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PERIODONTAL STATUS IN PATIENTS WITH DENTAL FLUOROSIS - A RETROSPECTIVE ANALYSIS

S.HARRITA[1], M. JEEVITHA[2*] AND SENTHIL MURUGAN.P[3]

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

2: Senior lecturer, Department of Periodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, India

3: Associate professor, Department of Oral and Maxillofacial Surgery, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences,S aveetha University, Chennai, India

***Corresponding Author: E Mail: Dr. M. Jeevitha: jeevitham.sdc@saveetha.com**

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ABSTRACT

Periodontitis is multifactorial in nature, the various determinants of periodontal disease are age, sex, race, socio-economic status and risk factors. Dental fluorosis is a developmental disturbance of dental enamel, caused by successive exposures to high concentrations of fluoride during tooth development, leading to enamel with lower mineral content and increased porosity. There is inconsistent epidemiological data on periodontal status of subjects with dental fluorosis. The aim of the study is to retrospectively analyse the periodontal status in patients with dental fluorosis. A retrospective university setup study where the data were collected from the record management system, where 86000 case sheets were revived and analysed out of which 424 collected data satisfied the inclusion criteria of this study. The data was compiled and statistically analysed using SPSS version 23.0.Within the limits of the study, Out of 424 patients with fluorosis 63.6% had generalised chronic gingivitis, 12.9% had localised chronic gingivitis, 12.9% had generalised chronic gingivitis with localised chronic periodontitis, 5.6% had generalised product

periodontitis, 4% had localised chronic periodontitis, 0.7% had localised chronic gingivitis and localised chronic periodontitis. It can be concluded that generalised chronic gingivitis was more commonly seen in the patients with mild fluorosis, Both generalised chronic gingivitis and generalised chronic periodontitis was common in males with dental fluorosis than females. Generalised chronic gingivitis was more commonly seen in patients with dental fluorosis in the age group of 18-30 years. This study provides epidemiological significance of the periodontal status of patients with dental fluorosis and provides the need for patient education about the effects of fluorosis on periodontium.

Keywords: Periodontitis; Fluorosis; Gingivitis; Periodontal disease

INTRODUCTION

Oral disease forms an important health problem and the community in the last decade there has been an increase in prevalence of dental health problems in India **[1]**.

Prevalence of periodontal disease in India ranges from 90% to 95% in different population group **[2]**. Periodontal disease is one of the two major dental diseases that affect human populations worldwide at high prevalence rates and it was observed that the prevalence of periodontal disease is greater in developing countries than the industrialized ones. Although the effect of fluoride in a reduction of dental caries is well established it effect on periodontal tissue is obscure.[2,3] Studies to assess the periodontal status among the subjects and high fluoride areas have been done in various parts of the country **[4, 5]**.

Dental fluorosis is a developmental disturbance of dental enamel, caused by successive exposures to high concentrations of fluoride during tooth development, leading to enamel with lower mineral content and increased porosity. The severity of dental fluorosis depends on when and for how long the overexposure to fluoride occurs, the individual response, weight, degree of physical activity, nutritional factors and bone growth, suggesting that similar dose of fluoride may lead to different levels of dental fluorosis **[6]**. Data regarding the periodontal status among the subject in high fluoride areas haven't been done in Tamil Nadu **[7]**. In general a higher level of gingival inflammation has been observed in fluorosis that in non-fluorosis area **[8-10]**. However several studies have found no difference in periodontal condition between fluoride and non-fluoride areas **[11, 12]**. Better gingival conditions in fluoride compared to non-

fluoride area have been reported by others. **[13-15]**. Alternatively fluoride may indirectly influence the periodontal status by definite decrease in plaque accumulation from low to high fluoride areas as reported by Anuradha *et al.* **[16]**. While, another study by Reddy *et al.,* reported that the conversion of hydroxyapatite to fluorapatite in cementum in a high fluoride area renders the periodontium resistant to breakdown **[17]**. No effort appears to have been reported in the literature to account for increased periodontal disease in high fluoride areas apart from blaming poor oral hygiene and plaque level. In addition to the inflammatory process that are common to high and normal fluoride level of water changes in fluorosed hard and soft tissues of periodontium suggest that The fluoride should be suspected as an Etiological agent for periodontal disease **[18]**. Thus the aim of the study is to evaluate the correlation between dental fluorosis and periodontal disease.

MATERIALS AND METHODS

Study setting

This study was done in a university setting among patients visiting Saveetha Dental College, Chennai. Approval from the ethical committee was obtained (SDC/SIHEC/2020/DIASDATA/0619-0320). Two examiners are involved in this study.

Sample Collection

In this retrospective study, a total of 86000 case sheets were reviewed out of which 424 data was collected from June 2019 and March 2020. Cross verification of data for errors was done by presence of additional reviewers and by photographs. Simple random sampling was done to minimize sampling bias. Study was generalised to the South Indian population.

Data collection/Tabulation

Data of patients who had fluorosis was collected from the record management system of the college and .Data was entered in excel in a methodological manner and imported to SPSS. Incomplete data was excluded from study.

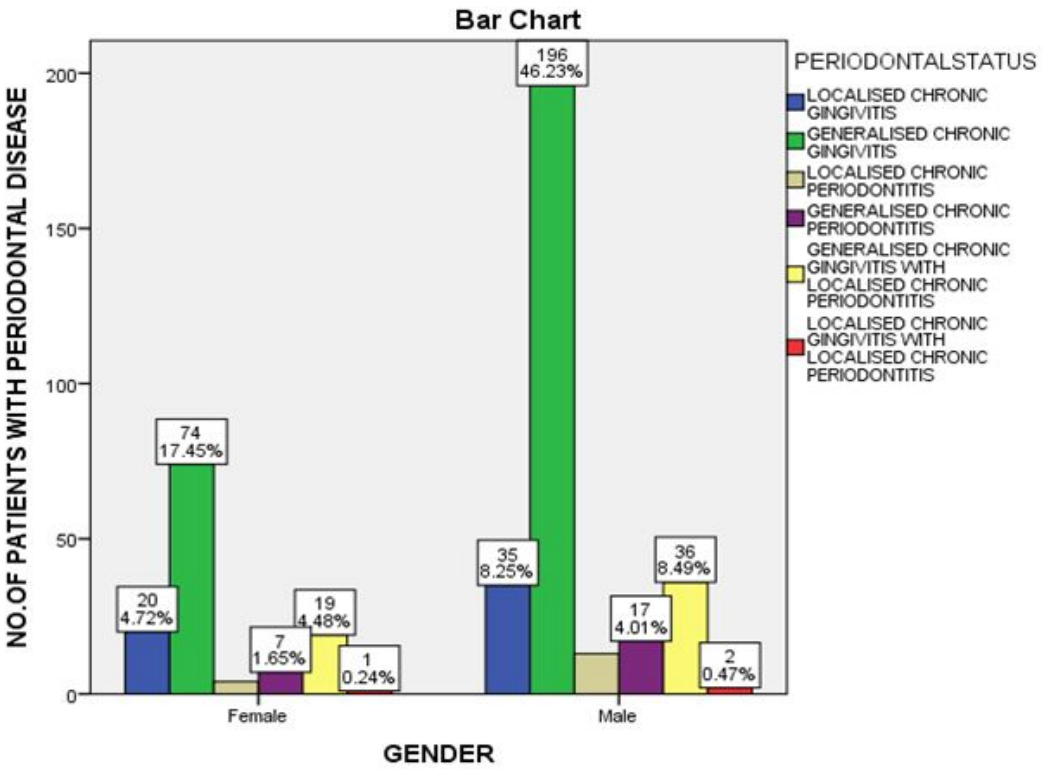
Analysis

IBM SPSS 23.0 software was used for data analysis. Independent variables include age, gender, fluorosis. Dependent variable is periodontal disease. Both descriptive and inferential statistics was done. Frequency distribution was done for age, gender. Chi-square test is done to find the association. $p<0.05$ was considered as statistically significant.

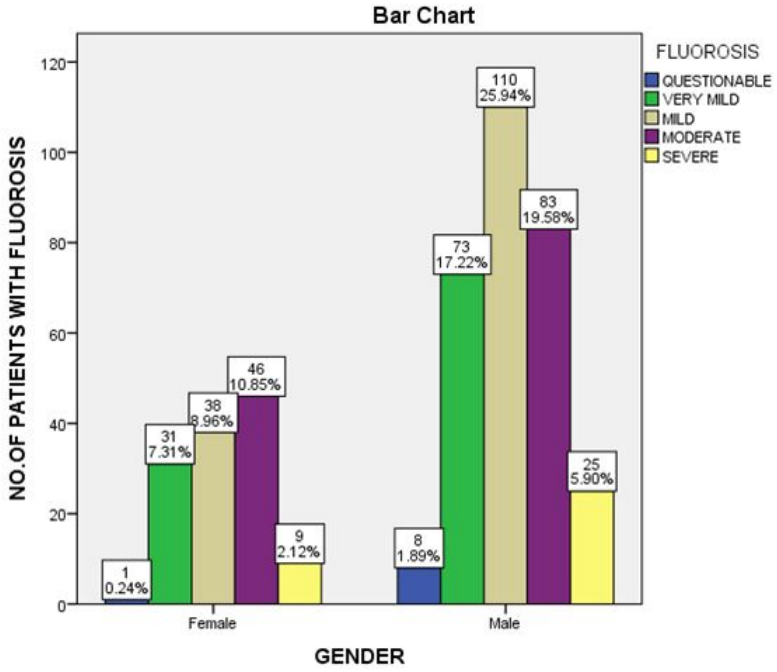
RESULTS AND DISCUSSION

From this study, when association between gender and periodontal disease was done, Generalised chronic gingivitis were more

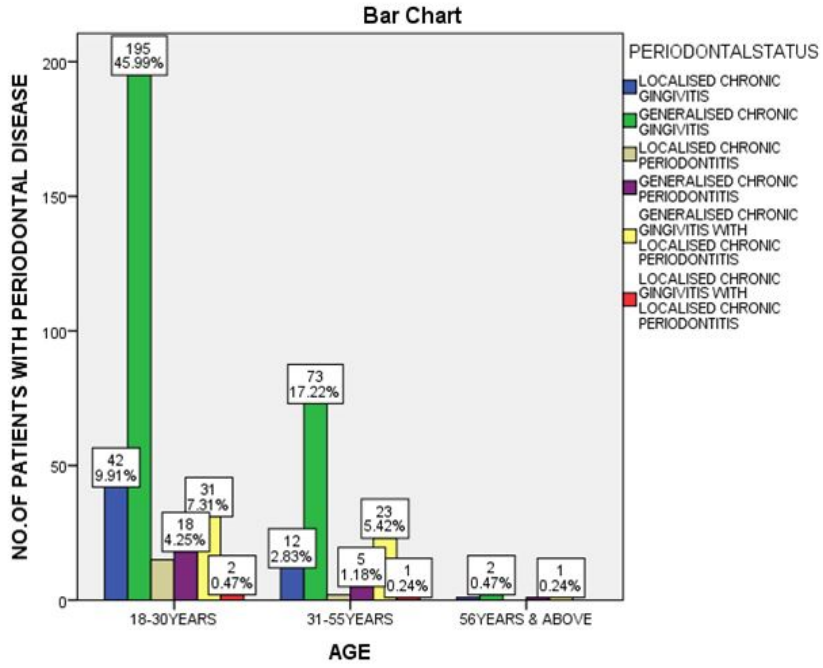
commonly seen in males than females, however this difference was not statistically significant (p>0.05) **(Graph 1)**. When association between gender and dental fluorosis was done, Mild fluorosis was more commonly seen in males than females, however this difference was not statistically significant (p>0.05) **(Graph 2)**. When association between age and periodontal disease was done, Generalised chronic gingivitis was more commonly seen in the age group of 18-30 years, however this difference was not statistically significant (p>0.05) **(Graph 3)**. When association between age and dental fluorosis was done, Mild fluorosis was more commonly seen in the age group of 18-30 years, however this difference was not statistically significant (p>0.05) **(Graph 4)**. When association between dental fluorosis and periodontal disease was done, Generalised chronic gingivitis was more commonly seen in the patients with fluorosis, however this difference was not statistically significant. (p>0.05) **(Graph 5)**.



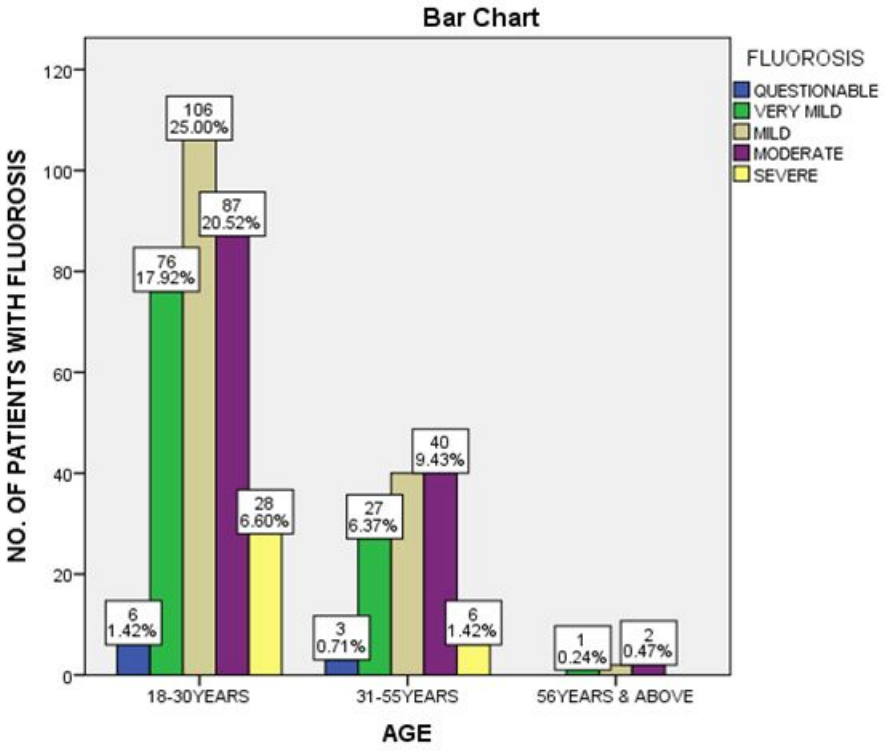
Graph 1: The above depicted bar graph shows association between gender and periodontal disease. X-axis represents gender and Y axis represents number of patients with periodontal disease. Generalised chronic gingivitis were more commonly seen in males than females, however this difference is not statistically significant. Pearson Chi-square test, p= value: 0.730 (p>0.05)



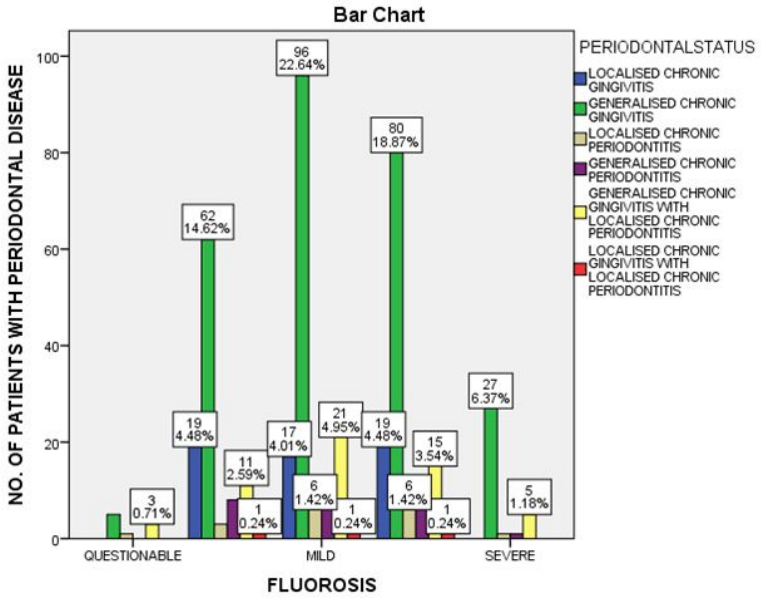
Graph 2: The above depicted bar graph shows association between gender and dental fluorosis. X-axis represents gender and Y axis represents the number of patients with dental fluorosis. Mild fluorosis was more commonly seen in males than females however this difference is not statistically significant.Pearson Chi-square test, p =0.286 (p>0.05).



Graph 3: The above depicted bar graph shows association between age and periodontal disease. X-axis represents age and the Y axis represents the number of patients with periodontal disease. Generalised chronic gingivitis was more commonly seen in the age group of 18-30 years, however this difference is not statistically significant. Pearson Chi-square p = 0.265 (p>0.05).



Graph 4: The above depicted bar graph shows association between age and dental fluorosis. X-axis represents age and Y axis represents the number of patients with dental fluorosis. Mild fluorosis was more commonly seen in the age group of 18-30 years however this difference is not statistically significant. Pearson Chi-square test, p value=0.887 (p>0.05).



Graph 5: The above depicted bar graph shows association between dental fluorosis and periodontal disease. X-axis represents dental fluorosis and Y axis represents number of patients with periodontal disease Generalised chronic gingivitis was more commonly seen in the patients with mild fluorosis, however this difference is not statistically significant. Pearson Chi-square test, p value=0.586 (p>0.05).

Murray *et al* States that gingivitis has more prevalence in the age group of 15 to 65 years with fluorosis **[19]**, this is similar to the result found in this study.

Although Periodontitis was found in all age group a steady increase was found with increase in age this finding was in sync with the result from study by **Haikel *et al.*[12]**.

In the study male were more affected by periodontal disease which was similar to the result in a study conducted by **adler *et al.*[20]**.

After contrasting result was obtained by Vandana *et al* with female predominance **[3]**.

Fluoride has long been known to have significant effect on dental Caries **[21]**. Some recent work on effect of fluoride on specific bacteria suggest that fluoride has and bactericidal effect on microorganism and is important in treatment of periodontal disease **[22][23]**.

A study by Kumar at all states that gingivitis is common in age group of 15 to 24 years which is similar to the result obtained in the study **[1]**. Similar observations was reported by **Haikal *et al* and murray *et al* [12], [21]**.

Our team has conducted several clinical studies like The CSTK levels are elevated in smokers with chronic periodontitis when compared to non-smokers **[24]**. In chronic periodontitis, there is destruction of gingival, periodontal ligament, cementum, and the bone. There is a need to regenerate the lost tissue which according to previous studies have shown that stem cells are effective in self renewal and in differentiation to produce specialised tissues **[25]**.Growth factors such as platelet rich fibrin (PRF) are considered vital mediators in inducing differentiation, proliferation and migration of periodontal progenitor cells **[26]**. The PRGF along with GTR has shown good results in improving clinical and radiographic parameters in patients with chronic periodontitis **[27]**.

From **Murugan T *et al*** study, it is observed that the coronally advanced flap was found to be a predictable treatment for isolated Miller,s class I and II recession defects **[28]**.

Study conducted by **Asha R *et al,*** discussed about the herbal way of managing periodontitis, which includes green tea, triphala , sumac and other herbal products, to have shown a profound effect on periodontal pathogens **[29]**. Few studies like Sheeja S et al, show that the salivary TNF-alpha levels are significantly higher in patients with chronic periodontitis **[30]**. **Archana M *et al*,** observed that there is an elevated serum IL-21 levels in patients with chronic periodontitis **[31]**. According to Waleed K *et al,* serum ET-1 is increased in chronic periodontitis **[32], [33]**. Study conducted by

Asha R *et al,* discussed the role of neutrophils in periodontitis which shows hyper/hypo activity to bacterial stimuli **[34]**. Avinash K *et al,* states the importance of CBCT in determining the anatomic structures, the cortical bone, IAN clearly **[35]**. Asha R *et al,* observed that implant treatment in chronic periodontitis patients can be done but with an effective treatment and maintenance regimen **[36]**. Asha R *et al* has also discussed gummy smile correction with lip repositioning **[37]**. Study conducted by Sriraman P et al shows that the prevalence of CMV,EBV & TTV was high in atheromatous plaque **[38]**.

Now we are focusing on epidemiological study. The idea for this study was stemmed from the community.

CONCLUSION

It can be concluded that generalised chronic gingivitis was more commonly seen in the patients with mild fluorosis, Both generalised chronic gingivitis and generalised chronic periodontitis was common in males with dental fluorosis than females. Generalised chronic gingivitis was more commonly seen in patients with dental fluorosis in the age group of 18-30 years. This study provides epidemiological significance of the periodontal status of patients with dental fluorosis and provides the need for patient education about the effects of fluorosis on periodontium.

AUTHOR CONTRIBUTION

All the authors contributed equally for the research

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CONFLICT OF INTERESTS

Nil

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