



## The Prevalence and Willingness for Treatment of Dental Fluorosis in Adult Patients

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### ABSTRACT

Fluoride is an important component for tooth development. However, ingestion of high concentration of fluoride may cause dental fluorosis. In India, it is considered endemic and it has a high prevalence rate due to increased fluoride concentration in groundwater sources. A retrospective study was conducted to evaluate the prevalence and willingness for the treatment of dental fluorosis in adult patients visiting a dental hospital from July 2019 till March 2020. 238 subjects diagnosed with dental fluorosis were selected. Data variables including socio-demographic data such as age and gender, dental fluorosis and treatment received for dental fluorosis were retrieved and analyzed using Statistical Package for Social Sciences Version 20. The results revealed that dental fluorosis was common in patients within 10-25 years and most prevalent in males. Among the diagnosed patients, 9.7% of them were willing to receive treatment for dental fluorosis such as bleaching, indirect veneering, direct veneering, and a combination of bleaching and indirect veneering which was statistically insignificant in gender ( $p > 0.05$ ) but significant in age ( $p = 0.048$ ). Within the limitations of the study, the prevalence of dental fluorosis was 0.57% which was highest in 10-25 years and males. The willingness for treatments of dental fluorosis was low with 9.7%.

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### KEYWORDS

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## INTRODUCTION

Fluoride is found to be an effective component to prevent dental caries [1,2]. Thus, it is important for us to ingest fluoride, but at the recommended level to avoid dental fluorosis. The main sources of fluoride are water, toothpaste, fluoride supplements and dental materials [3]. Fluoride also acts as a remineralizing agent [4].

Fluorosis is an endemic disease that can be seen in countries with an increase concentration of fluorides such as India, Sri Lanka, China, Eastern Africa, the Middle East and South America [5–8]. According to fluoride level, fluorosis can be classified into dental and skeletal fluorosis [9]. Dental fluorosis is a developmental disturbance due to excessive exposure to fluoride during enamel formation. The most common severely affected teeth are premolars and permanent second molars [10].

In order to assess the prevalence and severity of dental fluorosis, assessments such as the Thylstrup-Fejerskov Index (TFI) and Dean's Fluorosis Index (DFI) are commonly used. The modifications of DFI have been widely used in epidemiological studies and for the longest time and considered as a gold standard index [11].

Due to the high prevalence of dental fluorosis, it is important to create awareness and provide knowledge and information regarding dental fluorosis and the available treatment options. Meetika et al reported that there was a lack of knowledge about dental fluorosis in the Meerut district, Uttar Pradesh [9]. Their aesthetic concern can be fulfilled by getting the necessary treatment of dental fluorosis such as bleaching, microabrasion, macroabrasion, veneers, composite restoration and crowns [12]. A veneer is a thin layer of restorative material replacing the enamel for the aesthetic purpose [13]. To achieve a restoration that matches natural tooth color and appearance is one of the challenging tasks in aesthetic dentistry [14]. Besides, the evolution of composite restoration provides an improvement in the aesthetic and functionality [15].

Previously our teams had conducted numerous studies in the field of Endodontics such as clinical trials, in vivo and in vitro studies [16–35]. Now, we wanted to focus on studies related to the community level. Therefore, this study was done to evaluate the prevalence and willingness for the treatment of dental fluorosis among adult patients.

## MATERIALS AND METHODS

A retrospective study was conducted involving patients visiting a dental hospital from July 2019 till March 2020. The Institutional Ethics Committee has granted the study with the following ethical approval number SDC/SIHEC/2020/DIASDATA/0619-0320.

The records of the patients who reported to a University Hospital were analysed. Patients diagnosed with dental fluorosis were included in the study. Data variables such as demographic information of the patients diagnosed with dental fluorosis and treatment received for dental fluorosis were retrieved and recorded.

Data analysis was done using the Statistical Package for Social Sciences (SPSS) for Windows (version 20). A Chi-square test was done to determine the association of sociodemographic distribution such as age and gender with the willingness of treatment of dental fluorosis. The level of statistical significance was considered significant at  $p < 0.05$ .

## RESULTS AND DISCUSSION

The study was done to evaluate the prevalence and willingness of patients for treatment of dental fluorosis as it may affect their quality of life such as communication, performance and self-esteem.

A total of 238 patients were diagnosed with dental fluorosis. The hospital prevalence rate of dental fluorosis was 0.57%. In comparison to other studies, Prabhu et al reported the prevalence of 60.6% in the Kanchipuram district, Maya Ramesh et al reported the prevalence of 30.8% and 63.1% and Baskaradoss J.K reported the prevalence of 15.8% [36–39]. Studies showed that in Tamil Nadu, certain districts like Salem, Dharmapuri and Krishnagiri were the most affected compared to the city area [40]. The occurrence of dental fluorosis may vary widely among different locations even though they have similar fluoride concentrations [41].

The present study revealed that dental fluorosis was prevalent in males (73.9%) than females (26.1%) as shown in Graph 1. Similar to the study done by Riga Lilian et al, they reported males had the highest prevalence rate of dental fluorosis [42]. However, the prevalence has been found to vary between genders. In the study done by Idon et al, dental fluorosis was commonly seen in females due to high female clinic attendance and their aesthetic concerns [42].

Dental fluorosis was commonly seen in the 10-25 years' age group (49.6%) and decreased with increasing age among the patients as shown in Graph 2. Similar to the study done by Idon et al, 16-25 years age group had the highest prevalence rate [41]. In the study done by Alia S et al, 20-30 years age group had the highest prevalence rate [43]. This may be due to the higher number of younger patients diagnosed with dental fluorosis who attended dental hospitals for treatment. Besides, in elderly patients, due to severe oral disease, such as completely missing teeth, it was impossible to diagnose dental fluorosis.

Among the patients diagnosed with dental fluorosis, only 9.7% of them were willing to receive treatment and 90.3% of the patients were not willing to receive treatment for dental fluorosis which was not significant ( $p>0.05$ ). A higher number of males (10.8%) were willing for treatment of dental fluorosis than females (7.5%). Based on Graph 3, males preferred bleaching (85.7%), direct veneering (80%) and bleaching with indirect veneering (100%). An equal number of males and females received indirect veneering to treat dental fluorosis (50%). However, 73% of males and 27% of females did not receive any treatment for dental fluorosis.

Based on Graph 4, a greater number of patients in the 10-25 years age group (85.7%) followed by 26-40 (7.1%) and 66-80 years age groups (7.1%) received bleaching as a treatment. A higher number of patients in the 10-25 years age group (80%) followed by 26-40 years age group (20%) received direct veneering as a treatment for dental fluorosis and none from the 41-65 (0%) and 66-80 (0%) years age group. Meanwhile, patients in the 10-25 years age group (100%) received indirect veneering as a treatment and none from other age groups. An equal number of patients in 10-26 (50%) and 26-40 (50%) years age groups received bleaching with indirect veneering for the treatment of dental fluorosis and none from 46-60 (0%) and 61-80 (0%) years age groups. However, 10-25 (46%), 26-40 (45.6%), 41-60 (7.9%) and 66-80 (0.5%) years age groups did not receive any treatment for dental fluorosis which was statistically significant ( $p=0.048$ ).

Idon et al reported that the prevalence of patients seeking treatment of dental fluorosis was 8.9% and 9.3% based on age and gender respectively which was similar to the present study [41]. This study revealed that younger patients were willing for treatment because they have the greatest concern in aesthetics. However, the willingness for treatment was low among the diagnosed patients. The severity of dental fluorosis might be correlated with the reason for seeking treatment from the dentist. Those with moderate to severe dental fluorosis are more concerned with their aesthetic appearance [41,44,45]. Patients with mild fluorosis may not concern their aesthetics and the need for treatment as long as it does not affect their quality of life.

### Limitations

Since the present study was done in a university hospital-based setting, there was a presence of geographical variations. Other limitations were small sample size and observer bias.

### Future Scope

The limitations can be improved by conducting a community-based study with a larger sample size. Besides that, we should emphasize the knowledge and awareness of dental fluorosis among patients and explain the available treatment options.

### CONCLUSION

Within the limitations of the study, the prevalence of dental fluorosis in the Chennai population was 0.57% which was the highest in 10-25 years and males. The willingness for treatment of dental fluorosis was low with 9.7%.

### AUTHOR CONTRIBUTION

All authors have equal contribution in bringing out the research work.

### CONFLICT OF INTEREST

There was no conflict of interest declared by authors.

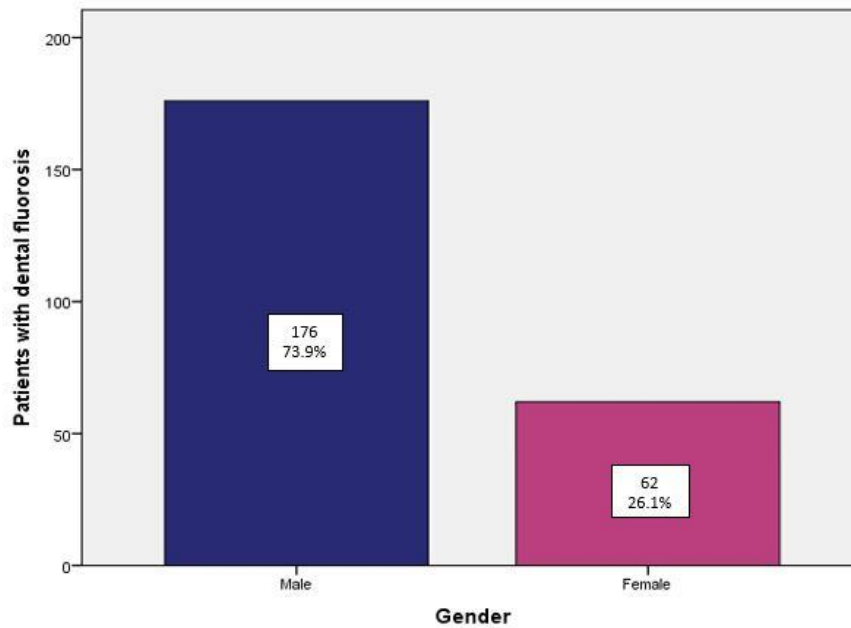
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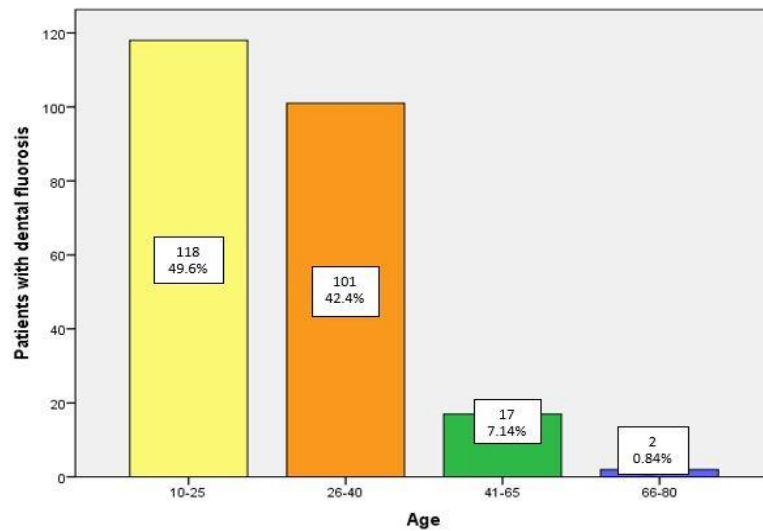
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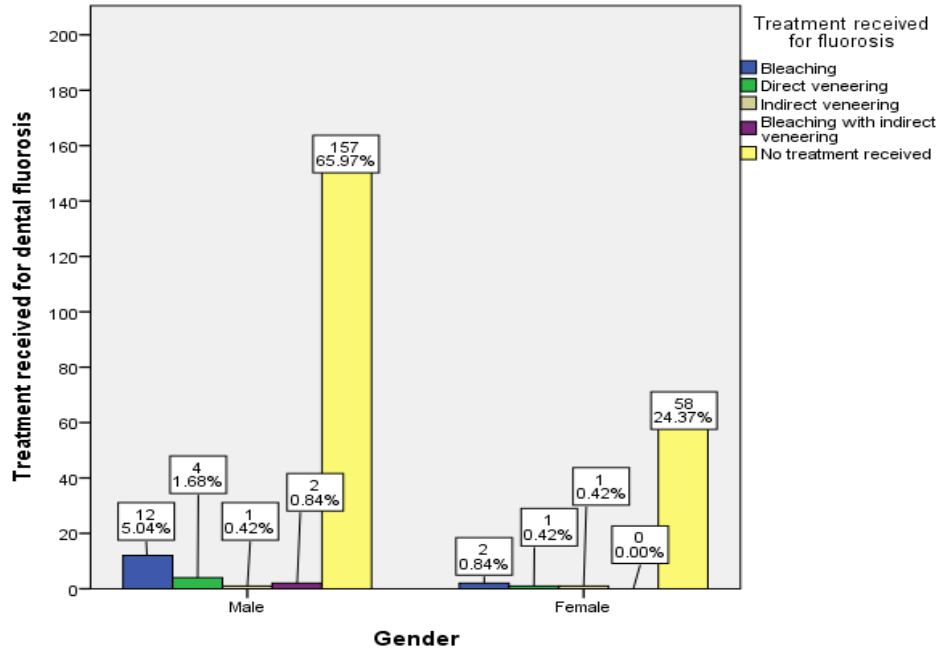
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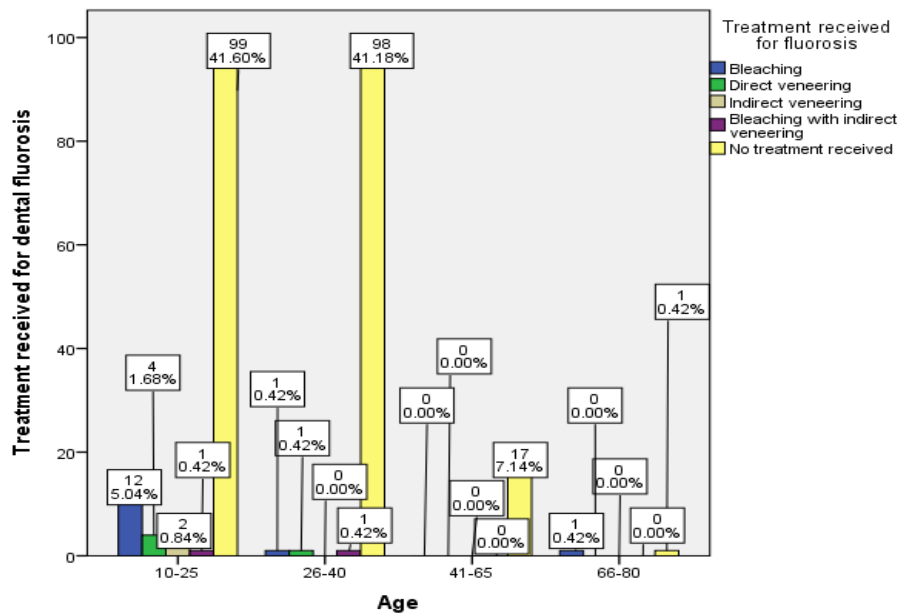
**Graph 1:** The bar chart represents the frequency distribution of dental fluorosis based on gender. X-axis represents gender and Y-axis represents the presence of dental fluorosis (Male-blue, female-pink). Dental fluorosis was higher in males (73.9%) than females (26.1%).



**Graph 2:** The bar chart represents the frequency distribution of dental fluorosis based on age. X-axis represents the age and Y-axis represents the presence of dental fluorosis (10-25 years-yellow, 26-40 years-orange, 41-65 years-green and 66-80 years-blue). Dental fluorosis was higher in 10-25 years (49.6%) followed by 26-40 years (42.4%), 41-65 years (7.14%) and 66-80 years (0.84%).



Graph 3: The bar chart represents the association of gender with the treatment received for dental fluorosis. X-axis represents the gender and Y-axis represents the treatment received for dental fluorosis (bleaching-blue, direct veneering-green, indirect veneering-brown, bleaching with indirect veneering-purple and no treatment received-yellow). (Pearson Chi-square value: 2.497<sup>a</sup>, df: 4, p-value: 0.645 (>0.05), hence, not significant). A higher number of males received treatment for dental fluorosis compared to females but it was statistically not significant.



Graph 4: The bar chart represents the association of age with treatment received for dental fluorosis. X-axis represents age and Y-axis represents the treatment received for dental fluorosis (bleaching-blue, direct veneering-green, indirect veneering-brown, bleaching with indirect veneering-purple and no treatment received-yellow). (Pearson Chi-square value: 21.138<sup>a</sup>, df: 12, p-value: 0.048 (<0.05) hence, significant). A higher number of patients in the 10-25 years age group received treatment for dental fluorosis compared to other age groups which were statistically significant.