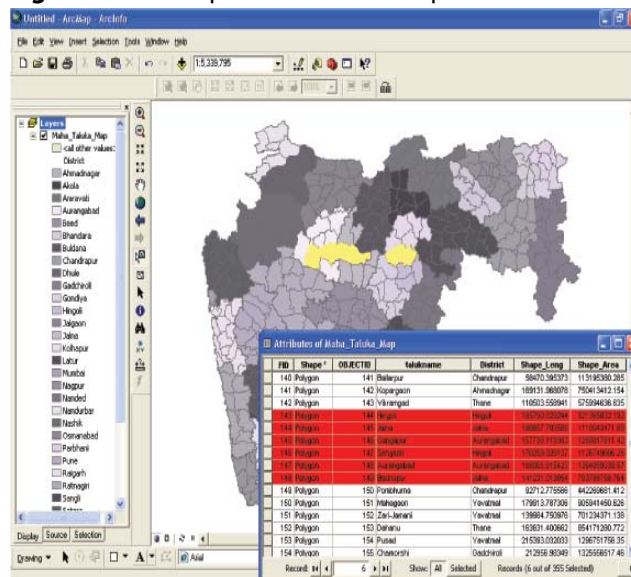
Introduction

Geographical Information System (GIS) is an integration of computer hardware, software and geographically referenced data¹. The purpose of using GIS is that maps provide an added dimension to data analysis, which helps in visualizing the complex patterns and relationships². Relationships among neighboring areas are explicit in maps which allows for the visualization of spatial patterns³. Nutrition is one of the many areas of possible application of GIS methodologies, and in Public Health Nutrition during emergencies has only recently discovered the potential. Even EP-INFO, probably the most popular software among public health nutritionists, has evolved in the last few years to include a GIS analysis component plus a large free source variety of maps of administrative boundaries, online atlas, health risk exposure data, and others⁴. Almost any nutrition survey aiming at defining the nutritional status in a certain area (at district, town, province, region, state, nation or continent level) can be enhanced by a GIS presentation. No major changes are needed in conducting the nutrition survey or in identifying its best epidemiological design.

Why Field Programmes should Consider Using GIS

The use of GIS certainly contributes tools to provide better answers for most leaders. GIS helps in decision making because it can overlay different pieces of information and provides maps of the phenomenon of interest. This key concept is reflected in figure 1, where the yellow area in the map graphically represents the record and all its data, also highlighted in red color in the table.

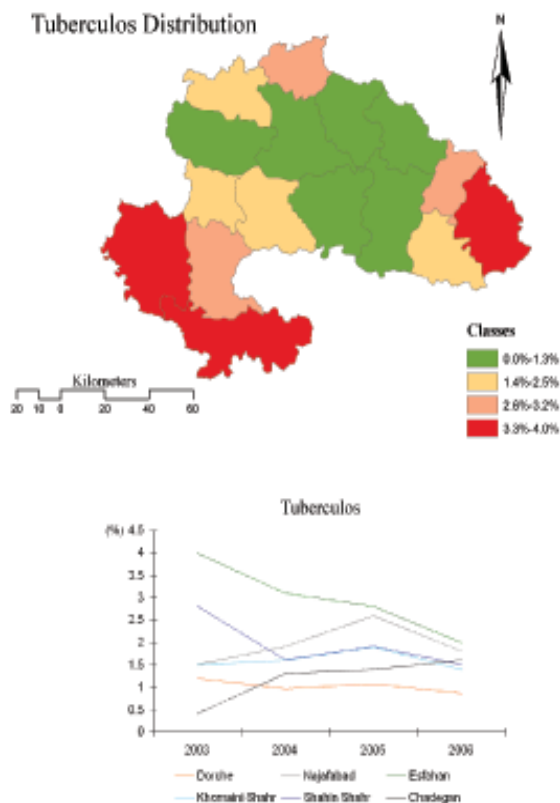
Fig. 1: Relationship between a GIS map and its attributes



How data are presented can have a number of practical implications. For example, there might be the need to share a decision regarding the out- come of a recent nutrition survey with the leaderships of a few villages in a rural area. How these data are represented will affect how well they can be shared and how much the programme can benefit from the stake- holders' contributions, independent of their education level. With this scenario in mind, figure 2 presents two different ways of representing the same dataset: a histogram and a map. In this situation, the GIS map may well be the best way to communicate the available data.

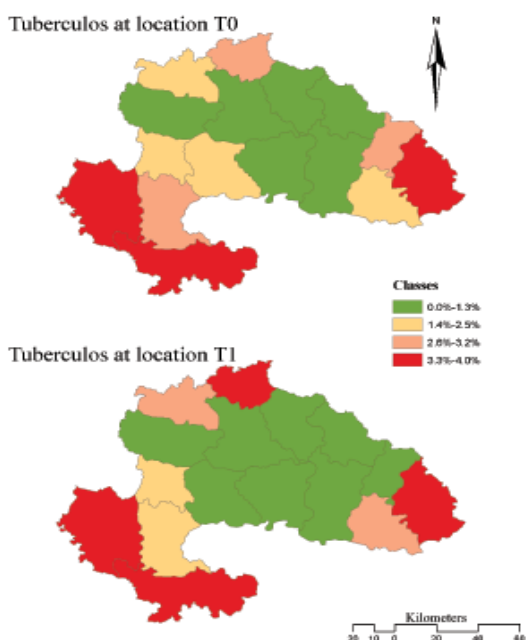
Geographical information system and mapping technologies have created new opportunities for nutrition surveys administrators to enhance planning, analysis, monitoring and management of their project. For example, it can reflect situations where the spatial distribution of

Fig. 2: Data representation using GIS



tuberculosis can precipitate kwashiorkor in children already suffering from chronic malnutrition (figure 3). The prevalence of tuberculosis is roughly the same at the two moments in time, however the spatial distribution has

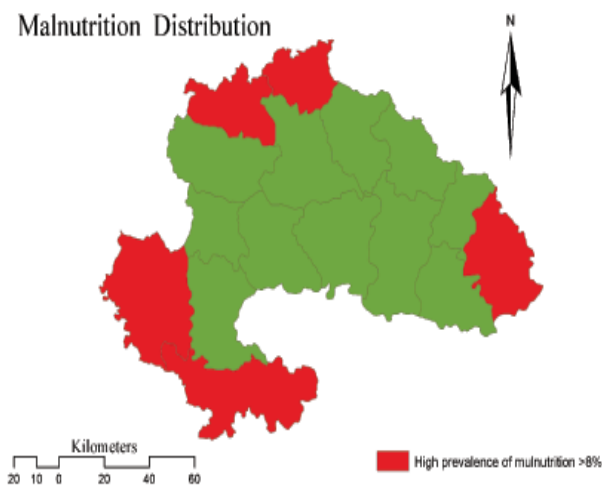
Fig. 3: Comparison of the distribution of tuberculosis at time 0 and 1



completely changed and therefore the appropriate areas to target have/should also change.

In figure 4, the areas in which the malnutrition indicators have reported a high prevalence of “very high” have been colored red. Compared with figure 3, it can be clearly seen that these red sections overlap with the sections in which the highest level of tuberculosis is actually located. This

Fig. 4: Analysis of the prevalence (%) of High Malnutrition status (HMS)



suggests that using malnutrition status to target geographic areas would not be a robust means to target tuberculosis.

Action Needed of Applying GIS

To apply GIS to a nutrition survey, extra time is demanded in two phases of the survey. A few minutes will be enough to collect geographical data using a Global Positioning System (GPS) during the field phase of the survey⁵. However, extra time is required for cleaning and analysis of the dataset to prepare for presentation in a GIS-map. The steps for conducting a nutrition survey, together with GIS-related actions, are listed in table 1. When applying GIS analysis in a nutritional survey; a GPS device and GIS software are needed.

The GPS allows users to collect data on both locations and tracks. There are different kinds of GPS that can be categorized in order of complexity and cost as basic GPS, mapping/cartographic GPS (these are quite enough for survey purposes), car GPS and differential GPS [6]. For the purposes described in this article, the models Garmin GPS or Garmin e-trex family (or similar other brand) are recommended. The choice of the model is related to the storage capacity of the waypoints and how data are downloaded into the computer. A commercial GPS has a standard accuracy of about 7 meters in positioning, which normally is well below the precision that a nutritional survey requires [6-12]. Some GPS can measure also the altitude, which can be useful in adjusting haemoglobin cut-offs to calculate the prevalence of anaemia in a survey.

Table 1: Actions needed when including GIS in a nutrition survey ⁵

Steps for conducting a Nutrition Survey	GIS	
	Action	Specific equipment
1. Define survey objectives		
2. Budget for the survey	Include a GPS, ensure software is available	
3. Choose the survey design	Decide where to collect the way- points or the tracks: i.e. centre points of the clusters, wells, roads, administrative boundaries, etc.	
4. Plan for personnel, facilities and equipment		
5. Select the sample		
6. Develop the questionnaire	Include an area in the question- naire for the collected GPS data	
7. Pre-test the questionnaire		
8. Train the personnel	Train the personnel in collecting the GPS data and filling in the questionnaire correctly	GPS
9. Standardize the anthropometric technique		
10. Interview/data collection		GPS
11. Edit and code the answers	Data entry of the GPS data on relation with the answers and/or anthropometric data	GPS, PC, software
12. Tabulate the data	The prepared tables include also the GPS data	PC
13. Analyze and report the survey results	Queries regarding geographical aspects are answered, and then interpreted	PC

Once the data have been collected by a GPS, there are several possible methods, solutions and software options for proceeding with the analysis. Here only one of them is considered.

In order to run the GIS analysis, at least three pieces of software are required. The first is necessary to download the data from GPS into the PC with the correct geographical coordinates (e.g. BaseMap). The second facilitates combining the GPS data with the nutrition dataset (attributes) and available maps (e.g. SPSS). The third is the GIS software, which is used for spatial analysis (e.g. ArcView, EpiMap, ArcGIS).

Methodology for applying GIS to a nutrition survey

Three kinds of data are necessary for GIS analysis in the context of a nutrition survey:

1. Data coming from anthropometry, questionnaires,

2. biochemical analysis, etc.
2. Waypoints collected with a GPS
3. Maps of the area obtained from different sources. The sets of data are combined within the GIS software which allows for their integration and analysis. The way to introduce waypoints and maps into the GIS can appear complex and therefore a step-by-step approach is summarized here (Table 2).

Conclusions

Statistical analysis of GIS nutrition dataset is an area still in its infancy and requires further research and development. Where stratified cluster surveys are used or several different discrete surveys are available, then GIS provides a clear and powerful means to compare differences between areas. When comparing areas within the same cluster survey, then differences that are observed between clusters may be suggestive of real geographical differences, but such

Table 2: Steps for applying GIS to a nutrition survey

I. Introducing the waypoints into the GIS software

- 1) Geographical collection of the waypoints using a GPS in the field
 - 2) Downloading the waypoints from the GPS into the computer
 - 3) Adjustment of the waypoints/tracks dataset
 - 4) Combining the geographical data with the nutritional survey data to answer specific queries
-

II. Introducing a map into the GIS software

- 1) Preparation of a digitalized map of your area of interest
 - 2) Georeferencing the map
 - 3) Digitalization and cleaning of the map
 - 4) Importing the map and the GPS waypoints and tracks into the GIS
 - 5) Visualizing the nutritional survey data on top of a map
-

differences should not be accepted as statistical fact. This is an important issue to remember if GIS is used for targeting. When systematic (interval) sampling is used, then true geographical differences are easier to identify using spatial statistic tools that are becoming more widely available within GIS software packages.

Health administrators, professionals and researchers need training and user support in GIS technology, data and epidemiological methods in order to use GIS properly and effectively.

An investment in GIS in a nutritional survey today, may allow users to benefit from the opportunity to link their data with other databases sources at a relatively low cost in the future. For instance, data on climate, rainfalls, soil erosion, and also food items prices and most of the typical food security parameters, could be subsequently linked.

References

1. O'Sullivan, D.A.U., D., *Geographic Information Analysis*. John Wiley & Sons, Hoboken, NJ 2003.
2. Tanser, F., LeSueur D. 2002,, the application of geographical information systems to important public health problems in Africa. *International Journal of Health Geographics*, 2002. 1: p. 4-12.
3. Taravat Najafabadi, A., *Applications of GIS in Health Sciences*. Shiraz E-Medical Journal 2009. In press.
4. Dean, A.G., *Epi Info and Epi Map: Current Status and Plans for Epi Info 2000*. *Journal of Public Health Management and Practice*, 1999. 5(4): p. 54-56.
5. Co, E., *Micro-gardening in Uganda*. *Field Exchange magazine*, 2005.
6. Kaiser R, S.P., Henderson AK, and Gerber ML, *The application of geographic information systems and global positioning systems in humanitarian emergencies. lessons learned, programme implications and future research.*, 2003. 27(2): p. 127-140.
7. Barnes S, P.A., *mapping the future of health care: GIS applications in Health care analysis*. . *Geographic Information systems* 1994. 4: p. 31-33.
8. CDC, *Public health GIS news and information*. 13th year of continuous reporting Accessed from CDC website at URL:<http://www.cdc.gov> on 22 may 2009, September 2006. 5(37).
9. (ESRI) *Environmental Systems Research Institute, I., World Basemap*. Redlands, CA: ESRI, Inc. Garmin Company URL "www.garmin.com" on 01 July 2009,2004.
10. (NIMA) *National Imagery and Mapping Agency, Digital Chart of the World: Vector Map Level 0 Database*. Fairfax, VA: NIMA. Retrieved online at <http://www.maproom.psu.edu/dcw/> on 29 May 2009, 1997.
11. Longley, P.A., Goodchild, M. F., Maguire, D. J. and Rhind, D. W., *Geographic Information Systems and Science*. Wiley, 2nd Edition, 2005: p. 517.
12. Smith, M.J., Goodchild, M. F., and Longley, P.A., *Geospatial Analysis - The comprehensive guide to principles, techniques and software tools*. 2007. Web version (Oct. 2007), accessed from <http://www.spatialanalysisonline.com/> on 05/19/2010.

Nanotechnology – The flip side of the coin?

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Abstract

Nanotechnology is the current boon of science to mankind. The enormous growth in nanotechnology has not spared any field and in particular it has engraved its success in the field of medicine. It is also important that one must be aware of the potential hazards of nanotechnology as it has grabbed a major position in the world of science and technology. The biological impacts of nanoparticles are dependent on size, chemical composition, surface structure, solubility, shape, and aggregation. These parameters can modify cellular uptake, protein binding, translocation from portal of entry to the target site, and the possibility of causing tissue injury. Effects of nanoparticles depend on the routes of exposure that include gastrointestinal tract, skin, lung, and systemic administration for diagnostic and therapeutic purposes. This review would talk in volumes about the potentially hazardous effects of nanotechnology.

Key words

Nanotechnology, Hazards, Nanoparticles

Introduction

Nanotechnology is the creation of useful materials, devices, and synthesis used to manipulate matter at an incredibly small scale—between 1 and 100 nm¹. Nanotechnology is a multidisciplinary field, which covers a vast and diverse array of devices derived from engineering, biology, physics and chemistry.² Nanotechnology is the science of manipulating matter measured in the billionth of meters or nanometer, roughly the size of two or three atoms. The word nano is the greek word for dwarf.³ Nanomedicine is the process of diagnosing, treating, and preventing disease and traumatic injury, of relieving pain, and of preserving and improving human health, using molecular tools and molecular knowledge of the human body by using nanoscale-structured materials and nanodevices including the interaction of nanostructured materials with biological

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systems.⁴

Fundamental concepts in nanotechnology

There are basically 3 concepts in nanotechnology

- Top down approach
- Bottom up approach
- Molecular nanotechnology

Top down approach (materialistic perspective) suggests that physical phenomena become pronounced as the size of the system decreases.⁵ Bottom up approach (a molecular perspective) of Nanotechnology offers science a way to build components from the “bottom up” by piecing them together from atoms and molecules directly.⁶ Molecular nanotechnology, sometimes called molecular manufacturing, is a term given to the concept of engineered nanosystems (nanoscale machines) operating on the molecular scale.⁵

Medical nanomaterials and nanodevices currently in use ⁴

Currently used materials would include,

Nanopores

Molecular Imprinting

Quantum Dots

Nanocrystals

Fullerenes

Nanotubes

Nanoshells

Magnetic Nanoprobes

Targeted Nanoparticles

Dendrimers

Radio-Controlled Biomolecules

Applications of nanotechnology to medicine

Nanomedicine is the application of nanotechnology (the engineering of tiny machines) to the prevention and treatment of disease in the human body.⁷

Nanomedicine refers to future developments in medicine that will be based on the ability to build nanorobots. In the future these nanorobots could actually be programmed to repair specific diseased cells, functioning in a similar way to antibodies in our natural healing processes.⁸

Nanomedicine may be broadly categorized into three

categories,⁹

A. Nanotechnology based diagnostics and imaging

- √ In Vitro Imaging
- Optical, electron or X-ray microscopies
- Scanning probes/near field methods
- Hybrid microscopies
- √ In Vivo Imaging

B. Targeted delivery

- √ Multi-Tasking Medicines
- Liposomes
- Micellar and micro-emulsion Systems
- Liquid crystal based formulations
- Nanocrystals
- Biodegradable nanoparticles/nanocapsules.
- Virus-like particles for gene delivery.
- √ Delivery Of Small Nucleic Acids Or Mimetics

C. Regenerative medicine

- √ Intelligent biomaterials and smart implants
- √ Bioactive signalling molecules
- √ Cell-based therapies

Toxicity of nanoparticles

The biological impacts of nanoparticles are dependent on size, chemical composition, surface structure, solubility, shape, and aggregation. These parameters can modify cellular uptake, protein binding, translocation from portal of entry to the target site, and the possibility of causing tissue injury. Effects of nanoparticles depend on the routes of exposure that include gastrointestinal tract, skin, lung, and systemic administration for diagnostic and therapeutic purposes. Nanoparticles interactions with cells, body fluids, and proteins play a role in their biological effects and ability to distribute throughout the body.⁴

Fate of nanoparticles in the human body

Following inhalation, ultrafine and fine particles can penetrate through the different tissue compartments of the lungs and eventually reach the capillaries and circulating cells or constituents, e.g., erythrocytes. These particles are then translocated by the circulation to other organs including the liver, spleen, kidneys, heart, and brain, where they may be deposited.⁴

Smaller particles apparently circulate for much longer and in some cases can cross the blood-brain barrier (BBB) to lodge in the brain. They can leak out of capillaries and get into the fluids between cells.⁴

Nanoparticles are different from most other industrial

hazards, as they could gain access to biological systems by passing through barriers within the body generally impermeable to larger particles. In-vitro studies have suggested that they may then cause damage to membranes, cellular organelles and DNA through their ability to trigger the production of reactive oxygen species. Toxic chemicals adsorbed to their surface or entrained within their microstructure may be delivered intracellularly or react with cell surface receptors, initiating immune responses.¹⁰

Pulmonary effects of nanoparticles

'Modern humans breathe in considerable numbers of nanoparticles on a daily basis in traffic fumes and even from cooking. Nanoparticles are used increasingly in industrial processes and have been hypothesized to be an important contributing factor in the toxicity and adverse health effects of particulate air pollution. Small size, a large surface area, and an ability to generate reactive oxygen species play a role in the ability of nanoparticles to induce lung injury. In some individuals they can trigger asthma by setting off an inflammatory response from the body's immune system.⁴ Exposure to unrefined SWCNT can lead to an increase in pulmonary toxicity in exposed workers due to oxidative stress. the degree of toxicity is linked to this surface and to the surface properties of these nanoparticles, rather than their mass.¹¹

Blood compatibility of nanoparticles

Given that the majority of nanoparticles are intended to travel to tumors through the bloodstream, the effects of nanoparticles on blood cells are of particular concern to those developing nanoparticle-based therapeutic and imaging agents. The blood compatibility of nanoparticles depends on the material used.³

Carbon nanoparticle-induced platelet aggregation

To determine the potential for blood platelet-nanoparticle interactions, the effects of engineered and combustion-derived carbon nanoparticles were studied on human platelet aggregation in vitro and rat vascular thrombosis in vivo (Radomski et al 2005). All particles resulted in upregulation of GPIIb/IIIa resulting in platelet induced aggregation.⁴

Transfer of nanoparticles from mother to fetus

The toxicopathology research group at the University of Liverpool (Liverpool, United Kingdom) has investigated the fate of injected gold nanoparticles into pregnant rats to determine whether they can be transferred across the placenta to the fetus. This research on possible transfer of nanoparticles to the fetus could indicate a new, particular, hazard of nanoparticles that would be a cause for concern.³

Delivery of inhaled materials can reach the central nervous system (CNS) by systemic delivery or via direct transport of materials from the nasal cavity to the brain via the olfactory nerve (olfactory transport).¹²

Cytotoxicity of nanoparticles

Cytotoxicity refers to toxic effects on individual cells.³ The structure and function of an enzyme can be altered by nanoparticles (NPs). The interaction between enzyme and NPs is governed by the key properties of NPs, such as structure, size, surface chemistry, charge and surface shape.¹³

Nanoparticle deposits in the brain

Passage of nanoparticles to cross the BBB to enter the brain has already been documented. There is a possible risk in inhaling nanoparticles that are so small that they can slip through membranes inside the lungs, enter systemic circulation, and lodge in the brain. There is the potential for neurodegenerative consequence of nanoparticle entry to the brain.⁴ Delivery of inhaled materials can reach the central nervous system (CNS) by systemic delivery or via direct transport of materials from the nasal cavity to the brain via the olfactory nerve (olfactory transport).¹⁴

FDA regulation of nanobiotechnology products

The FDA regulates a wide range of products, including foods, cosmetics, drugs, devices, and veterinary products, some of which may utilize nanotechnology or contain nanomaterials. The first generation of nanomedicines (liposomal preparations) were approved more than a decade ago before a real awareness existed about a number of issues related to safety concerns of nanomaterials and with a demonstrable relative success, in terms of their clinical safety assessment and safe use in cancer. However, nanomaterials such as phospholipids or biodegradable/bioerodible polymers are of a completely different nature from other anticipated materials that will be produced in the near future from the research pipeline. CNTs, quantum dots, and other nonbiodegradable and potentially harmful materials should be given different and more closer attention, looking at their toxicological potential impact in a number of different applications. By the same standards and in the new context, already existing nanopharmaceuticals, when administered for the same or new therapeutic indications making use of

different administration routes (e.g., pulmonary), should not be waived of a full assessment of their differential potential toxicology impact, particularly in the proinflammatory area (Gaspar 2007).⁴

Conclusion

This science might sound like a fiction now, but nanotechnology has strong potential to revolutionize the field of medicine in future. Nanotechnology will change health care and human life more profoundly. In the long run, perhaps 10–20 years from today, the nanorobots may join the medical armamentarium, finally giving physicians the most potent tools imaginable to conquer human disease, ill-health, and aging.

References

1. Sinha R kim G J, Nie S, Shin DM . Nanotechnology in cancer therapeutics: bioconjugated nanoparticles for drug delivery mol cancer ther 2006;5(8).
2. Ferrari M . Cancer nanotechnology:opportunities and challenges. Nature reviews cancer 2005; 5(3):161-71.
3. Kumar SR, Vijayalakshmi R. Nanotechnology in dentistry. Ind J dent res 2006; 17(2):62-65.
4. Freitas RA. Current status of nanomedicine and medical nanorobotics. Journal of computational and theoretical nanoscience 2005; 2(1):1–25.
5. <http://www.rcuk.ac.uk/cmsweb/downloads/rcuk/research/basictech/5-8.pdf>
6. <http://www.nanoprobes.net/>
7. http://whatis.techtarget.com/definition/0,,sid9_gci512908,00.html
8. www.understandingnano.com
9. <http://cordis.europa.eu/nanotechnology/nanomedicine.htm>
10. Priestly BG, Harford AJ, Sim MR. Nanotechnology: A promising new technology — but how safe? MJA 2007; 186(4):187-88.
11. <http://www.irsst.qc.ca/files/documents/PubIRSST/R-469.pdf>.
12. Takeda k, Suzuki k I. Nanoparticles transferred from pregnant mice to their offspring can damage the genital and cranial nerve syatems. Journal of health science 2009; 55(1): 95-102.
13. Zhang B, Wu Z. Regulation of Enzyme Activity through Interactions with Nanoparticles. Int. J. Mol. Sci. 2009; 10(9):4198-4209.
14. http://www.americanchemistry.com/s_acc/docs/LRIAbstracts/LRIAbstract_159.pdf.



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