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ORIGINAL ARTICLE

INCIDENCE OF DENTAL FLUOROSIS AMONG CHILDREN OF BATHINDA DISTRICT IN THE PUNJAB STATE

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ABSTRACT:
Background: Fluorosis is one of the common but major emerging areas of research in the tropics. It is considered endemic in 17 states of India. The objective was to find the prevalence of dental fluorosis among school children residing in Bathinda, Punjab, India. **Materials and Methods:** In total 930 school children below the age of 18 years were examined for the dental fluorosis. All the school children were residents of five villages of Bathinda district of the Punjab state. **Results:** It has been observed that 62.5% school children were affected by dental fluorosis with varying grades. The stages of children dental fluorosis were chalky white (22.7%), yellow brown blackish teeth (11.5%), horizontal streaks (28.6%), teeth with spots (25.8%). Discolouration of incisors were more prevalent followed by pre-molars and molars. **Conclusion:** Results of present study suggested that the city had a good number of cases of dental fluorosis and that the groundwater in certain areas had more than normal quantity of fluoride. Further studies with larger sample size in same area is required to substantiate results of present study.
Key words: Bathinda district, dental Fluorosis; drinking water; ground water.

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INTRODUCTION

Fluoride is one of the chemicals present in drinking water which emanates from rocks found in the ground water. Fluoride if taken in limited amounts, it can strengthen enamel and prevent cavities. In some countries like Canada, USA, Newzealand, Norway, Russia, Turkey and Venezuela, it is added to the drinking water supply. However, large amounts of fluoride ingested over time can cause disease known as fluorosis. Fluorosis manifests itself in three forms – dental, skeletal and non-skeletal. The World Health Organization (WHO) permits intake of upto 1.5 mg/l of fluoride whereas the Bureau of Indian Standards (BIS) permits 1.0 mg/l. In India, it has been estimated that 62 million people including 6 million children suffer from fluorosis due to consumption of fluoride contaminated water. The first case of endemic fluorosis in humans from India was reported by Shortt *et al*. in 1937 from the Praskasam district of Andhra Pradesh.[1]

Fluoride content of ground water in the South-Western districts of the Punjab State varies from 0.28 to 14.04 mg/l. As per safe limit of fluoride, about 60% of the total water samples collected from the arid region of the Punjab State were found unfit for drinking purposes (Kuldip Singh *et al*., 2013).[2]

In India, 62 million people including 6 million children, are estimated to have serious health problems due to consumption of fluoride contaminated water.[3]

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.[4]

The present study reports the effect of drinking water contaminated with fluoride on dental fluorosis among the children.

MATERIALS AND METHODS

This cross-sectional study was conducted to estimate the prevalence and severity of dental fluorosis among school children residing in Bathinda, Punjab, India.

Ground water is the main source of drinking water in the villages of Bathinda district of the Punjab state

which contain fluoride content with the mean value of 5.15 mg/l (Kuldip Singh *et al*., 2013).[2] Five villages of Bathinda district were selected to conduct survey on dental problems prevalent among the school children below the age of 18 years. In total 930, school children were screened for the presence of dental fluorosis with varying grades. These children were permanent residents of the villages.

Children were selected from the schools randomly who satisfied the following inclusion criteria:

- The school children in the age group of 7-18 years
- The children who were lifelong residents of that particular region and
- The children who were using groundwater as a source of drinking water from birth
- Children with teeth with at least more than 50% of the crown erupted and no restoration

Students were examined under bright natural light or under artificial light source. Type 3 examination was followed for screening of subjects. Instruments were disinfected with an antiseptic solution after every use. Single examiner performed all the examination procedure in this study so as to maintain consistency and to eliminate inter examiner bias. Recording was done by another person who assisted the examiner in recording the details. 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 AND DISCUSSION

It has been observed that children are more prone to the toxicity of high fluoride content of water. The school children of the five villages below the age of 18 years were examined for the prevalence of dental problems. It has been observed that 62.5% school children were affected by dental fluorosis with varying grades.

Subjects (n=930) were divided into five groups according to age which consisted of 520 (55.5%) males and 410 (44.5%) females. (**Table 1)**

The stages of dental fluorosis among these children were chalky white in case of 22.7% children, yellow brown teeth were observed in 28.1% children. Further, 11.5% children showed brownish black teeth. Horizontal streaks could be found in 28.6% children whereas teeth of 25.8% children showed spots. However, both spots and streaks were found among 13.7% children. **(Table 2)**

Discolouration of incisors was more prevalent followed by premolars and molars. Mild fluorosis exhibited brown pigmentation on a smooth surface whereas moderate fluorosis showed flecks on the enamel surface along with staining. The severe form of fluorosis showed pigmentation with pitting enamel surfaces.

Table 1: Distribution of sample by age and gender

GROUPS	MALES (N=520)	FEMALES (N=410)	TOTAL
Group A (8-10)	132 (14.2)	92 (10.4)	224 (24.6)
Group B (10-12)	116 (12.4)	87 (9.2)	203 (21.6)
Group C (12-14)	96 (10.2)	95 (10.4)	191 (20.6)
Group D (14-16)	92 (9.8)	77 (8.2)	169 (18.0)
Group E (16-18)	84 (8.9)	59 (6.3)	143 (15.2)
TOTAL	520 (55.5)	410(44.5)	930 (100)

Table 2: Incidence of Dental fluorosis with varying grades

Dental fluorosis with varying grades					
Chalky white	Yellow brown	Brownish black	Horizontal streak	Spots	Both spots and streaks
22.7%	28.1%	11.5%	28.6%	25.8%	13.7%

Similarly, Yadav *et al.* (2009) reported that the fraction of dental fluorosis affected children varied from 30% to 94.85% in the high fluoride villages and from 8.80% to 28.30% in the low/normal fluoride village of Jhajjar district of Haryana.[5] Their study revealed a significant positive correlation between fluoride concentration in drinking water and dental fluorosis. Likewise, there are many other reports from Haryana showing endemic fluorosis (Garg *et al*., 1998, Dahiya *et al*., 2000, 2001 and Yadav and Lata, 2002). Chakma *et al.* (1997) also reported prevalence of dental fluorosis (74.4%) among the children below the age of 20 years.[6,7,5,8]

CONCLUSION

The present study acts as a pointer to public health physicians, dentists, chemists, planners, administrators, engineers and water supply authorities.[9] The information furnished can be utilized as preliminary data, and a well-designed epidemiological investigation can be undertaken at district level to confirm and assess dental fluorosis and to evaluate the risk factors associated with the condition in the study region. Further studies in this regard are required, as the results of our study show a significant number of children affected with dental fluorosis.

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