



Evaluation of Severity of Dental Fluorosis in Patients Attending Dental OPD - A Multicentric Prospective Study

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Abstract

Objective: To evaluate incidence and grade of dental fluorosis and associated risk factors.

Material & Methods: Present prospective study was conducted on 246 patients who presented with dental problem over a period of 2 year.

Results & Discussion: Out of total 246 patients, 116 were male and 130 were females. Of them, 102,87 &57 belonged to the age groups of <20,20-40 &>40 years, respectively. Dental fluorosis was less in rural than urban areas. Majority were in the category of 'Mild fluorosis'

Conclusion: The prevalence of dental fluorosis was high in age <20 years. Also it was higher in people who consumed pipe water, compared to those consuming ground water. There existed a positive association between dental fluorosis and source of drinking water.

Keywords- Dental Fluorosis, Dean's Index, Oral health hazard, Severit

INTRODUCTION

Dental fluorosis is one of the common and major public Health problems in India. The problem has reached alarming proportions affecting at least 18 States in India. There are 50-60% districts affected in Andhra Pradesh, Telangana, Tamil Nadu, Uttar

Pradesh, Gujarat, Rajasthan and 30-50 % districts in Bihar, Haryana, Karnataka, Maharashtra, Chhattisgarh, Madhya Pradesh, Punjab, Orissa, West Bengal and less than 30 % districts in Jammu and Kashmir, Delhi, and Kerala^[1] It is due to variable amount of fluoride content in ground water

leading to an increase in the prevalence of fluorosis over the last 50 years.^[2] Nearly 12 million of the 85 million tons of fluoride deposits on the earth's crust are found in India.^[3,4] About 62 million people in India suffer from dental, skeletal and non-skeletal fluorosis. Out of these; 6 million are children below the age of 14 years ie, the period of greatest susceptibility being at the time of mineralization of permanent teeth.^[5]

Fluoride is known for its toxic effect in drinking water and fluoride concentration in drinking water up to 1.0 mg/l is beneficial for the human but beyond 1.0 mg/l is deleterious to health causing dental and skeletal fluorosis.^[6]

Dental fluorosis due to its cosmetic effect gains more public health importance today. Hence present study was undertaken to evaluate Severity of dental fluorosis in patients attending dental OPD.

MATERIAL & METHODS

Present study was conducted in three dental hospital Tapadia Dental hospital Nagpur, Jain Dental Hospital Nagpur & Chhattisgarh Dental College & Research Institute, Rajnandgaon. It was a prospective study conducted on 246 patients who were presented with dental problem to the outpatient department from July 2013 to July 2015.

Inclusion Criteria:

- All age group presented with dental problem related to fluorosis.

Exclusion Criteria:

- Refusal for participation in study
- H/o tobacco chewing, smoking.

All patients were informed in detail about aim, objectives of study and written consent was taken. A detailed history was obtained regarding age, socioeconomic status, location, source of water, amount of water intake, frequency of brushing & duration of dental problem. A thorough clinical examination was done. Intra oral examination was carried out using the mouth mirror in natural day light for assessing the presence of Dental caries. Status of each patients was also recorded using decayed, missing & filled tooth (DMFT), enamel mottling and severity of dental fluorosis was

recorded using Dean's Index on the WHO modified oral health assessment form.^{[7-10].}

This index for assessment of dental fluorosis using a six point scale was developed by Trendley H. Dean.^[7]

Each tooth was rated according to Dean's index, and the individual's dental fluorosis score was calculated based on the severest form recorded for two or more teeth .Data collected and analyzed.

Deans fluorosis index Criteria

Classification	Criteria
Normal (0)	The enamel represents the usual translucent semi-vitriform type of structure. The surface is smooth, glossy, & usually of pale, creamy white color.
Questionable (0.5)	Enamel discloses slight aberrations from normal translucency to few flecks to occasional white spots.
Very mild (1)	Small, opaque, paper white areas scattered irregularly over the tooth, but not involving as much as approximately 25% of tooth surface.
Mild (2)	The white opaque areas in the enamel of teeth are more extensive, but do not involve as much as 50% of tooth.
Moderate (3)	All enamel surfaces of the teeth are affected and surfaces subject to attrition show wear. Brown stain is frequently a disfiguring feature.
Severe (4)	All enamel surfaces of the tooth are affected and hypoplasia is so marked that the general form of the tooth may be affected. There is discrete pitting of the affected tooth. Brown stains are widespread and teeth often present a corroded-like appearance

RESULTS & DISCUSSION

A total of 246 patients were included in the study.

Table -1 Distribution of patients according to Age (N=246)

S.No	Age (years)	Number of patients	Percentage (%)
1	<20	102	41.47%
2	20-40	87	35.36%
3	>40	57	23.17%

The present study showed maximum incidence of fluorosis was below 20 year which is similar to study by [2]. The important reasons that can explain this is that fluoride crosses placental barrier and affect developing primary teeth most of the mineralization occurs in the intrauterine phase and most of the teeth are deciduous in the age group of 5 years.^[11] Other reasons being thinner enamel of primary teeth as compared to permanent teeth^[12] and the fluoride gets absorbed more rapidly in growing foetus and are less available for primary teeth.^[13] On the contrary, the greater physical size, activity and kind of nutrients intake lead to a higher intake of water, hence a higher prevalence in older age groups.^[14]

Table -2 Distribution according to Demographic profile

S.No	Demographic Data		Number of patients (N=246)	Percentage (%)
1	Gender	Male Female	116 130	47.15% 52.85%
2	Locality*	Urban Rural	167 79	67.88% 32.12%
3	Source of Water*	Pipe Borewell Drawwell	141 64 41	57.32% 26.02% 16.66%
4	Consumption of water llass/day*	Up to 5 6-9 >10	57 109 80	23.17% 44.31% 32.52%
5	Frequency of brushing	1 >1	234 12	95.12% 4.88%

*Significant $p < .05$

There was no significant difference in incidence between male & female. Which was not consistent with the results of other studies conducted in Kerala, where higher prevalence was reported among girls^[2]. There was significant differences in the incidence of dental fluorosis in rural & urban which is similar to study by [2]. The reason could be In the early years, in rural areas, the major source of drinking water was surface water-pond and well water- and in urban areas pipe water. The improvisation of water supply facilities, both in the rural and urban areas, with the initiative of local bodies, has led to wide spread dependence on pipe

water, for drinking purpose. Pipe water was the single most independent risk factor for dental fluorosis when association between water fluoride level and severity of dental fluorosis was considered for review.

There was a positive association between dental fluorosis and source of water (P value < 0.05) Ninety five percent reported that they brushed their teeth only once, these findings were consistent with study done done by [15]

Table-3 Distribution of patients according to severity of Fluorosis (N=246)

S.No	Severity of Dental Fluorosis	Number of patients	Percentage (%)
1	Normal (0)	19	7.72%
2	Questionable (0.5)	24	9.76%
3	Very mild (1)	66	26.83%
4	Mild (2)	64	26.01%
5	Moderate (3)	52	21.14%
6	Severe (4)	21	8.54%

The overall prevalence of dental fluorosis was found to be comparable with studies done by Saravanan S et al [10] and Mane AB et [15]. It was also observed that grade III and IV categories had caused discolouration of teeth, that is enamel hypoplasia probably occurred due to the consumption of water containing high level fluoride.



Fig.1. Mild Dental Fluorosis



Fig.2..Moderate Dental Fluorosis



Fig 3.Severe Dental Fluorosis

CONCLUSIONS

Dental fluorosis is the most convenient biomarker of exposure to fluoride. Compared to rural areas, the prevalence was higher in urban areas. There is an urgent need to improve the quality of water and institute defluoridation of drinking water in affected areas to limit and control the problems and health education to be imparted to people to use the same.

FUTURE SCOPE

As the major risk factor in the development of dental fluorosis is drinking water, larger-scale study are required to confirm the findings of present study.

It is also recommended that further study to be undertaken on fluoride intake from other sources like toothpaste, tea and diet in these areas because different culture, customs and dietary habits and patterns were observed during the study.

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REFERENCES

1. Dental Council of India. National oral health survey and fluoride mapping 2002-2003 Kerala. Dental Council of India: New Delhi;2004.9-267 .
2. Gopalakrishnan P, Vasan RS, Sarma PS, Nair KS, Thankappan KR.Prevalence of dental fluorosis and associated risk factors in Alappuzha district, Kerala. Natl Med J India 1999;12:99-103.
3. World Health Organization. Fluorides and Oral Health. WHO technical report series 846. Geneva: WHO; 1994.
4. Baskaradoss JK, Clement RB, Narayanan A. Prevalence of dental fluorosis and associated risk factors in 11-15 year old school children of Kanyakumari District Tamil Nadu, India: A cross sectional survey.Indian J Dent Res 2008;19:297-303.
5. Susheela AK. A Treatise on Fluorosis. New Delhi: Fluorosis Research and Rural Development Foundation; 2001.
6. Madhvan K. Studies on water quality problems of water quality problems of Alappuzha 2010.
7. Dental Fluorosis Classification Criteria. Fluoride Action Network.Available from <http://www.fluoridealert.org/health/teeth/fluorosis/criteria.html> [Last accessed on 2012 Jun 04].
8. Sharma SK. High fluoride in groundwater cripples life in parts of India. Diffuse Pollution Conference Dublin 2003. [9]. Water Supply in Himachal. Available from: <http://hpplanning.nic.in/Drinking%20Water%20Supply%20in%20Himachal%20Pradesh.pdf>. [Last accessed on 2012 Jun 22].
9. Water Supply in Himachal. Available from: <http://hpplanning.nic.in/Drinking%20Water%20Supply%20in%20Himachal%20Pradesh.pdf>. [Last accessed on 2012 Jun 22].

10. Saravanan S, Kalyani C, Vijayarani MP, Jayakodi P, Felix AJ, Nagarajan S, et al. Prevalence of dental fluorosis among primary school children in rural areas of Chidambaram Taluk, Cuddalore District, Tamil Nadu, India. *Indian J Community Med* 2008;33:146-50.
11. Feltman R, Kosel G. Prenatal ingestion of fluorides and their transfer to the foetus. *Science* 1955;122:560-1.
12. Thylstrup A. Distribution of dental fluorosis in the primary dentition. *Community Dent Oral Epidemiol* 1978;6:329-37.
13. Thaper R, Tewari A, Chawla HS, Sachdev V. Prevalence and severity of dental fluorosis in primary and permanent teeth at varying fluoride levels. *J Indian Soc Pedo Prev Dent* 1989;7:38-45.
14. Nanda RS. Observations on fluoride intake in Lucknow. *J Indian Dent Assoc* 1972;44:177-81.
15. [Mane AB, Revathi S, Savale PG, Paul CN, Heremath SG. Study of dental fluorosis among primary school children residing in a rural area of Raichur District, Karnataka. *Int J Biol Med Res.* 2011;2(3):716-20.