Research Article

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Periodontal Health in Patients with Sickle Cell Disease(SCD)

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ABSTRACT

Background: Sickle cell anemia (SCA) is an inherited disease in individuals homozygous for hemoglobin S. Individuals with SCD have a higher level of predisposition to developing periodontal disease due to the presence of these pathogens in the mouth, as well as alterations in their cellular and humoral immune response. **Aim of the study:** To assess periodontal health in patients with sickle cell disease.

Materials and methods: The study was conducted in the Department of Periodontics of the Dental institution. A total of 25 patients with SCD from the medical hospital were included in the study group. Study group comprised of sickle cell disease patients of both sex and varying age groups. A control group of 25 patients matched for age and sex was also included. Study was conducted for a period of one year.

Results: The number of male patients was 14 and he number of female patients was 11. The mean plaque index in sickle cell disease group was 3.96 ± 0.66 and in control group was 2.85 ± 0.74. The mean gingival index of sickle cell disease group was 2.45 ± 1.03 and in control group was 1.93 ± 0.79. on comparing the results, we observed that results are statistically significant for Plaque index and Gingival index.

Conclusion: Within the limitations of the present study, it can be concluded that the periodontal diseases are prevalent in patients with sickle cell disease. Thus, preventive dental care is very important for SCD patients.

Keywords: Sickle cell anemia, periodontal health, gingivitis.

INTRODUCTION

Sickle cell anemia (SCA) is an inherited disease in individuals homozygous for hemoglobin S. [1] Previous studies have shown clinical alterations in the oral mucosa and dental mineralized tissues and delayed tooth eruption, a high prevalence of dental caries, poor occlusion, and pulpal necrosis in healthy teeth in patients with SCA.[2,3] However, some studies have reported conflicting results as to the prevalence of caries and periodontal diseases. [4] Individuals with SCD have a higher level of predisposition to developing periodontal disease due to the presence of these pathogens in the mouth, as well as alterations in their cellular and humoral immune response. [5,6] Hence, the present study was conducted to assess periodontal health in patients with sickle cell disease.

MATERIALS AND METHODS

The study was conducted in the Department of Periodontics of the Dental institution. The ethical clearance for the study was obtained from the ethical board of the institute prior to commencement of the study. A total of 25 patients with SCD from the medical hospital were included in the study group. Study group comprised of sickle cell disease patients of both sex and varying age groups. A control group of 25 patients matched for age and sex was also included. Study was conducted for a period of one year. The patients suffering from other diseases known to influence dental caries or severity of periodontal disease were excluded from the study. An informed written consent was obtained from each patient after explaining them the procedure of the study verbally. A thorough

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general examination and oral examination was conducted for each patient. The demographic data of the patients was collected using a questionnaire. Autoclaved Plane mouth mirror & pig tail explorer were used to examine the oral cavity. While doing intraoral examination, we used Plaque index given by Silness & Loe and Gingival index given by Loe & Silness for the assessment of periodontal health of each patient.

The statistical analysis of the data was done using SPSS version 20.0 for windows. The Student's t-test and Chi-square test were used to check the significance of the data. The p-value less than 0.05 was predetermined as statistically significant.

RESULTS

Table 1 shows the demographic data of the study group. The mean age of the patients was 41.2 years. The number of male patients was 14 and he number of female patients was 11. Table 2 shows the comparative analysis of mean plaque index and mean gingival index in patients with sickle cell disease and control group. The mean plaque index in sickle cell disease group was 3.96 ± 0.66 and in control group was 2.85 ± 0.74. The mean gingival index of sickle cell disease group was 2.45 ± 1.03 and in control group was 1.93 ± 0.79. On comparing the results, we observed that results are statistically significant for Plaque index and Gingival index ($p<0.05$). [Fig 1]

DISCUSSION

In the present study, we observed that the mean plaque index in sickle cell disease group was 3.96 ± 0.66 and in control group was 2.85 ± 0.74. The mean gingival index of sickle cell disease group was 2.45 ± 1.03 and in control group was 1.93 ± 0.79. Brandão CF et al evaluatde the oral condition of children and adolescents with SCD in comparison with the condition of healthy controls. This was a cross-sectional study of children and adolescents aged 5 to 18 of both sexes from a hematology center in Bahia, Brazil, and subjects without hemoglobinopathies from a public school of the same state (comparison group). There were 124 individuals, 63 in the comparison group and 61 in the disease group. Interviews, dental and periodontal exams using the DMFT and Periodontal Community Index, respectively, were performed,

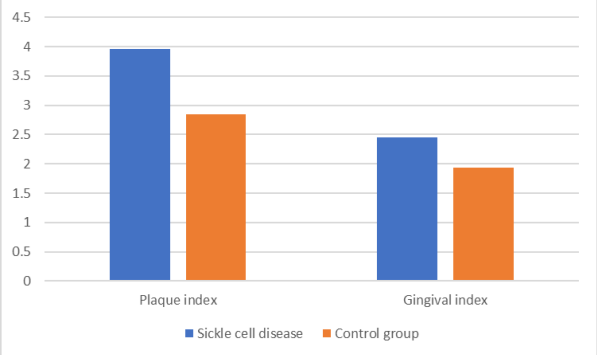
Table 1: Demographic details of the study group

Parameters	Study group (n=25)	p-value
Mean Age (years)	41.2	0.14
Number of male patients	14	0.23
Number of female patients	11	0.87
Dietary habits Vegetarian Non-vegetarian	 10 15	0.41

Table 2: Comparative analysis of mean plaque index and mean gingival index in patients with sickle cell anemia and control group.

Indices	Sickle cell disease (n=25)	Control group (n=25)	p-value
Plaque index (Mean ± SD)	3.96 ± 0.66	2.85 ± 0.74	0.005
Gingival index (Mean ± SD)	2.45 ± 1.03	1.93 ± 0.79	

Fig 1: Comparative analysis of mean plaque index and mean gingival index in patients with sickle cell anemia and control group.



and the salivary buffer capacity and salivary flow rates of the entire sample population were evaluated. The categorical variables were compared using a chi-square test or Fisher's exact test. For comparison of means, the Student's-t test was used for independent samples that presented symmetrical distribution. The study showed that the DMFT was 2.08 (2.71) for the SCD group and 1.05 (1.67) for the comparison group. For dmft, the values were 2.3 (2.6) and 0.88 (1.2), respectively,.

Exams of the periodontium showed the presence of gingival bleeding and dental calculus, with no statistical significance between groups. When evaluating salivary flow and buffer capacity, no significant differences were observed for the flow rates, but the SCD group presented a lower buffer capacity compared with the comparison group. Individuals who used hydroxyurea had a dmft (2.50) higher than that of the comparison group (2.00), and salivary flow was lower than the normal rate in 70% of the children who did not use this medication. They concluded that children and teenagers with SCD had deficient oral health when compared with the comparison group, presenting a higher level of dental caries and lower buffer capacity. Al-Alawi H et al investigated the prevalence of dental caries and periodontal disease and examine the possible association between oral health deterioration and SCD severity in a sample of Saudi SCD patients residing in the city of Al-Qatif, Eastern Province, Saudi Arabia. Dental examination to determine the Decayed, Missing and Filled Teeth index (DMFT), Community Periodontal Index (CPI), and plaque index system were recorded for 33 SCD patients and 33 age and sex-matched controls in the Al-Qatif Central Hospital, Qatif, Saudi Arabia. Self-administered surveys used to assess socio-economic status; oral health behaviors for both SCD patients and controls were recorded. In addition, the disease severity index was established for all patients with SCD. Decayed teeth were significantly more in individuals with ages ranging from 18 to 38 years with SCD compared to the control group (p = 0.036) due to oral hygiene negligence. The mean number of filled teeth was significantly lower in individuals with SCD when compared to the control group (p = 0.015) due to the lack of appropriate and timely treatment reflected in the survey responses of SCD patients as 15.2% only taking oral care during hospitalization. There were differences between the cases and controls in the known caries risk factors such as income level, flossing, and brushing habit. The DMFT, CPI, and plaque index systems did not differ significantly between the SCD patients and the control group. Data suggest that patients with SCD have increased susceptibility to dental caries, with a higher prevalence of tooth decay and lower prevalence of filled teeth. Known caries risk factors influenced oral health more markedly than did factors related to SCD.[7,8]

Mahmoud MO et al investigated the association between periodontal diseases and sickle cell anaemia (SCA). A group of 59 children with SCA (ages 12 to 16 years) were examined and compared to 54 healthy controls, matched by age and gender. Oral clinical examination included: plaque index (PI), gingival index (GI), probing depth (PD), clinical attachment loss (CAL), presence of calculus and tooth mobility. Clinical severity of SCA and oral hygiene habits were also assessed. There was no statistically significant difference between cases and controls in terms of PI, PD, CAL and tooth mobility at the 5% significance level. However, there was a statistically significant association between GI and SCA. The mean gingival index of SCA patients was 1.35 ± 0.19 compared to 1.18 ± 0.16 for the controls (P = 0.00001). There was a probability of 76.1% that the GI of SCA patients was greater than the GI of controls. The percentage of teeth with PD = 4 mm was greater in SCA patients compared to controls (2.5% vs 0.6%). Moreover, SCA patients had a higher percentage of teeth with CAL= 3 mm (0.7% vs 0.3%). There was a statistically significant association between having mild, moderate or severe gingival inflammation and the severity of sickle cell anemia. The results showed a statistically significantly higher prevalence of inflammed periodontium in children with SCA compared to a similar healthy population. de Carvalho HL et al investigated the association of SCA and SCT with periodontal diseases by evaluating clinical and radiographic characteristics. The sample (n = 369) was selected and divided into two groups: exposed groups [HbSS (SCA genotype) and HbAS (SCT genotype) = 246] and a nonexposed group (HbAA = 123). HbAA consisted of individuals without SCA and SCT. The clinical parameters evaluated were plaque index, gingival index, calculus index, clinical probing depth, clinical attachment level, gingival recession, tooth mobility and furcation involvement. The percentage of alveolar bone loss was measured using a Schei ruler. Binomial and Poisson regressions were used to estimate correlations of interest. None of the periodontal parameters was associated with SCA. SCT was associated with gingivitis and periodontitis. Individuals with SCT had a lower plaque index but a higher calculus index and greater alveolar bone loss compared with subjects in the HbAA group. They concluded that SCT can act as a predictor for establishment of

periodontal diseases. There was no correlation between SCA and periodontal diseases.[9,10]

CONCLUSION

Within the limitations of the present study, it can be concluded that the periodontal diseases are prevalent in patients with sickle cell disease. Thus, preventive dental care is very important for SCD patients.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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