

Oral Hygiene Status and Dental Caries Experience in Patients with Dental Fluorosis Visiting A Private Dental Institution in Chennai

Research Article

Nivetha G¹, Sri Sakthi D^{2*}, Arvind S³

¹ Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India.

² Reader, Department of Public Health Dentistry, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, 600077, India.

³ Reader, Department of Orthodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, 600077, India.

Abstract

Dental fluorosis exhibits as enamel mottling, surface irregularities, leading to plaque accumulation and thereby leading to dental caries and periodontal diseases. The aim of the study was find out the association of oral hygiene status and dental caries in patients with dental fluorosis visiting Saveetha Dental College. A retrospective study was carried out in Saveetha Dental College between June 2019-March 2020. The study population consisted of young adults who reported with dental fluorosis. The data was collected from patients records analysed from the data of 86000 patients between June 2019-March 2020 and entered in Excel sheets. The collected data were subjected to statistical analysis using SPSS software. A chi square test was done and a p value of < 0.05 was considered to be statistically significant. The independent variables present in this study were age and gender. The dependent variables were fluorosis, DMFT and OHI scores. The results showed that 53% of fluorosis patients had less than score of dental caries status and 56% of fluorosis had fair oral hygiene status. The study concludes that a lesser degree of dental caries and fair oral hygiene status were found in out patients with dental fluorosis.

Keywords: Fluorosis; Oral Health; Young Adults.

Introduction

Oral health is recognised and accepted as equally important when compared to general health. Oral health can be defined as standard health of the oral and related tissues which enables individuals to eat, speak and socialize without active-disease, discomfort which contribute to general health [1]. Oral disease can be considered as a public health problem due to their higher prevalence and social impact [2]. Poor oral health affects the quality of life in children, adults and old people. In adults, routine daily activities may be disrespected and lead to economic loss [3]. Poor oral hygiene and nutritional practices disturb the ecological homeostasis in plaque thereby causing an inexorable shift in plaque ecology towards highly cariogenic microorganisms [4].

Dental caries are multifactorial, primarily depending on host,

agent and environmental factors. It is formed by the interaction between acid producing bacteria and fermentable carbohydrate which leads to a break in the balance between demineralization and remineralization [5]. Streptococcus mutans and Lactobacillus acidophilus are the primary causative microorganisms for the development of dental caries [6]. It is the most common chronic disease that interferes with normal nutrition intake, speech, and daily routine activities. Dental caries are the major oral health problems and indicators of oral health problems all over the world [7]. The prevalence of dental caries has high graded society and wide geographic spread [8]. Fluoride is an essential component for normal mineralization of bones and dental enamel [9]. The main source of fluoride for the human body is usually in drinking water that covers about 75-90% of daily intake [10]. The higher concentrations of fluoride causes serious health problems namely dental fluorosis, skeletal fluorosis and non-skeletal fluo-

*Corresponding Author:

Sri Sakthi,
Reader, Department of Public Health Dentistry, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, 600077, India.
Tel: 8122399966
E-mail: srisakthi@saveetha.com

Received: September 06, 2020

Accepted: October 09, 2020

Published: October 27, 2020

Citation: Nivetha G, Sri Sakthi D, Arvind S. Oral Hygiene Status and Dental Caries Experience in Patients with Dental Fluorosis Visiting A Private Dental Institution in Chennai. *Int J Dentistry Oral Sci.* 2020;7(10):955-959. doi: <http://dx.doi.org/10.19070/2377-8075-20000189>

Copyright: Sri Sakthi ©2020. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

rosis. Dental fluorosis is considered the earliest sign of fluoride intoxication. Fluorosis may have direct as well as indirect effect on oral hygiene status. It causes failure of cemental resorption leading to hypercementosis and osteonecrosis [11]. Indirectly, it causes plaque associated periodontal disease [12].

Fluorides is the protective agent for dental caries [13]. The use of fluorides for prevention of dental caries has been proven to be a safe and effective public health strategy to reduce the burden of dental disease of the population in industrialized and developing countries. Adequate program monitoring and quality control maintenance can minimize occurrence of enamel mottling in communities using fluorides for dental caries prevention [14]. Previously our team has conducted numerous cross sectional studies [7, 15, 16], clinical trials [4, 6, 17-20], *in-vitro* studies [9, 21, 24] and review (25 over the past 5 years. Now we are focussing on epidemiological surveys. The present aimed to find out the degree of dental caries and oral hygiene status in fluorosis patients among young adults who visiting Saveetha Dental College.

Materials and Methods

Study design

Retrospective study.

Study population

A retrospective study was carried out among young adults reporting to Saveetha Dental College and Hospital. The study was conducted between June 2019-March 2020. The study population consisted of young adults .i.e 18-35 years who were reported with dental fluorosis.

Ethical approval

Ethical approval was obtained from the Institutional Ethical Committee and Scientific Review Board (SRB) of Saveetha Dental College. SDC/SIHEC/2020/DIASDATA/0619-0320.

Data collection

The data were collected by analyzing the records of 86000 patients between June 2019-March 2020. The data comprised 100 patients who were reported with dental fluorosis. The data includes patient's details, OHI score, DMFT score and fluorosis

score. The dental fluorosis were assessed by Dean's Fluorosis Index and categorized as very mild, mild and questionable. The oral hygiene status were assessed by Oral Hygiene Simplified Index and categorized as good, fair and poor. The dental caries status were assessed by DMFT (Decayed-Missing-Filled-Teeth index) and categorized as score of less than 5, 5-10 and greater than 10.

Data analysis

The collected data were entered in Excel sheet and subjected to statistical analysis using SPSS software. Chi square test were done between DMFT and fluorosis score, OHI and fluorosis and OHI and DMFT. The independent variables were age and gender while dependent variables were OHI, DMFT and fluorosis. The level of significance is $p < 0.05$.

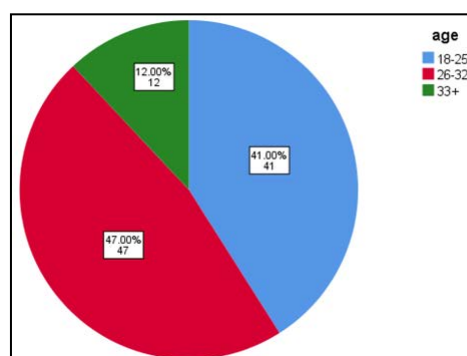
Results and Discussion

Dental fluorosis is recognised as an oral health disease of public health. It results in poor esthetic appearance which may have a psychological bearing and leading to low confidence level [26]. Adulthood is the stage where the individuals lay the foundation for oral health, environmental factors, parental care, socioeconomic status are the elements which shape the individual's attitude towards oral hygiene and treatment needs.

Our aim in this study was to find out the association of oral hygiene status, dental caries in fluorosis patients visiting Saveetha Dental College. Totally, 100 fluorosis patients were included in this study. About 41% were 18-25 age group, 47% were 26-32 age group and 12% were 32+ age group (chart 1). Out of 100 fluorosis patients, 77% were Male and 23% were females (chart 2).

Majority of patients with very mild fluorosis had fair oral hygiene status and < 5 DMFT score whereas patients with mild fluorosis had fair oral hygiene status and were in 5-10 DMFT score category. Patients with questionable fluorosis had fair oral hygiene status and < 5 DMFT score status. About 56% fluorosis patients had scores of > 5 DMFT score which was found to be statistically not significant (graph 1). Previous studies conducted by Sudhakar et al, Koteha et al, Tsutusi et al and Mascarenhas et al [27-30] reported with lesser degree of dental caries status in dental fluorosis patients which is similar to our present study. 53% of dental fluorosis patients had fair oral hygiene status. Association between OHI(s) and dental fluorosis was found to be statistically not significant (graph 4). The study conducted by Vora k et al,

Chart 1. Depicts the distribution of study population based on age. It shows that most number of patients with dental fluorosis were seen in 26-32 years age group [47.00%] followed by 18-25 years age group [41.00%] and least was among 33+ years age group [12.00%].



Shetty et al., and Reddy et al., [31-33] concluded that poor oral hygiene status was seen in dental fluorosis patients which was dissimilar to our present study. More number of patients with fair oral hygiene status had <5 DMFT score. A chi square analysis was done to check the association between DMFT score and Oral hygiene status of study population, even though a difference was observed based on the level of oral hygiene, it was not found to be statistically significant (graph 5).

Limitation

The main of this study is limited sample size and confined to a single source for data. Further descriptive studies on a larger scale can help us to give comprehensive data for arriving at a conclusion and to plan health oral health programs for the population

studied.

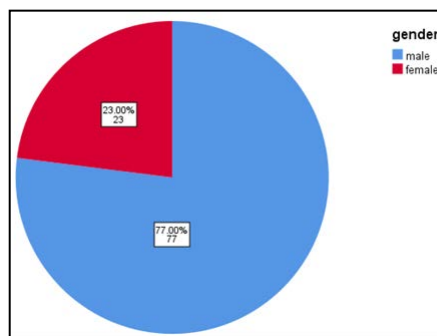
Conclusion

Within the limitations of the current study, it can be concluded that low to moderate level of caries risk was found in patients with dental fluorosis and cumulatively the oral hygiene status of the patients was found to be fair; indicating the need to educate the patients on proper brushing methods and oral hygiene practice, thereby reducing the dental caries risk also.

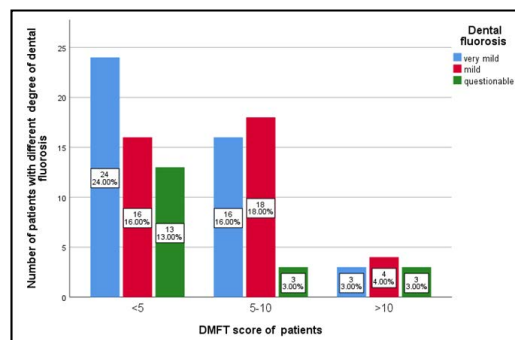
Acknowledgement

I sincerely express my gratitude and acknowledgement to Dr. Sri-

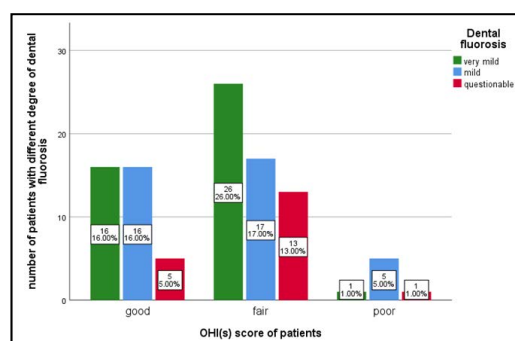
Chart 2. Depicts the distribution of study population based on gender. It shows that more number of male patients [77.00%] reported with dental fluorosis when compared to female patients [23.00%].



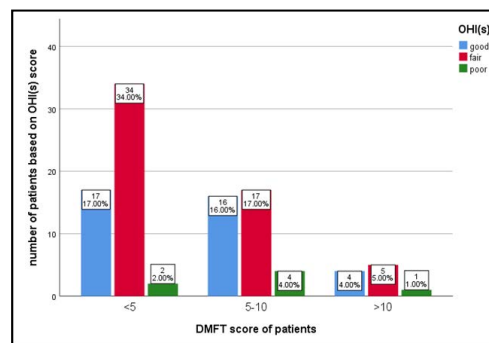
Graph 1. This graph represents the association between DMFT score and dental fluorosis in young adult patients. X axis represents DMFT score of patients and Y axis represents number of patients with different degrees of dental fluorosis. It was seen that majority of patients with very mild fluorosis (blue) had DMFT score less than 5. Chi square test was done (p-value=0.603), and it was not significant. Hence proving that there is no significant association between dental caries experience and different degree of fluorosis.



Graph 2. This graph represents the association between OHI(s) and dental fluorosis of young adults. X axis represents OHI score of patients and Y axis represents number of patients with degree of dental fluorosis. It was seen that the majority of patients with fair oral hygiene status had very mild dental fluorosis (green). Chi square test was done (p-value=0.209), and it was not significant. proving that there is no significant association between Oral hygiene status of patients and patients with different degrees of dental fluorosis.



Graph 3. This graph represents the association between OHI(s) and DMFT scores of young adults. X axis represents DMFT score of patients and Y axis represents number of patients based on their oral hygiene status. Even though, majority of the patients with good (blue) and Fair (red) oral hygiene were in <5 and 5-10 DMFT score category, A chi square test done (p-value=0.884), revealed no statistically significant association between the two variables in the study population.



Sakthi and Dr. Arvind Sivakumar and Dean and management for their support and also thank the Research and IT department of Saveetha dental college for their affable assistance in analyzing the data.

References

- Azodo CC, Ehizele AO, Umoh A, Ojehanon PI, Akhionbare O, Okechukwu R, et al. Perceived oral health status and treatment needs of dental auxiliaries. *Libyan J Med.* 2010 Mar 15;5:4859. Pubmed PMID: 21483589.
- Nagaraj P, Mani G. Knowledge, Attitude and Practice Among 13–15 Years Old School Children Towards Oral Hygiene. *Indian J Public Health Res Dev.* 2019;10(3):149-53.
- Naito M, Yuasa H, Nomura Y, Nakayama T, Hamajima N, Hanada N. Oral health status and health-related quality of life: a systematic review. *J Oral Sci.* 2006;48(1):1-7.
- Samuel SR, Acharya S, Rao JC. School Interventions-based Prevention of Early-Childhood Caries among 3-5-year-old children from very low socioeconomic status: Two-year randomized trial. *J Public Health Dent.* 2020 Jan;80(1):51-60. Pubmed PMID: 31710096.
- Peres MA, Peres KG, de Barros AJ, Victora CG. The relation between family socioeconomic trajectories from childhood to adolescence and dental caries and associated oral behaviours. *J Epidemiol Community Health.* 2007 Feb;61(2):141-5. Pubmed PMID: 17234873.
- Prabakar J, John J, Arumugham IM, Kumar RP, Sakthi DS. Comparing the Effectiveness of Probiotic, Green Tea, and Chlorhexidine- and Fluoride-containing Dentifrices on Oral Microbial Flora: A Double-blind, Randomized Clinical Trial. *Contemp Clin Dent.* 2018 Oct-Dec;9(4):560-569. Pubmed PMID: 31772463.
- Prabakar J, John J, Srisakthi D. Prevalence of dental caries and treatment needs among school going children of Chandigarh. *Indian J Dent Res.* 2016 Sep-Oct;27(5):547-552. Pubmed PMID: 27966516.
- Manjiri J, Mansi T, Ajay P. Prevalence of dental caries, periodontal diseases and periapical pathoses among patients attending a tertiary dental care centre in central Gujarat. A hospital-based cross-sectional study. *Int J Exp Dent Sci.* 2016;5:89-92.
- Kumar RP, Vijayalakshmi B. Assessment of fluoride concentration in ground water in Madurai district, Tamil Nadu, India. *Res J Pharm Technol.* 2017;10(1):309-10.
- Zohouri FV, Rugg-Gunn AJ. Sources of dietary fluoride intake in 4-year-old children residing in low, medium and high fluoride areas in Iran. *Int J Food Sci Nutr.* 2000 Sep;51(5):317-26. Pubmed PMID: 11103297.
- Haikel Y, Turlot JC, Cahen PM, Frank R. Periodontal treatment needs in populations of high- and low-fluoride areas of Morocco. *J Clin Periodontol.* 1989 Oct;16(9):596-600. Pubmed PMID: 2677057.
- Krook L, Veylin GA, Lillie JH, Wallace RS. Dental fluorosis in cattle. *The Cornell Veterinarian.* 1983 Oct 1;73(4):340-62.
- Petersen PE. The World Oral Health Report 2003: continuous improvement of oral health in the 21st century—the approach of the WHO Global Oral Health Programme. *Community Dent Oral Epidemiol.* 2003 Dec;31(Suppl 1):3-23. Pubmed PMID: 15015736.
- Doumit M, Doughan B. Dental caries and fluorosis among children in Lebanon. *Indian J Dent Res.* 2018 May-Jun;29(3):317-322. Pubmed PMID: 29900915.
- KANNAN SS, KUMAR VS, RATHINAVELU PK, INDIRAN MA. AWARENESS AND ATTITUDE TOWARDS MASS DISASTER AND ITS MANAGEMENT AMONG HOUSE SURGEONS IN A DENTAL COLLEGE AND HOSPITAL IN CHENNAI, INDIA. *WIT Transactions on The Built Environment.* 2017 Sep 7;173:121-9.
- Neralla M, Jayabalan J, George R, Rajan J, MP SK, Haque AE, et al. Role of nutrition in rehabilitation of patients following surgery for oral squamous cell carcinoma. *Int. J. Res. Pharm. Sci.* 2019 Oct 16;10(4):3197-203.
- Prabakar J, John J, Arumugham IM, Kumar RP, Srisakthi D. Comparative Evaluation of Retention, Cariostatic Effect and Discoloration of Conventional and Hydrophilic Sealants - A Single Blinded Randomized Split Mouth Clinical Trial. *Contemp Clin Dent.* 2018 Sep;9(Suppl 2):S233-S239. Pubmed PMID: 30294150.
- Mathew MG, Samuel SR, Soni AJ, Roopa KB. Evaluation of adhesion of Streptococcus mutans, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary molars: randomized controlled trial. *Clin Oral Investig.* 2020 Sep;24(9):3275-3280. Pubmed PMID: 31955271.
- Khatrri SG, Madan KA, Srinivasan SR, Acharya S. Retention of moisture-tolerant fluoride-releasing sealant and amorphous calcium phosphate-containing sealant in 6-9-year-old children: A randomized controlled trial. *J Indian Soc Pedod Prev Dent.* 2019 Jan-Mar;37(1):92-98. Pubmed PMID: 30804314.
- Pratha AA, Prabakar J. Comparing the effect of Carbonated and energy drinks on salivary pH-In Vivo Randomized Controlled Trial. *Res J Pharm Technol.* 2019;12(10):4699-702.
- Prabhakar AR, Murthy SA, Sugandhan S. Comparative evaluation of the length of resin tags, viscosity and microleakage of pit and fissure sealants - an in vitro scanning electron microscope study. *Contemp Clin Dent.* 2011 Oct;2(4):324-30. Pubmed PMID: 22346161.
- Pavithra RP, Jayashri P. Influence of Naturally Occurring Phytochemicals on Oral Health. *Res J Pharm Technol.* 2019;12(8):3979-83.
- Mohapatra S, Kumar RP, Arumugham IM, Sakthi D, Jayashri P. Assessment of Microhardness of Enamel Carious Like Lesions After Treatment with Nova Min, Bio Min and Remin Pro Containing Toothpastes: An in Vitro Study. *Indian J Public Health Res Dev.* 2019;10(10):375-80.
- Kumar RP, Preethi R. Assessment of Water Quality and Pollution of Porur, Chembarambakkam and Puzhal Lake. *Res J Pharm Technol.* 2017;10(7):2157-9.
- Harini G, Leelavathi L. Nicotine replacement therapy for smoking cessation-An overview. *Indian J Public Health Res Dev.* 2019;10(11):3588.
- Jackson SL, Vann Jr WF, Kotch JB, Pahel BT, Lee JY. Impact of poor oral health on children's school attendance and performance. *Am J Public Health.* 2011 Oct;101(10):1900-6.
- Anuradha B, Laxmi GS, Sudhakar P, Malik V, Reddy KA, Reddy SN, et al. Prevalence of dental caries among 13 and 15-year-old school children in an endemic fluorosis area: a cross-sectional study. *J Contemp Dent Pract.* 2011 Nov 1;12(6):447-50. Pubmed PMID: 22269235.
- Kotecha PV, Patel SV, Bhalani KD, Shah VS, Mehta KG. Prevalence of dental fluorosis & dental caries in association with high levels of drinking water fluoride content in a district of Gujarat, India. *Indian J Med Res.* 2012 Jun;135(6):873-7. Pubmed PMID: 22825606.
- Tsutsui A, Yagi M, Horowitz AM. The prevalence of dental caries and fluorosis in Japanese communities with up to 1.4 ppm of naturally occurring fluoride. *J Public Health Dent.* 2000 Summer;60(3):147-53. Pubmed PMID: 11109211.
- Mascarenhas AK, Mashabi S. High fluoride concentration in drinking water may increase the prevalence and severity of dental fluorosis, and decrease

- occurrence of caries. *J Evid Based Dent Pract.* 2008 Mar;8(1):15-6.Pubmed PMID: 18346695.
- [31]. Vora KS, Vora PK. Assessment of periodontal status of the patients with dental fluorosis in area with natural high levels of fluoride: A cross-sectional survey. *Dent. Hypotheses.* 2013 Oct 1;4(4):127.
- [32]. Shetty P, Shamala A, Murali R, Mansi Y, Srivastava R, Debnath A. Dental fluorosis and oral health status of 13–15-Year-Old school children of Chikaballapur District: A cross-sectional study. *J Indian Assoc Public Health Dent.* 2017 Apr 1;15(2):140.
- [33]. Reddy J, Parker JR, Africa CW, Stephen LX. Prevalence and severity of periodontitis in a high fluoride area in South Africa. *Community Dent Oral Epidemiol.* 1985 Apr;13(2):108-12.Pubmed PMID: 3857145.