

## DENTAL FLUOROSIS IN GROUND WATER OF JAMANGHATI VILLAGE OF DHAR DISTRICT (M.P)

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**Abstract:** The present study was carried out to evaluate the extent of Fluoride in ground water of Jamanghati in Dhar District. With special reference to the level of Fluoride concentration in water and its impact on the health of the people which is causing Dental Fluorosis. During the survey in the study area, it has been reported that many people in the study area were suffering from Dental problems. For the prevalence of Dental Fluorosis water sample was taken from the study area for quality analysis. The physico-chemical parameters of water samples were analyzed and presented degree of severing of Dental fluorosis was measured.

**Keywords:** Dental fluorosis , Dhar district, Ground water, Madhya Pradesh.

**Introduction:** Optimum amount of Fluoride is necessary in food and water but excess amount of Fluoride intake can cause dental and skeletal fluorosis. Some cases of Dental Fluorosis were reported from Jamanghati Village of Dhar District which emphasized to diagnose the causes. Ground Water Samples were collected from different area within the different month and analyzed.. Fluoride is a normal constituent in natural water samples. Its concentration though varies significantly depending on the water source. The Fluoride is found in both surface water and groundwater. As fluorine is highly reactive, it generally occurs in combination with other elements viz. calcium, copper, lead, phosphorous etc. as Fluorides [11].

Permissible limit of Fluoride is often based on the Fluoride content of drinking water. The amount of Fluoride that is permissible for tropical countries is quite different from the amount that is permissible for temperate countries where temperature is in cold/milder range. In India the permissible limit of Fluoride as per ISI is 1.0-1.5ppm and as per I.C.M.R. 1.0-2.0 ppm. According to WHO standards, the Fluoride in drinking water should be within a range that slightly varies above and below 1 mg/l. [13]

In India, the states of Andhra Pradesh [17], [18], [14] Bihar,[8] Chhattisgarh, Haryana, Punjab, [19], [10] Karnataka [22] Madhya Pradesh,[1] Maharashtra,[2] Orissa, Rajasthan, Tamil Nadu, [4]Uttar Pradesh, [15] Hyderabad [12] Kerala and Lakshadweep, [16] are affected by Fluoride contamination in water. This involves about 9000 villages affecting 30 million people [5].

**Material and Method:** Ground Water quality monitoring is being carried out through analysis of ground water samples collected mostly from the dug wells tapping the phreatic aquifers. The samples are analyzed for the major cations and anions for evaluating the ground water quality and its suitability for various uses [7].

**Study area:** Jamanghati village comes under the Dhar district. The village is surrounded by the hills of Vindhya series and situated under the depth of Mandu and it is known as Mandu tarai. It lies between area point 127 and 750 hector respectively. The weather is generally dry expected in the summer. The populations of village were 504 out of which 253 male and 251 were female. The people of the village use ground water for drinking and cultivation purpose.

The water sample was collected from different area of Jamanghati, mentioned above on monthly basis for physico-chemical analysis.

Primary surveys of Jamanghati were conducted for the purpose of dental and other deformities. Ground water sample from study sites was examined for Fluoride content where the population was severely affected by fluorosis. Dental, skeletal and other deformations of bones in children as well as adult were observed in the study area indicating the consequences to excess fluoride concentration.

The assessment of dental fluorosis is particularly important in area where the natural fluoride content of water supply is high. For reorganization dental fluorosis has been divided into 5 categories.

- a) Normal
- b) Questionable
- c) Mild
- d) Moderate
- e) Severe

**a. Normal:** - The enamel presents the usual translucent semi vitriform type of structure. The surface is smoothing, glossy and usually of a pale, creamy white color.

**b. Questionable:** - The enamel discloses slight abbreviations from translucency of normal enamel ranging from white flecks to occasional white spots.

**c. Mild:**-The white opaque areas in the enamel of the teeth are more extensive but still involve less

than 50% of the tooth.

**d. Moderate:** - All enamel surfaces of the teeth are affected and surfaces subjected to attrition show marked wear. Brown stain is frequently a disfiguring feature.

**e. Severe:** - All enamel surfaces are affected. Brown stains are wide spread and teeth often present a corroded appearance.

**Result and Discussion:** During the study period, total population of the village was 504. Here also the total population was divided into three groups according to their age, 5-18, 19-31 and 32 -45 years. There were 251 male and 253 female. Out of which 40.89% boys and 34.04% girls were suffered by different categories of dental fluorosis. 18.27% boys and girls were affected by questionable form, 20.33% boys and girls were suffered by mild form, 22.7% boys and girls affected by moderate form and 38.9% boys and girls were reached on severe condition. There were 43.93% boys and 31.05% girls were affected by other deformities.

In all the study sites, severe dental fluorosis were more prevalent in boys than in girls, the probable reason was that boy's often remain in the same village while young girls after marriage moved to some other place and rarely moved to school after 10-12 years of age. It has been also observed that severe dental fluorosis was observed in the children of between 5-18 age group and dental fluorosis was not found in those persons whom come under the age group of 19-31 and 32-45. The reason may mottled enamel can be produced only during the period of calcification of the teeth.

The high incidence of dental fluorosis in urban areas needs explanation, since endemic fluorosis is almost exclusively confined to village where water used is mostly from superficial sources such as wells and hand pump.[21],[09]

Depending upon the severity degree, dental fluorosis can turn into a grand aesthetic problem torturing a person.

It has been identified that white or yellow glistening patches on the teeth which may eventually turn brown. The yellow and white patches when turned brown present themselves in horizontal streaks. The brown streaks may turn black and may get pitted, perforated and chipped off at the final stage.

The example of dental fluorosis manifestations of various degrees of severity are shown in Plate Figures A-D which are classified in four categories 1.) Questionable 2) Mild. 3) Moderate 4) Sever.

**Questionable:** The enamel disclosed slight aberrations from the translucency of normal enamel

which ranges white flecks to occasional white spots. Here a definite diagnosis of the mildest form of fluorosis is not warranted and a classification of "normal" is not justified. So its border line between normal and mild. (Plate Figure- A)

**Mild:** The white opaque areas scattered irregularly over the labial and buccal surface of teeth. Which are more extensive but do not involve as much as 50% of the teeth. (Plate Figure-B)

**Moderate:** Entire tooth surface are affected and surfaces subject to attrition show wear brown stain is frequently a disfiguring feature. (Plate Figure-C)

**Severe:** Wide spread, deep brown or black areas, corrosion type of mottled enamel. All enamel surfaces are affected and hypoplasia is marked that the journal from of thought may be affected. The major sign is discrete or confluent pitting and teeth often present a corroded-like appearance. (Plate Figure-D)

Several classifications have been proposed to assess the severity of dental fluorosis, [3] based his classification on the clinical appearance of the enamel, and it varied from normal to severe: normal, Questionable, Very mild, Moderate, Moderately Severe and Severe.[20], [21] proposed a simplified classification to assess the severity if dental fluorosis as: Gradeo: Normal, translucent, smooth and glossy teeth. Grade 1: White opacities, Faint yellow line. Grade 2: Brown stain. Grade 3: Pitting and chipped off edges. Grade 4: Brown plaques, corrosion and falling of teeth. Fluoride makes bones and teeth more brittle [6].

Fluoride being a highly electronegative element has extraordinary tendency to get attracted by positively charged ions like calcium. Hence the effect of fluoride on mineralized tissues like bone and teeth leading to developmental alterations is of clinical significance as they have highest amount of calcium and thus attract maximum amount of fluoride that gets deposited as calcium-fluorapatite crystals and this forms the basis for Dental fluorosis is a noticeable and undesirable cosmetic change due only to the influence of fluoride on developing teeth.

**Conclusion:** So the consequences of excess Fluoride concentration indicated different degree of severity of dental Fluorosis, observed in Jamanghati village where age and sex play an important role in Fuorosis and other deformities. Here, the highest population of boys and girls reached on severe condition where the boys are more susceptible than the girls.

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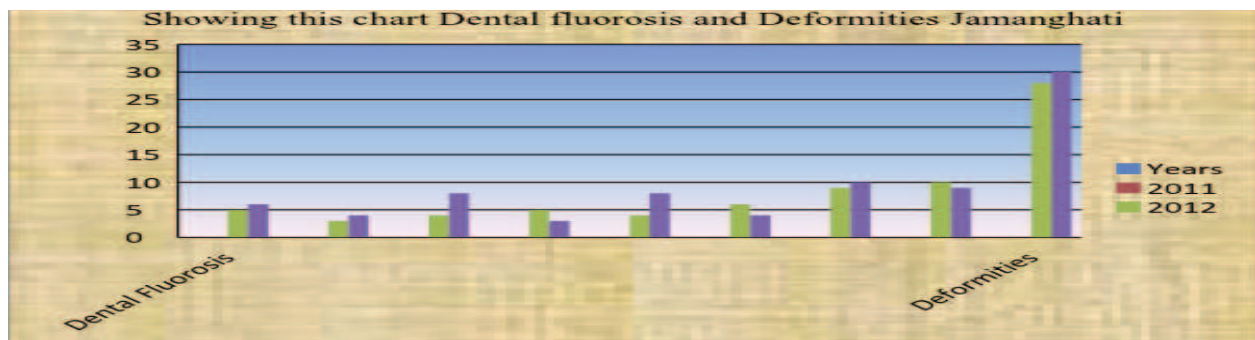


Figure 1: Showing this chart Dental fluorosis and Deformities Jamanghati



**Plate-A questionable form**



**Plate B mild form**



**Plate D severe form**



**PlateC moderate form**

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TABLE 1:- Physical-Chemical Analysis of Water in Jamanghati (2011)													
S. N.	Water quality parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PHYSICAL PARAMETER													
1.	Color	Color less	Color less	Color less	Color less	Color less	Color less	Color less	Color less	Color less	Color less	Color less	Color less
2.	Odour	None	None	None	None	None	None	None	None	None	None	None	None
3.	Turbidity (NTU)	0.5	0.3	0.5	0.2	2.1	2.5	2.4	1.2	1.1	0.5	0.8	0.5
CHEMICAL PARAMETER													
4.	pH	9.23	9.72	9.74	9.91	9.90	9.93	9.76	7.85	7.87	9.8	9.27	9.26
5.	Total Alk (mg/l)	115	72	78	74	77	76	75	73	102	104	118	122
6.	Total Hard (mg/l)	27	24	26	29	34	32	42	58	51	52	38	30
7.	Fluoride (mg/l)	13.9	13.8	13.8	13.9	23.2	10.2	12.0	16.35	16.40	18.5	12.9	13.0
8.	Chloride (mg/l)	57	59	62	65	68	72	70	67	69	70	57	56
9.	Nitrate (mg/l)	13.0	13.3	13.5	13.6	2.60	2.56	2.54	2.58	2.60	10	13.3	13.2

S. N.	Water quality parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>PHYSICAL PARAMETER</b>													
1.	Colour	Color less	Color less	Color less	Color less	Color less	Color less	Color less	Color less	Color less	Color less	Color less	Color less
2.	Odour	None	None	None	None	None	None	None	None	None	None	None	None
3.	Turbidity (NTU)	0.3	0.5	0.2	0.5	2.0	2.1	2.6	1.2	1.0	0.5	0.6	0.5
<b>CHEMICAL PARAMETER</b>													
4.	pH	9.25	9.73	9.75	9.92	9.90	9.92	10.8	7.86	7.88	9.8	9.63	9.25
5.	Total Alka. (mg/l)	116	72	80	75	76	77	76	71	104	106	76	120
6.	Total Hard. (mg/l)	29	25	27	28	30	35	43	59	52	54	26	29
7.	Fluoride (mg/l)	13.9	13.8	13.8	13.9	16.41	11.5	13.4	16.34	11.10	16.9	12.9	13.0
8.	Chloride (mg/l)	58	62	64	67	73	72	71	68	70	70	55	58
9.	Nitrate (mg/l)	13.1	13.5	13.5	13.6	2.61	2.59	2.56	2.58	2.59	11.0	13.3	13.1

Years	Dental Fluorosis								Deformities	
	Ques		Mild		Modrate		severe		Boys	Girls
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls		
2011	05	03	04	05	04	06	09	10	28	18
2012	06	04	08	03	08	04	10	09	30	22