

Prevalence of Dental Fluorosis in School Children of Age Ranged 8- 15 Years

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ABSTRACT

Background: Millions of children are suffering due to high fluoride in India. This leads to dental and skeletal fluorosis. It reduced dental caries in human dentition if in small quantity, whereas ingestion of higher concentrations (>1.5 mg/L) may cause fluorosis.

Materials and methods: The study was carried out on 300 school going children in 12 schools located in the urban areas of Patna district, Bihar, India. All ethical clearances were taken from the institutional review board for the present study. Informed consent was taken from the parents. This study included students ranged from 8-15 years of age of both genders.

Results: A total of 160 males and 140 females were included in this study. The distribution of male female ratio was statically non-significant. The number of effected males were 26 and Females were 29 and when compared both were statically non-significant.

Conclusion: A lot of de fluoridation work has to be undertaken by the government. Awareness among the community for water quality is must to reduce the fluoride related diseases.

Keywords: Fluorosis, prevalence, school children, Patna.

INTRODUCTION

Fluoride is essential in standard range for proper growth and function of the body. It exists in nature as complex form referred to as fluoride. Underground water contains fluoride due to weathering and leaching of fluoride-bearing minerals from rocks and sediments.¹

Six million children in India, are thought to have health complications due to high fluoride levels in their drinking water. Several body organs like bones and teeth contain about 96% of the fluoride.² It is helpful when injected in small amount. It reduced dental caries in human dentition if in small quantity, whereas ingestion of higher concentrations (>1.5 mg/L) may cause fluorosis. Enamel fluorosis displays itself as white spots/lines on enamel

surfaces.³ In severe cases, brownish discoloration of enamel is seen, and at the same time it leads to brittle enamel. Children belonging to age group of 0 to 12 years are most prone to fluorosis as their body tissues are in formative stage.⁴

Prakasam was the first district in India where the fluorosis was detected. At that point of time, this disease was prevalent in four states.⁵ Currently, this condition is being reported in twenty out of 32 states and it is on a sharper rise. Many new areas have been also involved since then. High incidence of endemic fluorosis in India is due to the fact that large areas of the country contain water supplies having high levels of fluoride.⁶

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Fluoride content has always been a concern for health care professionals as the deficiency of the element fluoride has been associated with defective enamel formation in teeth and the excess has been associated with skeletal and dental fluorosis.² Dental deformities have been reported among various studies in various areas. A lot of dental problems have been reported in the same studies due to excessive fluoride. Hence, it is important that the fluoride consumption should be at an optimum level for proper development of the calcified tissues.⁷ This study aimed at recording the fluorosis among school children age ranged 8- 15 years.

MATERIALS AND METHODS

The study was undertaken in the Department of Public Health Dentistry, Patna Dental College and Hospital, Patna, Bihar. The study was carried out on 300 school going children in 12 schools located in the urban areas of Patna district, Bihar, India. All ethical clearances were taken from the institutional review board for the present study. Informed consent was taken from the parents. This study included students ranged from 8- 15 years of age of both genders.

A research specific proforma was prepared based on the World Health Organization⁸ oral health assessment form, 1997. It consisted of mainly two parts, first consisted of information on demographic data, permanent residential address, information on source of drinking water, aids used for oral hygiene maintenance (fluoridated or non-fluoridated) and 2nd part had table for recording fluorosis using dean's fluorosis Index. Subjects were diagnosed under natural light or under artificial light source. Single examiner performed all the examination procedure in this study to reduce inter examiner bias. Assessment of dental fluorosis was done using Dean's index. The recording was made on the basis of the two teeth that are most affected. If the two teeth were not equally affected, the score for the less affected of the two was recorded.

RESULTS

The study was undertaken in the Department of Public Health Dentistry, Patna Dental College and Hospital, Patna, Bihar. The study was carried out on 300 school going children in 12 schools located in the urban areas of Patna district, Bihar, India. This

study included students ranged from 8- 15 years of age of both genders. A total of 160 males and 140 females were included in this study.

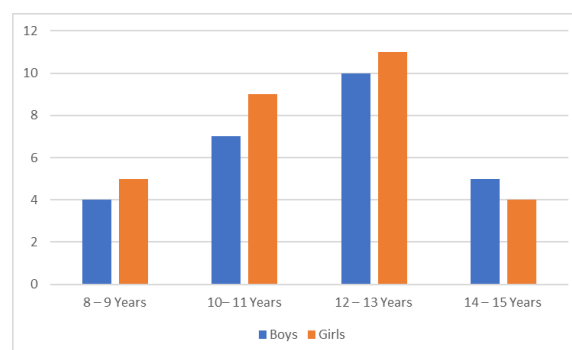
Table 1: Fluorosis prevalence rate

Gender of Children Examined	Number of Children Examined	Children Affected	Caries Prevalence Percentage
Male	160	26	16.25
Female	140	29	20.71
Total	300	55	18.33
P-Value	0.12 (NS)	0.83 (NS)	0.57 (NS)

NS: Non-Significant

Table 2: Age wise distribution of cases.

	8 - 9 Years	10- 11 Years	12 - 13 Years	14 - 15 Years
Boys	4	7	10	5
Girls	5	9	11	4



Graph 1: Graph showing age wise distribution of fluorosis cases.

The distribution of male female ratio was statically non-significant. The number of effected males were 26 and Females were 29 and when compared both were statically non-significant. The caries prevalence rate among males were 16.25 Percent and among females were 20.71 percent. Overall prevalence rate was 18.33 percent. A total of 4 males and 5 females at age group of 8 to 9 years were suffering from fluorosis. The highest number

were suffering in the age group of 12 to 13 years and lowest in age group of 8 to 9 years.

DISCUSSION

Dental fluorosis occurs as a result of excess fluoride ingestion during tooth formation. Enamel fluorosis and primary dentin fluorosis can only occur when teeth are forming, and therefore fluoride exposure (as it relates to dental fluorosis) occurs during childhood.⁹ Dental fluorosis is defined as a disturbance of dental enamel caused by excessive exposure to high concentrations of fluoride during tooth development. Excessive accumulation of fluoride in bone leads to skeletal fluorosis. The most common cause of fluorosis in India is fluoride laden portable water. Over half of groundwater sources in India have fluoride above recommended levels.⁶

The current study included 160 males and 140 females. Sixteen percent of boys and fourteen percent of girls are affected with dental fluorosis. This is in accordance to the study done by Shortt et al. The results showed that maximum cases were in age group of 10 to 11 years, followed by 12 to 13 years, then 14 to 15 years and the least in age group of 8 to 9 years. These results were similar to the study done by Choubisa et al.¹¹

Dean's fluorosis index was first published in 1934 by H. Trendley Dean [8]. The index undertook two deviations, appearing in its ultimate form in 1942. An individual's fluorosis score is based on the most severe form of fluorosis found on two or more teeth. Score 0 is considered normal when the enamel represents the usual translucent semi vitriform structure. The surface is smooth and glossy. Score 1 represents when the enamel discloses slight aberrations from the translucency of normal enamel, ranging from few white flecks to white spots. Score 2 represents small, opaque white area irregularly scattered over tooth but not involving as much as 25% of tooth surface. Score 3 shows white opaque areas in enamel of tooth but do involve as 50% of teeth. Score 4 has all enamel surfaces that are affected and attrition. Brown staining is also present. Score 5 shows hypoplasia and discrete pitting. There is brown staining and corrode like area. In this study, we found that questionable grade consisted of 15 boys and 17 girls, very mild had 20 boys and 25 girls, mild had 30 boys and 35

girls, moderate had 25 boys and 22 girls and severe had 10 boys and 26 girls. This is similar to Rozier et al.¹²

There are various universally known sources that contribute to excessive fluoride are mouthrinse, excessive fluoride containing toothpaste, bottled water not tested for fluoride contents, etc.¹³ These sources are directly responsible for forty percent of all the fluorosis. The remaining effect is due to high levels of fluoride in water. Severe cases can be produced by introduction to water that is naturally fluoridated to the levels well above the suggested levels, or by exposure to other fluoride sources such as brick tea or pollution from high fluoride coal.¹⁴

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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