

INCIDENCE OF DENTAL FLUOROSIS AMONG THE PATIENTS VISITING THE UNIVERSITY OF LAHORE DENTAL COLLEGE/ HOSPITAL — A STUDY

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ABSTRACT

Present study was carried out to find out the incidence of dental fluorosis among the patients visiting conservative department of The University of Lahore, Dental College Hospital during the months of April 2009 to June 2009. Total 1678 patients were seen in the conservative department. Patients presented clinical dental fluorosis were separated and classified according to Dean's Index of scoring dental fluorosis. The incidence of dental fluorosis was 12 % (197 patients, 80 males and 117 females) being higher in females than males. 44(22%) showed very mild, 39(20%) showed mild, 77(39%) showed moderate, and 37 (19%) showed severe dental fluorosis. These patients belonged to the areas of Patoki, Kasur District, manga mandi, Kot Radha kishan, and its surroundings, all areas near to The University of Lahore Dental College where Fluoride ions concentration is higher in drinking water causing serious effect on teeth (dental fluorosis) as well as on bony tissues. Main goal of our study was to highlight the effects of high fluoride levels in drinking water in these areas and bring the attention of educated community and responsible authorities towards serious health issue.

Key words: Dental fluorosis, incidence, dean's index, scoring, moderate.

INTRODUCTION

Fluorosis is the result of fluoride rearranging the crystalline structure of a tooth's enamel as it is still growing.¹ Dental Fluorosis is a permanent hypominer-alization of enamel, characterized by greater surface and subsurface porosity than in normal enamel, that results from excess fluoride (F⁻) reaching the developing tooth during developmental stages.²

The early research on dental fluorosis (mottled teeth) was associated with a dentist, Frederick Sumner McKay,¹⁰ who moved to Colorado Springs in 1901, and found strange marks on the teeth of native people in that city. There were earlier occasional reports on the strange tooth discolorations in humans, but, ap-

parently, no serious research efforts were undertaken until about 1902.

In 1888, a German dentist *Kuehns* reported at a meeting of his association his observations on strangely discolored teeth among some members of a family which had moved to his location from Durango (Mexico). All family members grown up in Durango had black stains on their teeth, "similar to the polished areas in caries nigra", the intensity depending on how long they had been living there. Kuehns thought that their local water, originating from a hot spring and formerly used by the family for household purposes, contains rather high amounts of iron compounds. Along with this iron, he speculated, manganese compounds might find their way into the dental tissue. As the discoloration

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occurred on the front teeth, he thought that under the action of light these manganese compounds form manganese oxides (colored dark brown to almost black), not just at the surface of the teeth but deep within the dental tissue. Bleaching was held ineffective as these supposed "oxides" would only be removed by some acid. The water of Durango was later found to have 7.5 ppm fluoride.¹⁰

Increased fluoride can decrease enamel and dentin mineralization either directly through interactions with the developing ameloblasts and/or odontoblasts or more indirectly by interacting with the extracellular matrix.³ An increasing porosity of the surface and subsurface enamel, causing the enamel to appear opaque and may present a continuum of changes ranging from fine white opaque lines running across the tooth on all parts of the enamel to entirely chalky white teeth. The enamel may be so porous or hypomineralized (in chalky white cases) that the outer enamel breaks apart post-eruptively and the exposed porous subsurface enamel becomes discolored.⁴ In more advanced stages teeth may become more susceptible to cavities. With more severe forms of fluorosis, caries risk increases because of pitting and loss of the outer enamel.⁵

The discoloration induced by fluorosis particularly in its advanced forms, can cause significant embarrassment and stress to the impacted child, resulting in adverse effects on esteem, emotion health, and career success.⁷

Over the past 50 years, the prevalence of dental fluorosis has increased quite dramatically and with this increase, esthetic concerns pertaining to fluorosis should be taken into consideration.⁹

According to recent estimates from the U.S. and British Governments, 2 to 12% of children living in fluoridated communities have dental fluorosis of "esthetic concern".⁸ More than 50 percent of infants are currently formula fed by 1 month of age, and these infants are likely to be continuously exposed to high intakes of fluoride for 9 or 10 months – a circumstance quite rare in the 1960s and early 1970s.

There is a growing body of evidence which indicates that the prevalence and, in some cases, the severity of dental fluorosis is increasing in both fluoridated and

non-fluoridated regions. This trend is highly undesirable for several reasons. It increases the risk of esthetically objectionable enamel defects. In more severe cases, it increases the risk of harmful effects to dental function and it jeopardizes the perception of the safety and, therefore, the public acceptance of the use of fluorides.⁶

METHODOLOGY

This study was carried conservative department of The University of Lahore Dental College. Total 1678 (females =897 and males = 781) patients were seen during April 2009 and June 2009. Patients presenting dental fluorosis were separated and Oral examination was carried out by two dentists on the dental chair using mirror and CPITN probe in natural light. Patients were seen by two dentists and both agreed on patient's clinical score of dental fluorosis as described by Dean's,¹³ and applied by Khan AA.¹² Teeth were examined wet and a CPITN probe was used to remove food debris or exclude any plaque or calculus and confirm fluorosis as suggested by Khan AA and others.^{11,16}

The examiners stood in front of the patient to inspect the teeth along a horizontal plane, noted the distribution pattern of any defects and decided if they were typical of fluorosis. Dean's index was scored on the condition of the two most severely affected teeth.¹²

In his studies, Dean¹³ suggested a category of questionable fluorosis in borderline areas, when comparing two large groups. However, this entity is considered a misnomer in Dean's classification system.¹³ Therefore in the present study, patients having questionable fluorosis were considered as having no fluorosis.^{12,14,15} Special hygiene instructions were given and many patients were treated with composite restorations on labial surface of anterior teeth and crowning was advised to improve asthetic concerns.

RESULTS

Study group consisted of 1678 patients (males = 781 and females = 897). Patients presenting dental fluorosis were 197 (12%). It included 80 (41%) males and 117 (59%) females.

Figure 1: Shows incidence of dental fluorosis among the patients seen in the conservative dentistry department. Fluorosis incidence was 12%. Sex wise comparison revealed that fluorosis incidence was higher in females (59 %) than in males (41%).

Figure 2: Shows incidence of dental fluorosis according to clinical severity based on dean’s classification. Fluorosis score was 44 (22%) very mild, 39(20 %) mild, 77(39 %) moderate, and 37 (19%) was severe.

Figure 3: Shows the dental fluorosis among various age groups of patients visiting dental department. Among these, 3 (2%) were 0-10years, 35 (18%) were 10-20years, 83 (42%) were 20-30 years, 51 (26%) were 30-40 years and 25 (12%) were above 40 years of age.

DISCUSSION

The prevalence of fluorosis is mainly due to the consumption of more fluoride through drinking water. It is necessary to find out the fluoride endemic areas to

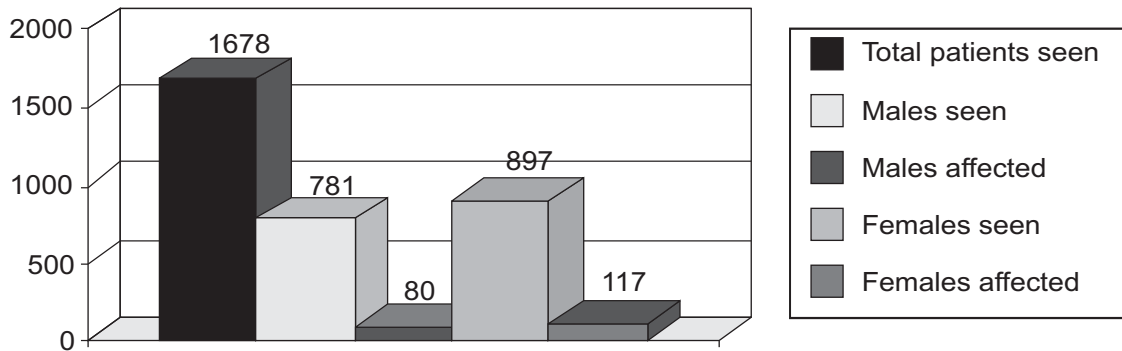


Fig 1: Shows incidence of dental fluorosis

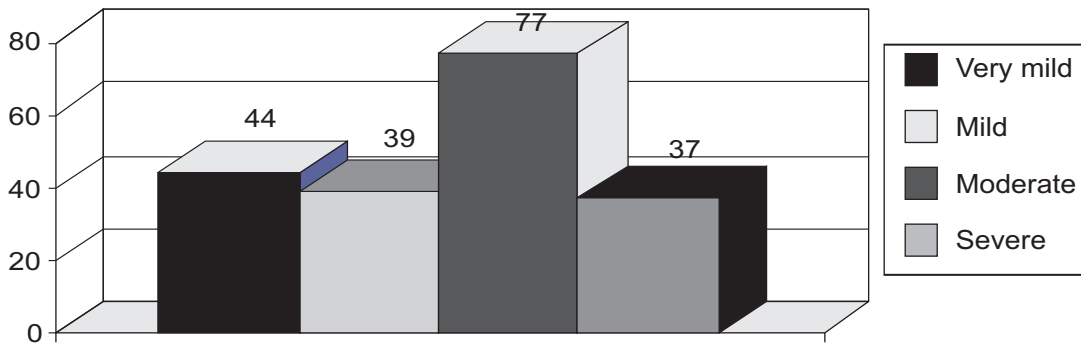


Fig 2: Shows clinical severity of dental fluorosis

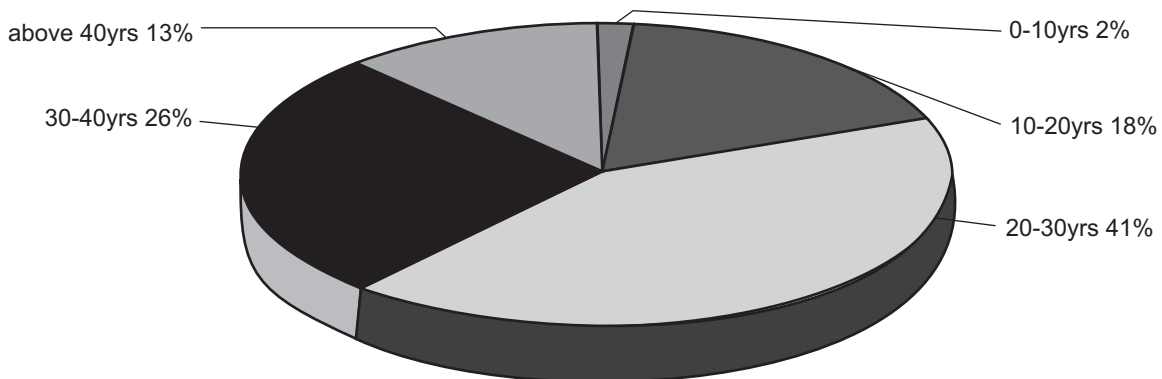


Fig 3: Shows incidence of dental fluorosis among various age groups.

adopt remedial measures to the people on the risk of fluorosis.¹⁷

The work of Dean and others led to an understanding of the relationship between ingesting high concentrations of fluoride and enamel fluorosis, with clinical severity increasing with the amount of fluoride ingested.^{18,19} Dean was the first to present a method for evaluating this range of severity by establishing categories describing fluorosis. Categories vary clinically from a faint frosty white streaking or snow flaking in the mildest forms, to esthetically obvious opaque white mottling found in mild-to-moderate fluorosis. Associated brown staining and pitting occur in more severe forms.

Histologically, enamel fluorosis is defined as the presence of a hypomineralized subsurface zone, lying beneath a well-mineralized enamel surface layer.²¹ Clear evidence indicates that the prevalence of enamel fluorosis has increased in both fluoridated and non-fluoridated areas since Dean's time.²² In the past years, ingestible fluoride has become available from an array of intentional and unintentional sources, including fluoride supplements or vitamins, toothpastes and other fluoride-containing, topically applied preparations and beverages manufactured in fluoridated areas.²³ These additional sources provide unpredictable and perhaps high sources of additional fluoride to the overall diet.²²

While enamel fluorosis does not directly affect oral health except in its severest forms, the recent US Public Health Service Review of Fluoride Benefits and Risks.²⁴ concluded that an increase in the prevalence of enamel fluorosis indicates that total fluoride exposure may be more than is necessary to prevent tooth decay. The prevalence of fluorosis in permanent teeth in areas with fluoridated water has increased from about 10-15% in the 1940s to as high as 70% in recent studies.²⁵

The prevalence of dental fluorosis in the United States has increased during the last 30-50 yrs years, both in communities with fluoridated water and in communities with nonfluoridated water.²⁶⁻²⁹

The present study was carried out to see the incidence of dental fluorosis among the patients visiting conservative department of The University of Lahore for treatment and esthetic concerns. In the

present study 1678 patients were seen in the conservative department during the months of April 2009 to June 2009. 197 patients were seen with dental fluorosis which was 12 % of the total patients seen and it was closer to the findings seen by Khan.¹² in various cities of Pakistan.

Fluorosis patients were classified according to clinical severity using Dean's Index of scoring dental fluorosis. Males with dental fluorosis were 80 (41%) and affected females were 117(59%). 44(22%) showed very mild, 39(20%) showed mild, 77(39%) showed moderate, and 37 (19%) showed severe dental fluorosis.

Young adult patients were more among the patients visiting the department. Only three (2%) patients were below 10 yrs, 35 (18%) were in the age group of 10-20 years, which was closer to the findings seen by (CDC, USA) 30, 83 (42%) were in the age group of 20-30 years, 51 (26%) were in the age group of 30-40 and remaining 25 (12%) belonged to above 40 years of age. It was closer to the findings by (CDC).³⁰ This indicates that people of 10-40 years age group are more affected by dental fluorosis as found by (CDC).³⁸ and also they are more concerned about their teeth and getting awareness to visit the dentist to improve their esthetics and get possible available treatment.

CONCLUSION

Continued research, therefore, should monitor the prevalence and severity of enamel fluorosis in the populations, and investigate further the causes of fluorosis. Since there are many possible sources of ingested fluoride, studies that look simultaneously at the effects of these multiple sources are needed. Dental fluorosis is becoming an alarming health signal in Pakistan and throughout the world. It is showing an increasing levels and most of it is related to common drinking water fluoride levels in Pakistan where natural fluoride concentrations are the main source and it should be taken seriously to prevent dental as well as other health related matters. Only recently have these types of studies been undertaken.³¹⁻³³ As individuals who are immunocompromised (e.g., AIDS, transplant, and bone-marrow-replacement patients) could be at greater risk of the immunologic effects of fluoride.³⁵ It is illogical to assume that tooth enamel is the only tissue affected by low daily doses of fluoride ingestion.^{36,37}

The choice of fluorosis index is also very important, with the choice being highly dependent on whether the study will investigate prevalence or seek to discover underlying risk factors.³⁴ Historically, the esthetic dimension of fluorosis has been assessed primarily as the judgment of the clinical examiner. There is clearly a need for research to assess the esthetic, social and psychological ramifications of enamel fluorosis as expressed by the teenagers and young adults with fluorosis, as well as their parents and peers.

The continuing goal of preventive fluoride regimens should be to reduce maximally the prevalence and severity of decay while minimizing the risk of objectionable enamel fluorosis. Also the government and higher authorities of the area should take necessary action to prevent the spread of fluorosis and its effects on the other body tissues

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