



Association of patients with fluorosis who underwent vital bleaching - A hospital-based study

Sadhvi B¹, Delphine Priscilla Antony S^{*2}, Suresh V³

¹Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai - 600 077, Tamil Nadu, India

²Department of Conservative Dentistry and Endodontics, Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai - 600 077, Tamil Nadu, India

³Department of Prosthodontics, Saveetha Dental College and Hospital Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai - 600 077, Tamil Nadu, India

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ABSTRACT



Fluorosis staining is an esthetic problem, especially when in anterior. Numerous treatment approaches include Conservative approaches such as vital tooth bleaching, which is the most sought option to eliminate fluorosis staining as it is simple, low cost, noninvasive. Further, it is relatively rapid, no distortion of enamel and can be safely used for permanent teeth. This research emphasizes the association of patients with fluorosis who underwent vital bleaching to correct the staining and to obtain esthetically pleasing teeth. This is a comparative and descriptive study for which the data was obtained from DIAS (dental information archiving software). The data collection was from the Undergraduate and postgraduate clinics, Saveetha dental college, SIMATS. The data was collected and compiled, followed by its statistical analysis by using the SPSS software by IBM. Results revealed the incidence of Vital bleaching for fluorosis was 76.7%, and vital bleaching for other reasons was 23.3%; Out of the patients who underwent vital bleaching for fluorosis, males were 86.7%, and females were 13.3% with P-value < 0.05 statistically significant; patients from 1-34 years were 83.3%, 35-55 years were 10.0% and above 55 years were 6.7% with P-value < 0.05 statistically significant. The overall results show a Male predilection in vital bleaching for fluorosis and 1-34 years as the most predominant population for undergoing vital bleaching among fluorosis patients.

*Corresponding Author

Name: Delphine Priscilla Antony S

Phone:

Email: delphine.sdc@saveetha.com

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INTRODUCTION

Dental fluorosis is a developmental disturbance of enamel caused by excessive intake of fluoride during tooth formation (Denbesten and Li, 2011), and characterized by the presence of bilateral, diffuse, thin and horizontal white striations and stained areas. Enamel is subjected to innumerable cycles of demineralization and remineralization (Rajendran et al., 2019). The Altered enamel due to fluorosis may present with a wide range of severity, especially when it is combined with the presence of caries involving enzymes such as MMPs (Teja et al., 2018).

Mild fluorosis appears as opaque or white parchment enamel, while more severe fluorosis can be characterized by brown stains or pitting of enamel. Post-eruptive features of dental fluorosis may include pitting and larger surface destructions of enamel (Aoba and Fejerskov, 2002). L Dental fluorosis is not a condition that causes pain or has clinical symptoms (Chankanka et al., 2010). However, it is possible to observe negative effects of fluorosis, such as embarrassment from or being unhappy with the appearance and hindering smiling, especially in cases involving staining or pitting, typical features of moderate to severe fluorosis (Li et al., 2014).

A review evaluated the relationships between perceptions of dental appearance or oral health-related quality of life with dental fluorosis. They showed that severe fluorosis was consistently reported to be linked to a less favourably dental appearance, also having a negative impact on the individuals (Bhagyajothi and Pushpanjali, 2009). In India, fluorosis was identified in 1937 in Nellore of Andhra Pradesh by Shortt et al. (1937). Geological crust of India, especially South India, has fluoride-rich bearing minerals which can contaminate underground aquifers (Handa, 1975). Nearly 73% of Tamil Nadu is hard rock crust (Mariappan, 2001). In Tamil Nadu, Madurai is a known endemic fluorosis area. It has fluoride level in drinking water of about 1.5 - 5.0 ppm (Meenakshi and Maheshwari, 2006).

Fluorosis stains are generally treated in the light of three concepts: Removing the stained enamel, bleaching the stained tooth, and / or covering the stained area (Ramalho, 2010). The most conservative approaches involve bleaching the teeth, as one of the most challenging tasks in dentistry is to meet the esthetic demands (Nasim et al., 2018). This can be accomplished using a variety of materials that are mostly based on chemicals that produce peroxide ions. The choice of materials, for any procedure, forms the base for the success of the treatment (Manohar and Sharma, 2018). The use of peroxide-based bleaching materials can cause dental sensitivity and less frequently, gingival irritation (Heymann, 1998).

Natural products are not popularly used as they do not give immediate differences on removing the stains, though they do not have any adverse effects (Rajakeerthi and Nivedhitha, 2019). Peroxide based materials are thus commonly used in conservative therapy when compared to other. Even very young patients can be highly concerned over discolouration of their anterior teeth (Siddique, 2019). Therefore, suitable treatments are needed for young permanent teeth that are partially erupted

and have large pulp chambers and incomplete root formation (Janani et al., 2020). To overcome this problem, a conservative treatment approach for the management of yellow-brown intrinsic staining of dental enamel is presented. There are three fundamental approaches for bleaching vital teeth- which are in-office or power bleaching, at-home or dentist-supervised night-guard bleaching, and bleaching with over-the-counter (OTC) products and vital tooth bleaching is the most sought option to eliminate fluorosis staining as it is simple, low cost, non-invasive.

Further, it is relatively rapid, no distortion of enamel and can be safely used for permanent teeth (Croll, 1990). Non-vital teeth bleaching includes chemicals such as sodium perborate commonly and also chemicals like chlorhexidine that serves as a vehicle (Noor and Pradeep, 2016; Ramanathan and Solete, 2015).

Previous research by Joshi (2016), studied the varied treatment options for fluorosis staining and revealed that vital bleaching and veneers were most preferred among the patients. Penumatsa and Shaneshha (2015) studied the agents for vital bleaching and revealed that hydrogen peroxide gives the best results.

However, the Challenges faced in previous articles were they could not find all the side effects of vital bleaching; and the number of patients with fluorosis willing to take up bleaching.

This research emphasizes the association of patients with fluorosis who underwent vital bleaching to correct the staining and to obtain esthetically pleasing teeth. As a dental practitioner, it is important to ensure that the patient is aware of the process of bleaching and their side-effects. Aim of this study is to examine the association of fluorosis patients who underwent vital bleaching.

MATERIALS AND METHODS

This study was carried out in a university setting which consists of subjects of the predominantly South Indian population. Pros of this study include available data, similar ethnicity. Cons of this study are the fact that it is a uni centred study and the geographic locations, trends are not assessed. Approval for the study is by the ethical board of Saveetha University (applied) (Ramamoorthi et al., 2015). The number of people involved includes 3 reviewers - A Guide, researcher and a reviewing expert. This is a retrospective study in which the samples were considered from the time period of May 2019 to February 2020. Case sheets reviewed for the research includes All patients applicable for study,

and cross-verification of the required samples were by a reviewing expert through photographs. Measures were taken to minimise the sampling bias. These are the inclusion of only clear and readily available data, Followed by simple random sampling. Both Internal and external validation was also obtained to carry out the study.

The required data for the study was obtained from DIAS (dental information archiving software), which is a patient management system that records all the patients' data. The required data- i.e., the fluorosis patients who underwent vital bleaching along with the required parameters such as gender and age were collected and entered methodically in an excel sheet for the tabulation of data and further statistical analysis.

Data were validated by 1-2 external reviewers, and all the non-specific, unclear or incomplete data were excluded from the study.

Statistical software used for analysis is the SPSS (statistical package for the social sciences) by IBM and the statistical tests used were chi-square tests, custom tables, frequency tables, bar graphs to analyse and compare the obtained results. The type of analysis performed was exploratory data analysis. Independent variables include ethnicity, reasons for fluorosis, gender, age and the Dependant variables include vital bleaching.

RESULTS AND DISCUSSION

Out of the total sample size (30 cases), the incidence of Vital bleaching for fluorosis is 76.7% and vital bleaching for other reasons is 23.3%. The x-axis represents reasons for vital bleaching, and the y-axis represents the percentage of patients who underwent vital bleaching on a scale of 1-100 (Figure 1); Out of the patients who underwent vital bleaching for fluorosis, males are 86.7%, and females are 13.3%. the x-axis represents gender and y-axis represents the percentage of males and females who underwent vital bleaching for fluorosis on a scale of 1-100 (Figure 2); patients from 1-34 years were 83.3%, 35-55 years were 10.0%, and above 55 years were 6.7%. the x-axis represents gender and y-axis represents the percentage of patients under each age group who underwent vital bleaching for fluorosis on a scale of 1-100 (Figure 4). Chi-square test showing the association of gender and reasons for vital bleaching revealed that among both males and females, fluorosis is significant over other reasons for vital bleaching with p-value < 0.05 statistically significant. the x-axis represents gender, and the y-axis represents the number of patients under each category on a scale of 1-100 (Figure 3).

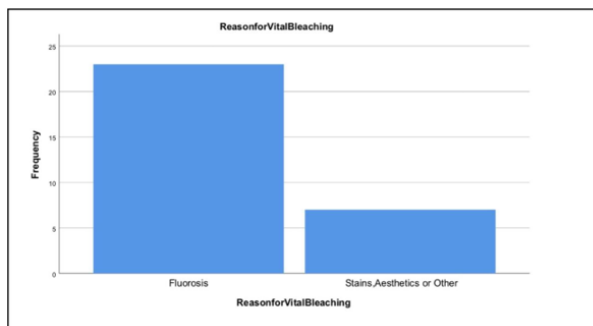


Figure 1: Bar graph representation of frequencies of various patients who underwent vital bleaching

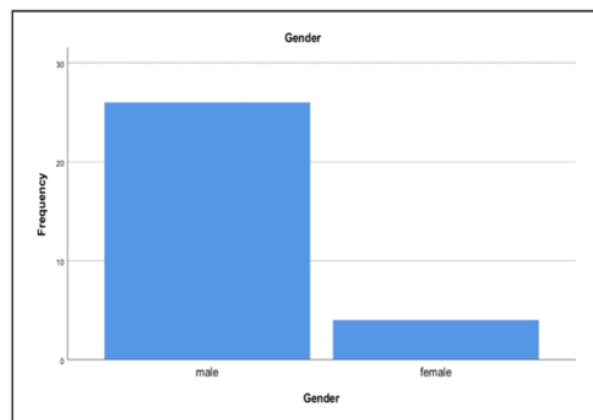


Figure 2: Bar graph representation of frequencies of males and females who underwent vital bleaching for fluorosis

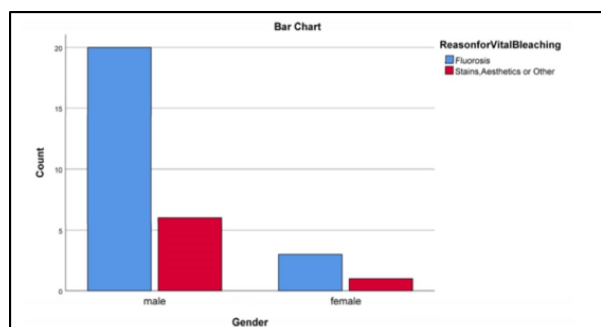


Figure 3: Bar graph depicting association of gender and reasons for vital bleaching

Similarly, the chi-square test showing the association of age and reasons for vital bleaching revealed that in the younger population, i.e., 1-34 years, fluorosis is significant over other reasons for bleaching. In contrast, in the middle-aged population, other reasons are more significant. In the age group above 55 years, both fluorosis and other reasons are equally significant - x-axis represents age groups. The y-axis represents the number of patients under each category on a scale of 1-100. Chi-square tests between various age groups and reasons for vital

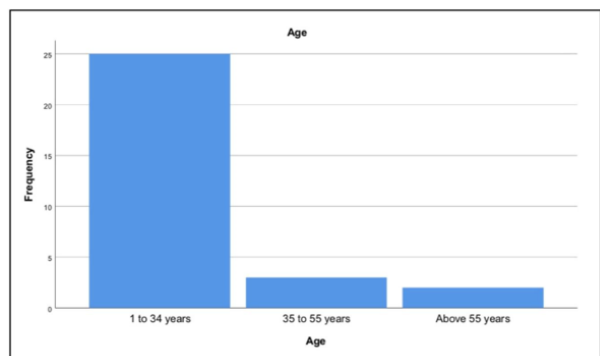


Figure 4: Bar graph representation of the frequencies of various age groups who underwent vital bleaching for fluorosis

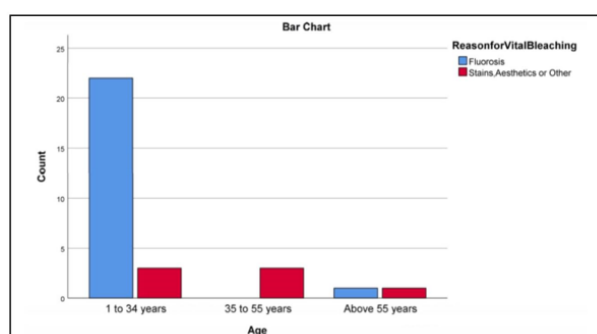


Figure 5: Bar graph depicting association of age and reasons for vital bleaching

bleaching reveal p-value < 0.05 statistically significant (Figure 5).

Considering the high prevalence of dental fluorosis in many states of India, this study was conducted to investigate the association of fluorosis patients who are opting for the removal of unaesthetic dental fluorosis stains with other essential parameters associated such as gender and age. These events and their clinical management can present as important challenges to the odontologist (Kumar and Antony, 2018) and Rapid treatment can prevent long term problems to the patient and save the teeth (Jose et al., 2020). Thus, this article also dwells on the need for the dentists to be aware of their local indigenous pathologies such as fluorosis that causes detrimental effects on the dentition and to treat it in a better manner with the complete knowledge of the techniques, side effects of the treatment options such as veneers and vital bleaching, as they are the most sought after options to treat stainings due to fluorosis. A veneer is a thin sheet of material placed on the front surface of the tooth used for aesthetic purposes and protection (Ravinthar and Jayalakshmi, 2018). Vital bleaching, on the other hand, is the adjunct for tooth whitening in esthetics and is thus the topic of discussion in our study.

Association of vital bleaching and Gender revealed male predominance (86.7% males). Supporting our results, Choubisa et al. (2010) stated that fluorosis has a Male predilection and thereby there is a significant increase in the number of males among the fluorosis patients with severe stains opt corrective procedures to eliminate fluorosis stains. Rigo et al. (2010) stated that Females have a higher incidence for fluorosis than males; They are 29% more prone for bleaching procedures when compared to males. The reason for Male predilection in our study is because of the increased general male population when compared to female, thereby in the endemic fluorosis prevalent regions, males are more affected by fluorosis than females and thereby are more in numbers to opt for vital bleaching. However, Our study findings are in concordance with the majority of the results from similar studies.

Association of vital bleaching and Age showed the younger age group as the predominant population who underwent vital bleaching due to fluorosis (1-34 years -83.3%) in our study. Supporting our study, IA Sherwood et al. in 2010 revealed that the Younger population were affected by fluorosis and Bleaching of discoloured teeth in young patients may offer advantages over more conventional treatment involving partial or complete coverage restorations. The reason for the younger population opting for vital bleaching is because they are more concerned aesthetically when compared to older populations. Further, More than a century of experience has shown bleaching to be an effective treatment for the conditions of fluorosis, tetracycline staining, and other conditions such as acquired external and internal discolouration, in agreement with the findings of our study.

Limitations of the study are the non-inclusion of some data in the study that were unclear of certain reporting parameters. Other limitations are the Geographic limitations - assessment of predominantly South Indian population. Further, This study is a Unicentered study, which is also a major limitation.

Future prospects of this study include overcoming the limitations and emphasis on Knowledge and association of vital bleaching with various parameters, as it is essential for a dental practitioner. The increasing demand for tooth bleaching has driven many manufacturers and researchers to develop bleaching products to be used either in the dental office or at home. However, as with any dental procedure, bleaching involves risks and regular maintenance, especially cleaning regularly (Teja and Ramesh, 2019), post-procedure is also essential.

For that reason, this review article is provided to help clinicians improve their information about the bleaching process and their understanding of the controversial issues regarding the effects of bleaching such as enamel erosion (Nasim and Nandakumar, 2018) on teeth, resin composite, and bonding, to help reduce the risks to patients. Finally, Clinicians should inform their patients about the possible changes that may occur on their dental restorations during bleaching procedure as well as the possibility of replacement of the bleached restorations at the end of bleaching treatment.

CONCLUSION

Our study assessed the association of vital bleaching in fluorosis patients with various parameters such as age, gender and reasons for vital bleaching. The overall results show a Male predilection in vital bleaching for fluorosis and 1-34 years as the most predominant population for undergoing vital bleaching among fluorosis patients.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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