

PREVALENCE AND SEVERITY OF DENTAL FLUOROSIS AMONG SCHOOL GOING CHILDREN IN KALIGIRI MANDAL, SPSR NELLORE DISTRICT

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Abstract

Background: Fluoride at optimal level decreases the incidence of dental caries and is also necessary for maintaining the integrity of oral tissues but at the same time when taken in excess during developmental stages can cause adverse effects like dental fluorosis and skeletal fluorosis. **Objective:**The objective was to find the prevalence of dental fluorosis among school going children residing in kaligiri mandal,Nellore district,Andhrapradesh,India.**Materials and Methods:** A total of 609 school children, residing in the villages of kaligiri mandal since childhood and consuming the groundwater, in the age group of 7–15 years was selected from various schools. Schools were selected from all the villages of kaligiri mandal. Children were categorized in five age groups and were examined for dental fluorosis. Dean's criteria for assessment of dental fluorosis were used, and observations were recorded on a study specific performa. **Results:** Among the 609 children examined, 446 (73%) were found to be having dental fluorosis, among which number of males (251) was more than females (195). Among the different grades of fluorosis observed, moderate dental fluorosis was observed in most of the cases (155). **Conclusion:** It was evident from the results that the city had a good number of cases of dental fluorosis and that the groundwater in certain areas water fluoridation above 1.2ppm was cause of dental fluorosis

Key words:Dean's fluorosis index, dental fluorosis, Kaligiri mandal, school going children

Introduction

Fluoride is a double -edged sword. Fluoride at optimal level decreases the incidence of dental caries and is also necessary for maintaining the integrity of oral tissues but at the same time when taken in excess during developmental stages can cause adverse effects like dental fluorosis and skeletal fluorosis (1). Endemic dental fluorosis is a disturbance in tooth formation caused by excessive intake of fluoride during the formative period of the dentition. The degree of severity of the clinical manifestations of this form of chronic fluoride intoxication depends upon the amount, form and frequency of fluoride ingestion, the duration of exposure, the age of the person, the bioavailability of the fluoride compound and possibly other yet unknown factors (2). India is one among the 23 Nations around the globe where health problems have been reported due to excessive fluoride in drinking water. Endemic dental fluorosis is most prevalent in areas where the drinking water contains elevated levels of fluoride (3). In India, Bureau of Indian Standard (BIS) (4) has set maximum permissible level of fluoride in water as 1ppm. Since the pioneering studies of Dean, several attempts have been made to determine the relationship between the occurrence of fluorosis and fluoride concentration in drinking water in numerous populations

throughout the world (5). Fluoride concentration in Rajasthan's groundwater is much higher than the permissible limit of 0.6-1.5 ppm (parts per million) of fluoride recommended for potable purposes (6). In India, Prakasam district of Andhra Pradesh was the first place where fluorosis was detected. and at that time, the disease was prevalent in only four states, namely Andhra Pradesh, Tamil Nadu, Punjab, and Uttar

Pradesh. Now, fluorosis has been reported endemic in 20 out of 32 constituent states of India[7]. and day by day more new areas have been engulfed by this problem

Dental fluorosis is a chronic fluoride –induced condition in which an excess of fluoride is incorporated in the developing tooth enamel and disrupt the enamel formation of the tooth. Prevalence of dental fluorosis due to high levels of fluoride in drinking water is an endemic global problem. Although, definite mechanism of dental fluorosis is yet to be confirmed, hypomineralization of teeth enamel is the real fact and so the teeth enamel become more porous and softer than the normal counterparts[8]. Water fluoridation was once heralded as one of the best public health achievements in the twentieth century. Since this practice is not feasible or cost effective in many regions, especially rural areas, researchers and policy makers have explored other methods of introducing fluoride to the general population such as adding fluoride to milk and table salt. Lately, major concerns about excessive fluoride intake and related toxicity were raised worldwide, leading several countries to ban fluoridation. Health-care professionals and the public need guidance regarding the debate around fluoridation[9].

In India, provision of safe drinking water is a constitutional mandate.[10]Thirty percent of urban and 90% of rural population is dependent on untreated water source, of which 80% is ground water.By early 2004, the rural drinking water supply program in India was estimated to have 3.7 million hand pumps dependent on ground water. While this has lowered the incidence of waterborne diseases, it has led to the emergence of other problems such as depletion of drinking water sources due to excessive withdrawal by irrigation wells and contamination by fluorides and arsenic. The principal source of these fluoride contaminants is from the soil.[11]

. Fluoride intake at optimal level decreases the incidence of dental caries and is also necessary for maintaining the integrity of oral tissues. But at the same time when consumed in excess amount during developmental stages can cause adverse effects such as dental and skeletal fluorosis.[12]Dental fluorosis is a disturbance in tooth formation caused by excessive intake of fluoride during the formative period of the dentition. The degree of severity of the clinical manifestations of this form of chronic fluoride intoxication depends on the amount, form and frequency of fluoride ingestion, the duration of exposure, the age of the person, the bioavailability of the fluoride compound and possibly other yet unknown factors.[13]

It is well documented that fluoride can have both beneficial and detrimental effects on the dentition ever since Mc Kay and G.V. Black in 1916 published the effect of fluoride on dentition. [14].The beneficial effects of fluoride on dental caries are due primarily to the topical effect of fluoride after the teeth have erupted in the oral cavity. In contrast, detrimental effects are due to systemic absorption during tooth development resulting in dental fluorosis..[15] developed a classification for fluorosis, which is still widely used, based on his interpretation of clinical appearance. [16]. Dean and McKay suggested that optimum level of water fluoride should be below 0.9 - 1.0 PPM.[17].The severity of dental fluorosis depends on the amount of fluoride exposure, the age of the child, individual response, as well as other factors including nutrition [18] Although water fluoridation can cause fluorosis, most of this is mild and not usually of aesthetic concern. [19]. Severe cases can be caused by exposure to water that is naturally fluoridated to levels well above the recommended levels, or by exposure to other fluoride sources such as brick tea or pollution from high fluoride coal. [20]

Fluorosis has attained an alarming dimension all over the world. In India 19 states have been identified as endemic fluoride areas and Andhra Pradesh state is one among them which is facing serious health problems. The fluoride level in water in India ranges from 2- 29ppm, where as the permissible level in drinking water according to WHO standard is 1.0-1.5ppm. High incidence of endemic fluorosis in India is due to fact that large area of the water supplies are having high level of fluoride.2,3. In Andhra Pradesh state alone 17 districts are affected by fluorosis, among them Nellore district is one of the affected district. The major water source in the district is As there were no studies conducted in this area, even though it is severely affected with fluorosis, hence the present study was conducted to assess the awareness of dental fluorosis and to evaluate the prevalence of dental fluorosis.

Materials and Methods:

Study area :

Kaligiri Mandal of Nellore district, Andhra Pradesh we had selected villages that effected by fluoride in ground water, borewell and where there is significant occurrence of dental fluorosis. That report indicating that the area was dental fluorosis. Majority of people oin study area belong to low socio economic class. Jiravaripalem, Kondareddypalem, and Nadimi madigapalem villages are the most effected by fluorosis. This villages are located at northern part of Nellore district. It is about 366 km away from the Nellore city[21,22].

This study was aimed to estimate the prevalence and severity of dental fluorosis among 7–17 years old school going children of Kaligiri mandal, Nellore district, Andhrapradesh, India. For study purpose, Data was collected from 5-17 years old childrewho were life long residence of Jiravaripalem, Kondareddypalem and Nadimi madigapalem villages of Kaligiri Mandal of Nellore district, Andhra Pradesh and who consumed drinking water from the some source of there life. Data was collected to the observed by school children. This survey carried out for problem causes due to high fluoride concentration in drinking water which causes dental fluorosis in children. Most of the children with clinical signs of dental fluorosis had moderate to severe dental according to dean's index.

In 1942, H.T. Dean developed an index to describe and diagnosis enamel fluorosis [23,24]

Classification of the dental fluorosis severity degrees according to **DEAN's** fluorosis

Index:

Questionable; The enamel represents the usual translucent semivitriform (glass-like) type of structure. The surface is smooth, glossy and usually of pale creamy white color

Very Mild; Small, opaque, paper white areas scattered irregularly over the tooth but not involving as much as approximately 25% of the tooth surface. Frequently included in this classification are teeth showing no more than about 1 – 2mm 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 involve as much as 50% of the tooth.

Moderate; All enamel surfaces of the teeth are affected and surfaces subject to attrition show wear. Brown stain is frequently a disfiguring feature.

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 corroded-like appearance.

Dean's fluorosis index was first published in 1934 by H. Trendley Dean. The index underwent two changes, appearing in its final form in 1942. An individual's fluorosis score is based on the most severe form of fluorosis found on two or more teeth.

QUESTIONARY:

Keeping in view of the scope and objectives of the study, interview schedule was prepared. A struturally well prepared and pre tested questionnaire was developed after perusal of the available literature. Thus, the final interview schedule consists of all the relevant items such as profile characteristics, etc., for measuring the variables included in the study. After pre-testing the questionnaire at the proposed study area, necessary modifications were incorporated. The finalized questionnaire which was used in the interview schedule for obtaining the primary data is appended herewith. Name, Age, Sex, Habitate, Education, No. of family members, Occupation, Sources of drinking water amount of water consumed, Type of toothpaste, Residance, How many times brushing per day, have you ever considered teeth whitening, how often do you make dental visit, consumption of tea and sea fish per day etc.

Severity of the dental fluorosis was assessed by deans index with the help of dentist and total samples are tested and classified according to the severity of dental fluorosis. The classification was divided questionable, very mild, mild, moderate and severe. The study involves collection of both primary and secondary data. The primary data was collected from the selected victims of dental fluorosis with the help of duly pre-tested questionnaire. The secondary data was regard to reports of the rural water supply and sanitation department Nellore in the study area.

Result and discussion:

Kaligiri mandal of Nellore district, Andhra Pradesh India seems to be threaten area of fluoride in dental fluorosis total 8 fluoride effected villages has been find out with the help of rural water supply and sanitation department Nellore and water samples had been taken for the analysis of water fluoride content. Water samples from different bore wells of 8 villages which showed a maximum range of 0.8 to 4.0 ppm by DEAN's method. Among 10 villages are showing high levels of Fluoride. Almost all the selected villages are higher than the permissible level of 1 ppm according to WHO (World Health Organization,1984)[25]

Of total 609 children examined,446 children (73%) had dental fluorosis [Table 2]. Among the 446 affected children, 251 (56%) were males and 195(43%) were females [Table 2. The number of children having dental fluorosis also varied according to the grades of fluorosis and age[Table 3]

The Moderate type is higher(34.7%),and Mild type is lower(11.1%),Questionable type is (16.1%),Very mild is (14.5%), Severe is (22.6%).

Particularly Jiravaripalem(3.1),Kondareddypalem (2.42) and Nadimi madigapalem(2;16) in Kaligiri mandal, has excess levels of fluoride

Table: 1 Systematic representation of the sample

S.NO	Name of the village	Boys	Girls
1.	Jiravaripalem	40	35
2.	Gudladona	42	39
3.	Pedakonduru	30	26
4.	Kondareddy palem	45	40
5.	Nadimi madigapalem	40	38
6.	Thimmareddypalem	37	34
7.	Kavalimustapuram	45	38
8.	Nagasamudram	42	38
TOTAL.		321	288

Detailed information and classification of the samples according to boys and girls are represented in the table: 1. The total number of the villages are 8, number of the boys are 321 are (52%) and girls are 288(48%).

Table: 2. Classification of effected children in the region

Name	Questionable	Very mild	Mild	Moderate	Severe

Boys and Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
Jiravaripalem	7	4	6	3	4	2	16	12	10	11
Gudladona	6	4	5	2	2	6	12	9	8	6
Pedakonduru	7	3	4	3	2	1	8	7	5	3
Kondareddy palem	8	5	9	6	7	5	15	14	11	9
Nadimimadigapalem	5	4	7	6	5	4	15	12	10	8
Thimmaredd palem	4	1	3	1	2	2	5	4	3	3
Kavalimustapuram	3	3	2	2	4	5	7	8	4	2
Nagasamudram	4	4	4	2	1	1	6	4	5	3

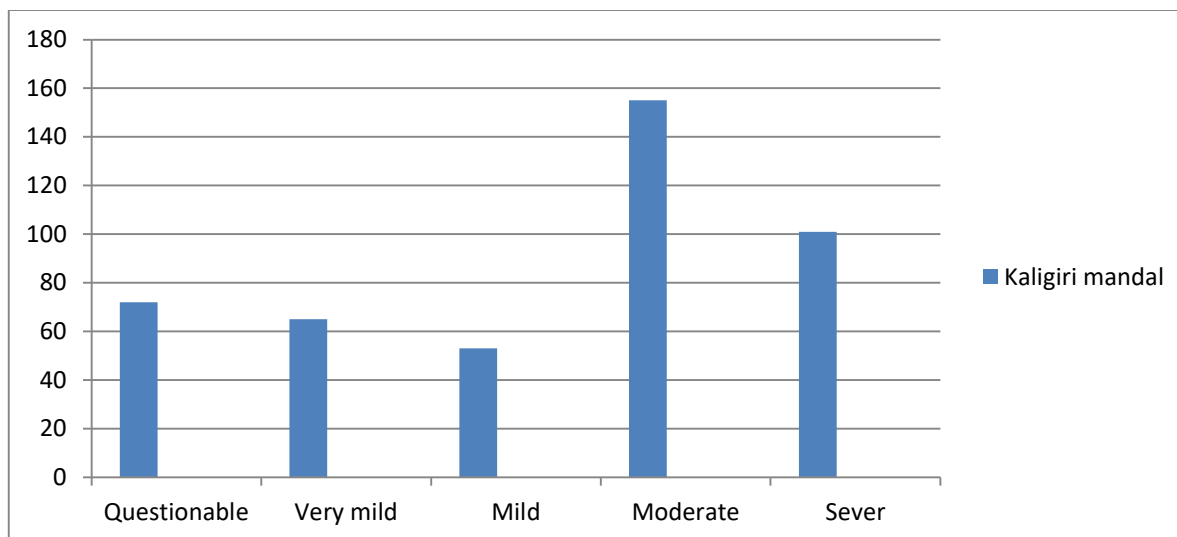
The responds of every village of the region are classified according to deans index and gender represented in the table: 2 Total 8villages Children were observed according to Dean's index

Table: 3. Classification of effected children according to the age

Type	7-9 Years		10-12 Years		13-15 Years		Total	Percentage
	Boys	Girls	Boys	Girls	Boys	Girls		
Questionable	20	11	17	10	7	7	72	16.1%
Very mild	9	6	20	15	10	5	65	14.5%
Mild	8		14	11	5	6	53	11.1%
Moderate	36	28	36	30	13	12	155	34.7%
Severe	23	20	24	20	9	5	101	22.6%
Total	96	74	111	86	44	35		

The information represented based on the age view and it is tabulated as above table: 3. Based on the age it was divided into Three types. Those are 7-9 years, 10-12 years and 13-15 yrs. Boys and Girls data are represented separately. The percentage was calculated and recorded in the table. Questionable (18%), Very Mild (16%), Mild (10%), Moderate (36%), Sever (20%).

Figure1: Graphical representation of effected Children of Dental Fluorosis in Kaligiri mandal



Conclusion:

Dental fluorosis still exist as a major dental public health in India: measures need to be taken to control this by introducing defluorodisation plants in various parts of the country. The great need for introducing various small scale methods of defluorodisation in the present study area to prevent dental fluorosis. In the present study, it can be concluded that children of Jirraripalem, Kondareddypalem and Nadimamadigapem village's of consuming water more than 1.5 ppm of fluoride ranges from 1.53-3.5ppm are suffering from dental fluorosis

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