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Prevalence of dental fluorosis in school children of age ranged 8- 15 years

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Abstract

Introduction- 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.

Materials & Methods- It included 1075 students ranged from 8- 15 years of age of both gender. In all students, demographic data, permanent residential address, information on source of drinking water, aids used for oral hygiene maintenance (fluoridated or nonfluoridated) and fluorosis was recorded using dean's fluorosis Index.

Results- The present study consisted of 525 boys and 550 girls. The difference was non- significant (P- 0.1). 21% boys and 22% girls had dental fluorosis. The difference was non- significant (P- 1). Dental fluorosis was seen in 10 boys and 10 girls in age group 8-9 years, 45 boys and 50 girls in age group 10-11 years, 35 boys and 40 girls in age group 12-13 years and 20 boys and 25 girls in age group 14-15 years. The difference was significant (P<0.05). The 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. The difference was significant (P<0.05).

Conclusion- Dental fluorosis is common in school children in age range 10-11 years of age. Girls were more commonly involved as compared to boys. Water fluoridation above 1.2ppm was cause of dental fluorosis.

Keywords: Children, Dental fluorosis, Dean's fluorosis Index

1. Introduction

Fluorine is required in normal range for proper growth and function of the body. It exists in nature as complex form referred to as fluoride. Groundwater contains fluoride due to weathering and leaching of fluoride- bearing minerals from rocks and sediments^[1].

In India, 6 million children, are estimated to have serious health problems due to consumption of fluoride contaminated water. Bones and teeth contain about 96% of the fluoride. When ingested in small quantities (<0.5 mg/L or 0.7 ppm) fluoride is beneficial for teeth by reducing dental caries, whereas ingestion of higher concentrations (>1.5 mg/L) may cause fluorosis. Dental fluorosis manifests as opaque white spots or lines, and in severe cases, enamel becomes discolored and brittle, leading to chipping. Children in the age group of 0 to 12 years are the most prone to fluorosis as their body tissues are in formative / growth stage during this period^[2].

In India, Prakasam district of Andhra Pradesh was the first place where fluorosis was detected and at that time, the disease was prevalent in only four states, namely Andhra Pradesh, Tamil Nadu, Punjab, and Uttar Pradesh. Now, fluorosis has been reported endemic in 20 out of 32 constituent states of India and day by day more new areas have been engulfed by this problem. 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^[3].

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. The occurrence of dental, skeletal fluorosis, and muscular fluorosis has been reported by various studies conducted in Unnao District of Uttar Pradesh and the cause has been related to the use of fluoride. Hence, it is important that the fluoride consumption should be at an optimum level for proper

development of the calcified tissues [4]. This study aimed at recording the fluorosis among school children age ranged 8-15 years.

Materials & Methods

This study was conducted in the department of Public health dentistry, MNR Dental College and Hospital, Sangareddy, Andhra Pradesh, India, in year 2016. It included students ranged from 8- 15 years of age of both gender. Institutional ethical committee provided the ethical clearance regarding the study.

A study specific proforma was prepared based on the World Health Organization oral health assessment form, 1997. It consisted of 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.

Students were examined under bright natural light or under artificial light source. Single examiner performed all the examination procedure in this study. 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

Table 1: Distribution of subjects.

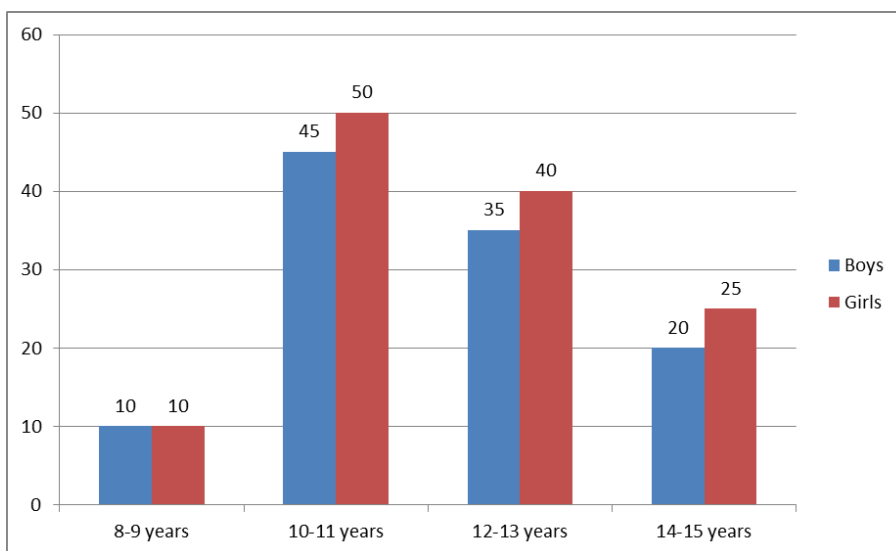
Boys	Girls	P value
525	550	0.1

Table I shows that present study consisted of 525 boys and 550 girls. The difference was non- significant (P- 0.1).

Table 2: Prevalence of dental fluorosis.

Gender	Boys	Girls	P value
Total	110 (21%)	125 (22%)	1

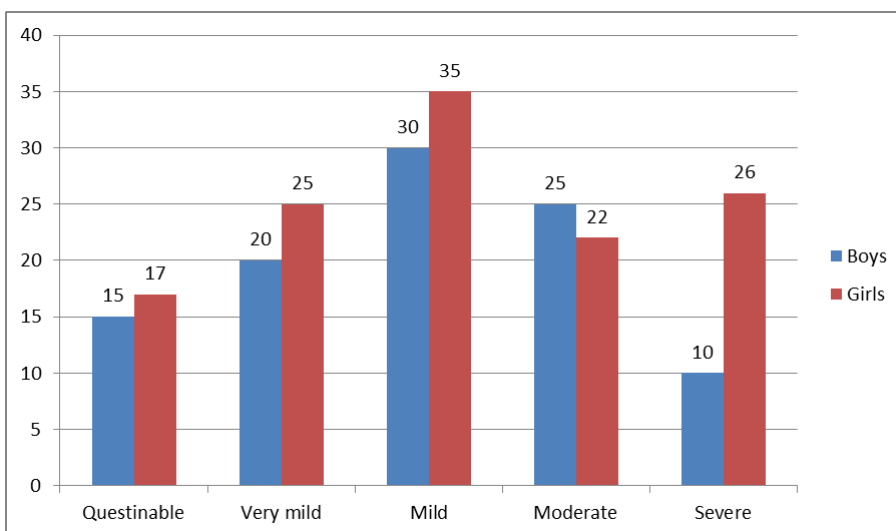
Table II shows that 21% boys and 22% girls had dental fluorosis. The difference was non- significant (P- 1).



Graph I: Age wise distribution of cases

Graph I shows that dental fluorosis was seen in 10 boys and 10 girls in age group 8-9 years, 45 boys and 50 girls in age group 10-11 years, 35 boys and 40 girls in age group 12-13

years and 20 boys and 25 girls in age group 14-15 years. The difference was significant (P<0.05).



Graph II: Grading of dental fluorosis

Graph II shows 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. The difference was significant ($P < 0.05$).

Discussion

Dental fluorosis is defined as a disturbance of dental enamel caused by excessive exposure to high concentrations of fluoride during tooth development. Skeletal fluorosis is a bone disease caused by excessive accumulation of fluoride in the bones. In India, the most common cause of fluorosis is fluoride-laden drinking water which is sourced as groundwater from deep-bore wells. Over half of groundwater sources in India have fluoride above recommended levels^[5].

The present study consisted of 525 boys and 550 girls. 21% boys and 22% girls had dental fluorosis. This is similar to the results by Shortt *et al.*^[6] We found that maximum cases were recorded in age group 10-11 years (45 boys and 50 girls) followed by 12-13 years (35 boys and 40 girls), 14-15 years (20 boys and 25 girls) and 8-9 years (10 boys and 10 girls). This is in accordance to Choubisa *et al.*^[7]

Dean's fluorosis index was first published in 1934 by H. Trendley Dean^[8]. The index underwent two changes, appearing in its final 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 semivitriform 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 Aggarwal *et al.*^[9]

Many well-known sources of fluoride may contribute to overexposure including dentifrice/fluoridated mouthrinse, excessive ingestion of fluoride toothpaste, bottled waters which are not tested for their fluoride content, inappropriate use of fluoride supplements, ingestion of foods especially imported from other countries, and public water fluoridation. The last of these sources is directly or indirectly responsible for 40% of all fluorosis, but the resulting effect due to water fluoridation is largely and typically aesthetic^[10]. Severe cases can be caused by exposure to water that is naturally fluoridated to levels well above the recommended levels, or by exposure to other fluoride sources such as brick tea or pollution from high fluoride coal.

Conclusion

Dental fluorosis is common in school children in age range 10-11 years of age. Girls were more commonly involved as compared to boys. Water fluoridation above 1.2ppm was cause of dental fluorosis.

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