



PREVALENCE AND AWARENESS OF DENTAL FLUOROSIS IN 9-12 YEAR OLD CHILDREN, IN AND AROUND BAGALKOT DISTRICT, KARNATAKA CROSS-SECTIONAL STUDY

Dental Science

Dr. Rashmi Chour	Reader, Dept. of Pedodontics, P.M.N.M Dental College and hospital, Bagalkot, Karnataka - 587101
Dr. Rajas Prasad*	Private practitioner, Nasik, Maharashtra - 422101 *Corresponding Author
Dr. Sayantini Das	Intern, P.M.N.M Dental College and hospital, Bagalkot, Karnataka - 587101
Dr. Girish Chour	Reader, Dept. of Oral and Maxillofacial surgery, P.M.N.M Dental College and hospital, Bagalkot, Karnataka - 587101

ABSTRACT

BACKGROUND: To assess the prevalence and awareness of dental fluorosis in and around Bagalkot district, Karnataka: a cross-sectional study
MATERIALS & METHODS: A cross sectional study was conducted on 800, 9-12 year old school children from 15 schools of Bagalkot district. After taking consent from their parents, a questionnaire was used to collect the data regarding awareness of dental fluorosis, source of water, diet and socio demographic characters. Oral examination was done under natural light to score Deans fluorosis index. Chi square test was used.
RESULTS: Study revealed that 72.4% of the study population had dental fluorosis. Out of which 82.2 % were aware of the condition. Fluorosis score in relation to gender was not statistically significant.
CONCLUSION: Dental fluorosis is a public health problem in Bagalkot district. Active steps must be taken to Defluoridate the water before distribution to reduce the morbidity associated with dental fluorosis in this area.

KEYWORDS

Awareness, Deans fluorosis index, dental fluorosis, school children.

INTRODUCTION

Dental fluorosis is a well-known developmental enamel defect due to excessive fluoride ingestion during enamel formation, generally from chronic long term exposure to elevated levels of fluoride.¹ Water fluoridation is a recognized method for preventing dental caries when it is undertaken at the ideal concentration for each region, according to the local mean temperature. However it is a risk factor for dental fluorosis when the fluoride concentration is above the recommended levels.²

India is one among the 23 nations around the globe where health problems occur due to excess ingestion of fluoride.³ Fluorosis disturbs enamel significantly and affects esthetics quite adversely which can cause psychological distress to the affected person.⁴

According to National Oral Health Survey and Fluoride Mapping-2002 - 2003, the prevalence in children aged 12 – 15 years was 7.2% in three states (Haryana, Uttar Pradesh and Andhra Pradesh), which is higher than national average.⁵

Rare knowledge of the causes of dental fluorosis may be considered one of associated risk factors which increase dental fluorosis problem because it will be reflected on people practice and attitude. Different studies have found very low knowledge on risk factors of dental fluorosis and its disadvantages.^{6,7} Regarding public perception, previous studies showed that more than half the children who have dental fluorosis were avoiding smiling and not accepting their appearance.⁸ In addition, parents felt worried and embarrassed when

their children who had dental fluorosis.⁹

Karnataka with increase in bore-wells is rising as a high fluoride affected state. Districts within the north eastern region have contrasting high level of fluoride, which has been linked to dental fluorosis. Hence the aim of the present study is to assess the prevalence and awareness of dental fluorosis among 9-12 year old school children in Bagalkot district, Karnataka.

MATERIALS AND METHODS:

A school based cross-sectional study was conducted in and around the Bagalkot district, Karnataka among the age group 9-12 years old children. A total of 15 schools were selected in the study area. 800 students were randomly selected among the 15 schools. A Self-designed questionnaire form was piloted and subsequently used in the study comprising of questions soliciting data regarding

- Socio-demographic features
- Address
- Source of drinking water
- Awareness of discolouration
- Awareness of fluoride level in drinking water
- Awareness of treatment aspect

Followed by ADA type III oral examination using plane mouth mirror under natural day light to know the fluorosis score using Deans fluorosis index as stipulated by WHO (1997).¹⁰ Data processing and analysis were done using the Statistical Package for the Social Sciences, (SPSS -17). Chi-square test was used for statistical analysis

RESULTS:**Table 1:**

		AGE (in years)				Total	Chi square test	
		9	10	11	12		Chi square value	p-value
Presence Of Fluorosis	Absent	71	37	49	64	221	35.94	<0.001*
		47.0%	20.6%	24.9%	23.5%			
	Present	80	143	148	208	579		
		53.0%	79.4%	75.1%	76.5%			
Dean's Index	Normal	72	35	49	68	224	134.34	<0.001*
		47.7%	19.4%	24.9%	25.0%			
	Questionable	55	38	42	26	161		
		36.4%	21.1%	21.3%	9.6%			
	Very Mild	20	71	53	86	230		
		13.2%	39.4%	26.9%	31.6%			

	Mild	4	22	29	56	111		
		2.6%	12.2%	14.7%	20.6%	13.9%		
	Moderate	0	12	14	16	42		
		0.0%	6.7%	7.1%	5.9%	5.3%		
	Severe	0	2	10	20	32		
		0.0%	1.1%	5.1%	7.4%	4.0%		

*p<0.05 statistically Significant, p>0.05 Non Significant, NS
 Out of the total 800 children examined, 579 children exhibited the presence of dental fluorosis, which constituted a 72.4% with a chi-square value of 35.94 which was highly significant (p value <0.001)

When the Dean's index was employed, 32 (4%) children showed severe dental fluorosis, while 224 (28%) children were normal, which was a highly significant finding (p value <0.001).

Table 2:

		Age (in years)				Total	Chi square test	
		9	10	11	12		Chi square	p-value
Source of water	B	155	220	38	80	493	55.50	<0.001*
		78.3%	64.5%	50.7%	43.0%	61.6%		
	T	43	121	37	106	307		
		21.7%	35.5%	49.3%	57.0%	38.4%		
Awareness of discoloration	0	118	266	67	125	576	34.51	<0.001*
		59.6%	78.0%	89.3%	67.2%	72.0%		
	1	80	75	8	61	224		
		40.4%	22.0%	10.7%	32.8%	28.0%		
Awareness of cause of discoloration	0	151	223	45	126	545	9.50	0.02*
		76.3%	65.4%	60.0%	67.7%	68.1%		
	1	47	118	30	60	255		
		23.7%	34.6%	40.0%	32.3%	31.9%		
Family history	0	125	203	48	116	492	1.04	0.79(NS)
		63.1%	59.5%	64.0%	62.4%	61.5%		
	1	73	138	27	70	308		
		36.9%	40.5%	36.0%	37.6%	38.5%		
Visit to any dental for the same	0	141	251	43	99	534	27.33	<0.001*
		71.2%	73.6%	57.3%	53.2%	66.8%		
	1	57	90	32	87	266		
		28.8%	26.4%	42.7%	46.8%	33.3%		
Awareness of treatment options	0	139	301	64	152	656	28.33	<0.001*
		70.2%	88.3%	85.3%	81.7%	82.0%		
	1	59	40	11	34	144		
		29.8%	11.7%	14.7%	18.3%	18.0%		
Awareness of fluoride level in water	0	168	335	73	178	754	44.35	<0.001*
		84.8%	98.2%	97.3%	95.7%	94.3%		
	1	30	6	2	8	46		
		15.2%	1.8%	2.7%	4.3%	5.8%		
Awareness of skeletal fluorosis	0	151	247	52	158	608	12.37	0.006*
		76.3%	72.4%	69.3%	84.9%	76.0%		
	1	47	94	23	28	192		
		23.7%	27.6%	30.7%	15.1%	24.0%		

B – Bore well water; T- Tap water
 0 – NO; 1-Yes

*p<0.05 statistically Significant, p>0.05 Non Significant, NS

With regards to the questionnaire, 493 (61.6%) out of 800 children have been drinking bore well water since birth compared to 307 (38.4%) children who consumed tap water which was found to be highly significant (p value <0.001)

Out of the 800, only 224 (28%) were aware of the discoloration of the teeth and 255 (31.9%) were aware of the cause of the discoloration of the teeth, which were highly significant values. (p values <0.001 and 0.02 respectively).

With respect to visiting the dentist and awareness of treatment options for such dental discolorations, out of 800 children, only 266 (33.3%) had visited a dentist at some point of time regarding the discolorations and 144(18%) were aware of the various treatment options for this condition, which were highly significant (p value <0.001).

Regarding the awareness of fluoride levels in water and knowledge of skeletal fluorosis, 46(5.8%) were aware of the increased fluoride content in water whereas 192 (24%) had knowledge about skeletal fluorosis which was highly significant. (p values ,<0.001 and 0.006 respectively).

DISCUSSION:

In the present study the prevalence of dental fluorosis was 72.4%,

which is differing from the study conducted by Dahiya et al¹¹ showed prevalence of fluorosis is 92.73% in the village of Juai Kalan, Bhiwani district, Haryana and 100% prevalence in Nalgonda district a study coded by KM Sudhir et al.¹² this may be attributed to the fact that majority of the children has bore well water as the source of drinking water since birth which in turn has been stated to have high levels of fluorides.

With respect to awareness regarding the discoloration and its cause, 28% of the children were aware of marks on their teeth that would not brush off, where as a 72% were not aware of any such marks on their teeth but a study conducted by Ethel Vento et al¹³ in Gozo, Malta showed that 11% of the children were aware of marks on their teeth where as 83% were not aware of any such marks.

With respect to awareness of the cause of discoloration, only 31.9% were aware of the cause. Also, with regards to treatment options for the same, only 18% of the children were aware. Now, both the awareness aspects maybe attributed to the low socio-economic status and the lower levels of literacy among the people of Bagalkot district.

The WHO guideline for the maximum permissible limit of fluoride in drinking water is 1.5 mg/L, higher concentration of fluoride can cause fluorosis of varying degrees. Bureau of Indian standard has further reduced the safer limit of fluoride to 1.1 mg/L. Only 5.8% children were aware of the increased fluoride levels in the drinking water of the area and 24% of the children were aware the increased fluoride levels

causes skeletal problems too. This low awareness may be attributed to lesser number of awareness camps regarding water fluoride levels conducted in that area.

Based on this study, it can be stated that more than permissible limits of fluoride content in drinking water in the study area point toward the risk of deleterious effects among the population due to chronic fluoride exposure.

CONCLUSION:

Although dental fluorosis is an irreversible condition of the enamel of teeth, but can be prevented if the level of fluoride in the water is optimum. Regular water testing, routine medical check-up camps and continued health awareness programme would certainly benefit the community residing in fluoride endemic areas.

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