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Prevailing Dental Fluorosis: A cross-sectional study in 12-15 year old school going children of Ambala District, Haryana, India

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ABSTRACT

Introduction: As the world of dental research is approaching the peak of development in context of preventive and curative treatment options, the concern for esthetics has gained quite an importance. Dental fluorosis is the most studied causal factor resulting in discoloration of teeth.

Aim: To determine the prevalence of dental fluorosis among 12-15 years old school going children in Ambala district.

Methodology: this cross-sectional study was conducted on 996 school going children in the age group of 12-15 years. Clinical examination included assessment of dental fluorosis using WHO criteria (1997). The data obtained were tabulated and subjected to statistical analysis using Statistical Package for Social Sciences version 20.0 (SPSS; Chicago, IL, US)

Results: Around 53.02 % of the total subjects were found to have very mild to severe fluorosis. In the present study no significant difference in the prevalence and severity of dental fluorosis was found between boys and girls. Severe form of fluorosis was only seen in 3.01 % of the total participants while fluorosis grade accounting for most number of subjects was moderate form (19.48%).

Conclusion: prevalence of dental fluorosis among 12-15 year old school going children in Ambala district was found to be high. Measures like finding an alternative source of drinking water for the affected blocks or a mass defluoridation of the drinking water before distribution have to be implemented.

Keywords: Dental Fluorosis, School going, Fluoride

INTRODUCTION

The image of perfect smile represented by regularly arranged white teeth has gained popularity in recent decades and it has become important to have teeth with no sign of abnormality. The growth of this expectation may reflect the rising values placed on aesthetics by society.[1]Many different factors can result in changes in the normal appearance of the enamel. The single most studied causal factor is fluoride, which can result in a range of clinical manifestations referred to collectively as dental fluorosis. Fluoride has been recognized as the central component in strategies to prevent dental caries- a disease that has major health, economic, and social effects on communities worldwide.[2] Though use of fluorides has been demonstrated to be one of the most successful measures in public health history, it has been seen that fluoride intake, particularly from drinking water, even in optimal levels may result in very mild to mild dental fluorosis.[3] While the evidence for the effectiveness of fluoride in the reduction of dental caries seems clear, adverse effects, particularly on tooth colour, may also have an impact since fluorosis affects people's appearance. Results of studies have demonstrated that dental fluorosis may cause dissatisfaction and feelings of unattractiveness or more general negative lay perceptions.[4]

The effect of fluoride on the dentition is dose-dependent and is not confined to increased caries resistance and that's why fluoride is known as double-edged-sword. Above certain levels of fluoride in the water supply, visible changes, particularly in the enamel become evident. This condition is known as dental fluorosis. Although being a 'late' measure of fluoride exposure, dental fluorosis is the most sensitive sign of prolonged high fluoride exposure.

The features of fluorosis cover a continuum of changes from the normal. In mildest cases, fine white lines lying parallel to the perikymata are apparent in dried enamel. In more severe cases, the fine white lines merge to produce opaque areas in the enamel which are visible in wet teeth. Occasionally such enamel may fracture after tooth eruption to give pits in the tooth surface, and the pits may become discoloured and occasionally carious. In most severe cases, much of the surface of the tooth may be discoloured and pitted, and the teeth are of displeasing appearance to many people, but such severe fluorosis is not widespread.[5]

Endemic fluorosis continues to remain a challenging national dental health problem. Over more than three decades of continuing epidemiological studies on the prevalence of endemic fluorosis indicate that million's of children's are afflicted with endemic fluorosis in India.[6]

Dental fluorosis, in mild form may result even due to optimal fluoride intake.[3] This has led to the ongoing discussion of, how to define what was seen at the time as an "optimal" dose of fluoride.[7]

People sharing similar geographic and climatic conditions living in Haryana have been exposed to drinking water with different concentrations of fluoride, ranging from as low as 2.09 mg/L to as high as 6.90 mg/L.[8,9] There is little information available about the prevalence of dental fluorosis among school children of Ambala district of Haryana. This makes Ambala an ideal place for the present study, to assess the prevalence of dental fluorosis at different concentrations of fluoride in drinking water. The aim of the present study was to determine the prevalence of dental fluorosis among 12-15 years old school going children in Ambala district.

MATERIALS AND METHOD

The present study was done to assess the dental fluorosis prevalence among 12-15 years old school going children in Ambala district (Haryana) India. Permission to examine the school children was obtained from the District Education Officer. All the required and relevant information regarding the schools and children population was obtained from District Education Office Department, Ambala and online sources.[10,11]

Based on school going population of the concerned age group, the sample size was determined to be 996. Children in the age group of 12-15 years from the selected schools who were present on the day of examination were included in the study. Handicapped children, those on long term medication, those undergoing orthodontic treatment and not willing to participate in the study were excluded. Consent was taken from the school authorities as well as parents/guardians of all study subjects. The armamentarium included mouth mirrors, tweezers, kidney tray, disposable gloves and face masks, sterile cotton rolls, data recording sheets and pencils. The Proforma including the children's demographic details, Dental Fluorosis (WHO 1997)[12] were recorded.

STATISTICAL ANALYSIS

The data obtained were tabulated and subjected to statistical analysis using Statistical Package for Social Sciences version 20.0 (SPSS; Chicago, IL, US) Descriptive statistical analysis has been carried out in the present study to assess prevalence of dental fluorosis. Results for categorical measurements were presented in Number (%). Chi square test was used to find association between different study variables.

RESULTS

Table 1 shows the distribution of study subjects according to gender. Study population consisted of 996 children, of which 438 (43.98 %) were females and 558 (56.02 %) were males.

Table 2 shows the distribution of study subjects according to age. Based on the age, study population belonging to 12 year, 13 year, 14 year and 15 year consisted of 201 (125 females; 76 males), 250 (135 females; 115 males), 273 (114 females; 159 males) and 272 (64 females; 208 males) subjects respectively.

Table 3 depicts the prevalence of dental fluorosis according to gender wise distribution of subjects. Normal tooth appearance was seen in 43.57% of subjects. Subjects with questionable and severe fluorosis accounted only for 3.41% and 3.01% of the total subjects, respectively. Subjects with

moderate fluorosis were found to be highest in number (19.48%) followed by those suffering from mild fluorosis (19.01%).

DISCUSSION

The present study was attempted to explore the dental fluorosis prevalence among school going children of Ambala district, Haryana. India. The execution of epidemiological studies and dissemination of data such as that of present study seek to advocate that different strategies need to be planned for the improvement of oral health status of the population. To this extent, the findings of the present study provide the basis for the assessment of treatment needs and development of preventive dental health care strategies. Younger age groups, perhaps have the most to gain from the effective new strategies since they are likely to suffer greater dental disease in future unless effective self-care preventive measures-in the narrower sense are not used. Moreover younger individuals perceive oral health as having a greater impact on their life quality than older people. Children of both genders were considered, to take into account the gender differences in context to dental fluorosis. In the present study, schoolchildren from both government and private schools were included in order to have subjects from all the social, economic and cultural backgrounds.

Out of the total subjects, 43.57 % did not show any sign of fluorosis. Dental fluorosis was questionable in 3.41% of the subjects. Around 53.02 % of the subjects were seen to have very mild to severe fluorosis. This could be due to the fact that in Haryana, the groundwater concentration of fluoride has been reported to be high (2.09 -6.90 mg/l)[8,9] as compared to permissible limit of 1.0 mg/l (WHO 1971).[13]

These findings were in line with those reported by Prabhu D et al (2013) ,[14] Yadav RK et al (2012)[15] and Yadav JP et al (2003)[16]. However, the prevalence of dental fluorosis reported by Singh A et al. (2013),[17] Ragini M et al. (2013)[18] and Baskardoss JK et al. (2008)[19] was not in concordance with our results. There may be two possible assumptions behind this observation, first one as originally suggested by Galagan and Lamson, that there is a positive association between mean annual temperature and total fluoride intake.[20] Secondly, the widely differing prevalence may be due to age group and gender taken for the study, uniformity of selection of the sample, area selected and the methodology used for the survey.

In the present study no significant difference in the prevalence and severity of dental fluorosis has been found between boys and girls. These findings were similar to the findings of study conducted by Gladys NO et al. (1991),[21] Na'ang'a PM et al. (1990),[22] Rwenyonyi CM et al. (1999)[23] and Hamdan MAM (2003).[24] On the contrary, studies conducted by Ragini M et al (2013)[18] and Nirgude A et al (2010),[25] showed a statistically significant difference in dental fluorosis prevalence between the genders with girls accounting for higher prevalence.

Information regarding source of drinking water; liquids they routinely consumed, other than water; oral hygiene aids used was not collected, although these are the important confounding factors for dental fluorosis. This was the major limitation of our study.

High fluoride content in drinking water is the main reason for dental fluorosis in Ambala district. Measures like finding an alternative source of drinking water for the affected blocks or a mass defluoridation of the drinking water before distribution have to be implemented. Creating public awareness on the various home defluoridation techniques is also equally important. This requires the synergistic action of health planners, health administrators, and water supply authorities.

CONCLUSION

This study assessed the prevalence of dental fluorosis among 12-15 year old school going children in Ambala district which was found to be high. Factors related to prevalence and severity of fluorosis need to be studied. Further investigation on the possible variables which may explain the unexpected susceptibility of various populations to the effect of low level of fluoride is needed to be done. Ground water should routinely be analyzed for fluoride levels especially in rural areas. It can be concluded that Dental fluorosis is a public health problem in the study area, therefore active

steps need to be taken to change or modify the drinking water supplies in the Ambala district of Haryana.

REFERENCES

1. Alkhatib MN, Holt R, Bedi R. Aesthetically objectionable fluorosis in the united kingdom. Br Dent J 2004;197(6):325-8. 30
2. John J. Clarkson , Kevin Hardwick ,David Barmes ,Linda M Richardson. International collaborative research on fluoride, J Dent Res 2000;79(4):893-904.
3. Rozier RG. The prevalence and severity of enamel fluorosis in North American children. J Public Health Dent 1999;59:239-246.
4. Van Palenstein, Helderman WHV, Mksasabuni E. Impact of dental fluorosis on the perception of well-being in an endemic fluorosis area in Tanzania. Community Dent Oral Epidemiol 1993;21:243-4.
5. Riordan PJ. perceptions of dental fluorosis. J Dent Res 1993;72(9):1268-74.
6. Teotia M, Teotia SPS and Singh KP. Endemic chronic fluoride toxicity and dietary calcium deficiency interaction syndromes of metabolic bone disease and deformities in India. Year 2000, Indian J Pediatr 1998;65:371-81.
7. Fejerskov O, Jan Ekstrand, Brian A Burt. Fluorides in Dentistry. Second edition. Munksgaard Text book: 1996.
8. Bishnoi M, Arora S. Potable groundwater quality in some villages of Haryana, India: Focus on fluoride. Journal of Environmental Biology. 2007; 28(2): 291-4.
9. Meenakshi, Garg VK, Kavita, Renuka, Malik A. Groundwater quality in some villages of Haryana, India: Focus on fluoride and fluorosis. J. Hazrdous Matr.2004; 106(1): 85-97.
10. National Informatics Centre, Ambala. List of schools of District Ambala. Avalilable from http://ambala.nic.in/ambala-schools.html. Last assessed in January,2017.
11. Datanet India Pvt. Ltd. District Education Stat. Available from: *http://www.districteducationstat.com/haryana/ambala/index.aspx.* Last assessed on January,2017.
12. World Health Organisation. Oral health surveys- Basic methods. 4th edition. Geneva: WHO, 1987.
13. World Health Organisation. International standards for drinking water. 3rd Ed. Geneva: WHO, 1971.
14. Prabu D, John J, Saravanan S .Impact of Dental Caries and Dental Fluorosis on the Quality of Life of 12- year old Children in Tamil Nadu, India. Chettinad Health City Medical Journal.2013;2(3):74-79.
15. Yadav RK , Gautam R, Saini Y, Singh A. Endemic Dental Fluorosis and Associated Risk Factors in Dausa District, Rajasthan (India). World Appl Sci J 2012; 16 (1): 30-3.
16. Yadav JP, Lata S. Urinary fluoride levels and prevalence of dental fluorosis in children of Jhajjar district, Haryana. Ind J Med Sci Vol 2003; 57 (9):394-9.
17. Singh A, Laura JS, Rana A. Fluoride distribution in groundwater and prevalence of dental fluorosis among school children in villages of Jind district, Haryana (India). Int J Curr Res 2013; 5(4): 998-1002.
18. Ragini M, Varsha D, Jaya K, Rashmi U. Fluoride distribution in drinking water and dental fluorosis in children residing in Chandrapur District of Maharashtra. Int J Life Sci 2013 ; 1(3): 202-6.
19. Baskaradoss JK, Clement RB, Narayanan A. Prevalence of dental fluorosis and associated risk factors in 11–15 year old school children of Kanyakumari District, Tamilnadu, India: A cross sectional survey. Indian J Dent Res 2008; 19(4): 297-303.
20. Galgan DJ, Lamsan GG. Climate and dental fluorosis. Publ Health Rep, Wash. 1953;68:497-508.
21. Gladys NO, Valderhaug J, Birkeland JM, Lokken P. Fluorosis of deciduous teeth and first permanent molars in rural Kenya community. Acta Odontol Scand 1991;49:197-202.
22. Na'ang'a PM, Valderhaug J. Prevalence and severity of dental fluorosis in primary schoolchildren in Nairobi, Kenya. Community Dent Oral Epidemiol 1993;21:15-8.
23. Rwenyonyi CM, Bjorvatn K, Birkeland JM, Haugejorden O. Altitude as a risk indicator of dental fluorosis in children resideng in areas with 0.5 and 2.5 mg fluoride per liter in drinking water. Caries Res 1999;33:267-74.

24. Hamdan MAM. The prevalence and severity of dental fluorosis among 12year old schoolchildren in Jordan. Int J of Paediatr Dent 2003;13:85-92.
25. Nirgude A, Saiprasad GS, Naik PR and Mohanty S.An Epidemological study on fluorosis in an urban slum area of Nalgonda, Andhra Pradesh, India. Indian Journal of Public Health 2010; 54 (4): 194-6.

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LEGENDS

Gender	No. of subjects(n)	Percentage (%)
Females	438	43.98
Males	558	56.02
Total	**996**	**100**

Table 1. Distribution of study subjects according to gender

Age(Years)	No. of subjects(n)	Females(n)	Males(n)	Percentage (%)
12	201	125	76	20.18
13	250	135	115	25.10
14	273	114	159	27.41
15	272	64	208	27.31
Total	**996**	**438**	**558**	**100**

Table 2. Distribution of study subjects according to age

Dental Fluorosis (Grades)	Gender		N (%)
	Females	Males	
0 (normal)	219	215	434 (43.57)
1 (questionable)	14	20	34 (3.41)
2 (very mild)	45	69	114 (11.45)
3 (mild)	80	110	190 (19.08)
4 (moderate)	65	129	194 (19.48)
5 (severe)	15	15	30 (3.01)
Total	**438**	**558**	**996 (100)**

Table 3. Prevalence of dental fluorosis according to gender wise distribution of subjects