Research Paper	Zoology

PREVALENCE OF DENTAL FLUOROSIS IN CHIMUR TEHSIL OF CHANDRAPUR DISTRICT

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KEYWORDS :

INTRODUCTION
The excess consumption of fluoride through drinking water causes a disease known as fluorosis which has been observed in many parts of world where drinking water contain excessive amount of fluoride including India. The primary manifestation of fluorosis is mottling of teeth and osteoscerosis of skeleton, secondary effects include damage to non-skeletal tissues in humans and animals. Dental fluorosis is characterized by lusterless, opaque white, patches in the enamel which may become stained yellow to dark brown and in severe forms cause marked pitting and brittleness of teeth (Nirgude et al, 2010). Dental fluorosis, in school students was used as a marker to identify the endemic village in the district. This is less expensive, less time consuming procedure to identify endemicity. Some studies have been reported in different part of Maharashtra (Somvanshi *et al*., 1990 and Babu et al., 2004) and particularly in Chandrapur district affected by high fluoride in drinking water (Kamble *et al*., 2010 ; Dhawas et al., 2012 and Dhurvey and Dhawas, 2013). The primary work has been reported on water analysis in the study area but no substantial work has been done on dental fluorosis and evaluating the risk factor associated with the condition. Therefore the present study was carried out to evaluate the toxic effect of fluoride on human teeth among the population of Dongargaon, Pijdura and Chikni of Warora tehsil of Chandrapur district of Maharashtra.

AIMS AND OBJECTIVE
To find out the fluoride concentration and prevalence of dental fluorosis in study area.

METHODOLOGY
Study area
Chimur tehsil, Chandrapur district, Maharashtra, India. The present study was carried out during May 2010 to December 2011 in two villages which were randomly selected from Chimur tehsil of Chandrapur district, India which is one of the endemic district of Maharashtra, India. The climate of the area is extreme type. The summer is very hot and winter is very cool and pleasant. The average annual rainfall is about 1420 mm.

Collection of water samples and analysis
8 water samples were collected from all the available ground water sources to assess the fluoride ion concentration. Fluoride ion concentrations were measured with an ion analyzer. The main sources of drinking water in these villages are dug wells and bore wells.

Selection of sample
The villages comprise 1016 individuals in various age groups which were selected. A door to door approach with face to face interviews was carried out. All the households in two villages were enumerated and a list was made. There were 216 households and this firmed the sampling frame. The clinical examination was carried out at the ground of school in the morning. Each student was examined by a team of research students and dentist under the natural and bright sunlight. No dental instrument (mirror, explorer) was used. The Dean's Index recommended by WHO was used for diagnosis of dental fluorosis (Table 1). As a result a study population of 304 persons was yielded.

Before start the study the ethical permission was taken from the department of ethical committee. After explaining the purpose of

the visits and camps, data was collected by one of the two authors of the study. Informed consent was taken from the study subjects or from the parents in case of children. A questionnaire was designed to collect information regarding names, sex, age, duration of stay and drinking water source.

RESULTS AND DISCUSSION
In the two villages of our study area the range of fluoride concentration of the presently available ground water sources was estimated to be 1.48 – 2.01 mg/l (Table. 2).

Out of 304 study subjects, 146 (48.02%) males and 158 (51.97%) were females. According to age wise division 55 belonging to the age group 2-6 years, 83, 118 and 48 to the age group of 7-12, 13-16 and 17-21 years respectively (Table. 3 and 4).

Clinical symptoms of dental fluorosis patients from study area like plaque formation, yellow and black brown stained teeth with marked pitting were high among population with different grades like mild, moderate and severe dental fluorosis (Fig. 1- 4 and Table. 5).

It was observed that 205 persons out of 304 (100%) study subjects were found to be suffering from dental fluorosis with a prevalence of 67.43%. The prevalence of dental fluorosis increased with age and this association was found to be statistically significant (p<0.05) (Table. 6).

Female fluorosis cases 113 (71.51%) were more than male fluorosis cases 92 (63.01%), higher percentage of females suffered from dental fluorosis. Prevalence of dental fluorosis was more prevalent among females than the males and this association was also found to be statistically significant. Females outnumbered the males in distribution of dental fluorosis cases (p<0.01) (Table. 7).

DISCUSSION
The present results revealed that the fluoride concentration in the drinking water of the study area was found in the range of 1.48-2.01 mg/l. Shashi et al., (2008) shown that in three endemic villages of Punjab the fluoride concentration ranges from 3-22.5 mg/l. Narwaria and Saksena, (2013) observed that in all ten villages of Karera block in Madhya Pradesh the fluoride concentration was found 1.65 mg/l in Hazinagar and 3.91 mg/l in Dumduma village.

In the present study on dental fluorosis in endemic villages of Chimur tehsil of Chandrapur district, it was observed that females (51.97%) formed majority of the study population as compared to males. Nirgude et al., (2010) and Dhawas et al., (2012) reported a similar finding in Nalgonda and Chandrapur districts of Andhra Pradesh and Maharashtra respectively.

In the present clinical examination it was seen that on the basis of clinical symptoms, the dental fluorosis was observed with the various grades of discolouration of teeth ranging from chalky white to yellow and brown with pitting. This differences being attributed of fluoride content of drinking water. Similar findings were reported by Susheela, (2005).

In the present finding the overall prevalence of dental fluorosis cases was found to be (67.43%). A similar result of 81.7% of dental fluorosis in Mexico was reported by Medina- Solis et al., (2008) and Sudhir et

al., (2009) recorded 100 % prevalence among the school students of similar age groups in Nalgonda district of Andhra Pradesh. Also, lower prevalence of 4.1% was recorded in primary school children in Northen Hilly state of India (Chauhan et al., 2012).

The prevalence of dental fluorosis was found increasing with the age and this association was found to be statistically significant by Chi-square test (P < 0.05). The same was reported in the other studies conducted in the area of Chidambaram Taluka of Cuddalore district of Tamil Nadu (Sarvanan et al., 2008).

The dental fluorosis was more prevalent among females (71.51%) than males and this association was also found to be statistically significant by Chi-square test. The similar result was reported by Nirgude *et al.,*(2010) in Nalgonda district of Andhra Pradesh, Singh *et al.,* (2011) in Brabanki district of Uttar Pradesh, Chauhan et al., (2012) in a Northern hilly state of India, Ramezani et al., (2004) in Iran and by Saravanan et al., (2008) in Tamil Nadu. This is, perhaps, the first report in dental fluorosis in Chimur tehsil of Chandrapur district of Maharashtra.

Table. 1 Criteria for Dean's Fluorosis Index (DFI)

Score	Criteria
Normal	The enamel represents the usual translucent semivitriform type of structure. The surface is smooth, glossy, and usually of a pale creamy white color.
Questionable	The enamel discloses slight aberrations from the translucency of normal enamel, ranging from a few white flecks to occasional white spots. This classification is utilized in those instances where a definite diagnosis of the mildest form of fluorosis is not warranted and a classification of "normal" is not justified.
Very Mild	Small opaque, paper white areas scattered irregularly over the tooth but not involving as much as 25% of the tooth surface. Frequently included in this classification are teeth showing no more than about 1-2 mm of white opacity at the tip of the summit of the cusps of the bicuspids or second molars.
Mild	The white opaque areas in the enamel of the teeth are more extensive but do not involve as much as 50% of the tooth.
Moderate	All enamel surfaces of the teeth are affected, and the surfaces subject to attrition show wear. Brown stain is frequently a disfiguring feature.
Severe	Includes teeth formerly classified as "moderately severe and severe." All enamel surfaces are affected and hypoplasia is so marked that the general form of the tooth may be affected. The major diagnostic sign of this classification is discrete or confluent pitting. Brown stains are widespread and teeth often present a corrodiled appearance.

Source : Dean 1942. As reproduced in Health Effect of Ingested Fluoride. National Academy of Science

Table. 2 Concentration of fluoride in drinking water sorces of study area

S. N.	Villages	Sources	F Concentration
1	Doma	Dugwell	1.68
2	Doma	Borewell	1.56
3	Doma	Dugwell	1.98
4	Doma	Dugwell	2.01
5	Siwara	Borewell	1.48
6	Siwara	Dugwell	1.69
7	Siwara	Borewell	2.00
8	Siwara	Dugwell	1.58

Table. 3 Total number of examinees of study area

S. N.	Villages	Number of Households	Number of Examinees
1	Doma	118 (54.62%)	168 (55.26%)
2	Siwara	98 (45.37%)	136 (44.73%)
	Total	216 (100%)	304 (100%)

Table. 4 Distribution of examinees by age and sex

S. N.	Age Groups (Years)	Total
1	2-6	55 (18.09%)
2	7-12	83 (27.30%)
3	13-16	118 (38.81%)
4	17-21	48 (15.78%)
	Sex	
1	Male	146 (48.02%)
2	Female	158 (51.97%)
	Total	304 (100%)

Table. 5 Prevalence of dental fluorosis according to grade

S. N.	Grade	Number of Cases
1	Very mild	53 (25.98%)
2	Mild	67 (32.84%)
3	Moderate	40 (19.60%)
4	Severe	45 (22.05%)
	Total	204 (100%)

Table. 6 Prevalence of dental fluorosis according to age

S. N.	Age Group	Dental Fluorosis	No Symptoms	Total
1	2-6	19 (34.54%)	36 (65.46%)	55 (100%)
2	7-12	67 (80.72%)	16 (19.28%)	83 (100%)
3	13-16	93 (78.81%)	25 (21.19%)	118 (100%)
4	17-21	25 (52.08%)	23 (48.92%)	48 (100%)
	Total	205 (67.43%)	99 (32.56%)	304 (100%)

$\chi 2 = 12.60; df = 3; p<0.01$

Table. 7 Prevalence of dental fluorosis according to sex

S. N.	Sex	Dental Fluorosis	No Symptoms	Total
1	Male	92 (63.01%)	54 (36.98%)	146 (100%)
2	Female	113 (71.51%)	45 (28.48%)	158 (100%)
	Total	205 (67.43%)	99 (32.56%)	304 100%)

$\chi 2= 2.88, df=1, p<0.05$

REFERENCES   Babu, P., Gonade, G., Bhai, H. Y. and Sinha, M. (2004). Fluoride contamination in groundwater in Ghatanji taluka, Yavatmal district Maharashtra. Proceedings of the Workshop on Medical Geology IGCP-454. Geological Survey of India. 96-101. | Chauhan D., Chauhan T., Sachdev V. and Kirtaniya B. C., A study of prevalence andseverity of dental fluorosis among school children in a Northern hilly state of India, J. Res. Den. Sci.,3(3), 170-174, (2012). | Dhawas, S., V. Dhurvey, J. Kodate, and R. Urkude, An epidemiological study of skeletal fluorosis in some villages of Chandrapur district, Maharashtra,India, JERAD, 7,2013, 1679-1683. | Dhurvey, V and Dhawas, S. Skeletal Fluorosis In Relation To Drinking Water, Nutritional Status And Living Habits In Rural Areas Of Maharashtra, India(2014) JESTFT 8 (1), 63-67. | Kamble, N. A. and Velhal, V. V. (2010). Study of sodium fluoride toxicity on hematological parameter of Rattus norvegicus. Biol. Forum-An Inter. J. 2(2) : 56-58. | Medina- Solis C.E., Pontigo Loyola A.P., Maupome G., Lamadrid Figueroa H., Loyola- Rodriguez J.P., Hernandez- Romano J.,Villalobas- Roledo J.J. and Marquez- Corona M.L., Dental fluorosis prevalence and severity using Dean's Index based on six teeth and on 28 teeth. Clin Oral Invest., 12(1), 197-202, (2008). | Narwaria, Y. S. and Saksena, D. N. (2012). Incidence of dental fluorosis in domestic animals of Shivpuri, Madhya Pradesh, India. J. Environ. Res. Devel. 7(1A) : 426-430. | Nirgude, A. S., Saiprasad, G. S., Naik, P. R. and Mohanty, S. (2010). An epidemiological study on fluorosis in an Urban Slum area of Nalgonda, Andhra Pradesh, India. Ind. J. Pub. Health. 54(4) : 194-196. | Ramezani G.H.H., Valaei N. and Eikani H., Prevalence of DMFT and fluorosis in the students of Dayer city (Iran). J. Ind. Soc. Pedo Dent., 22(2), 49-53, (2004). | Saravanan S., Kalyani C., Vijaayarani M.P., Jayakodi P., Felix A.J.W., Nagarjan S., Arunmozhi P. and Krishnan V., Prevalence of dental fluorosis among primary school children in rural area of Chidambaram Taluka, CuddaloreDistric, Tamil Nadu, India, Ind. J. Comm. Med., 33(3), 146-150, (2008). | Shashi, A., Kumar, M. and Bhardwaj, M. (2008). Incidence of skeletal deformities in endemic fluorosis. Trop. Doct. 38 : 231-233. | Somvanshi PR, Chaubey BS, Phadake RV and Sakharde PM (1990) Fluorosis in Maharashtra. J. Asso. Physicians of India, 38(3):217-219. | Sudhir K.M., Prashant G.M., Subba Reddy V.V., Mohandas U. and Chandu G. Prevalence and severity of dental fluorosis among 13-15 year old school children of an Area known for endemic fluorosis : Nagalanda district of Andhra Pradesh. Ind. Soci. Pendo. Prev. Den., 27(4), 190-196, (2009). | Susheela AK (2005) An easily preventable disease through practice and intervention: New Delhi: Fluorosis Research & Rural Development Foundation. 10.