

## Original Article

### Evaluation of the Prevalence of Periodontal Diseases in Patients with Sickle Cell Anemia and Beta Thalassemia

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#### ABSTRACT:

**Background:** Worldwide, patients with hemoglobin E-beta-thalassemia (Hb E/ $\beta$ -thalassemia) represent approximately 50 per cent of those affected with severe beta thalassemia. Sickle cell disease is a chronic disorder has been linked to hypoxia. The pathophysiology of Sickle Cell Disease is thought to result from polymerization of hemoglobin S in red blood cells (RBCs) under hypoxic conditions, which results in the occlusion of blood vessels. **Aim:** To evaluate the prevalence of periodontal diseases in patients with sickle cell anemia and beta thalassemia. **Materials and method:** The study was conducted as a joint effort by the Department of Periodontics and Department of Human Physiology of the dental institution. A total of 40 patients were included in the study. The patients were randomly divided into three groups I and II. Group I comprised of beta thalassemic patients (n=20) and Group II comprised of sickle cell anemic patients (n=20) of both sex and varying age groups. After performing a thorough general examination, including their demographic data, intraoral examination was done using Plaque index given by Silness & Loe and Gingival index given by Loe & Silness. **Results:** In the present study, a total of 40 patients were selected. 20 patients had beta thalassemia and 20 patients had sickle cell anemia. The plaque index and gingival index of the patients was calculated and mean of the patients was calculated. The mean plaque index of beta thalassemia patients was  $3.89 \pm 1.23$  and of Sickle cell anemia patients was  $3.49 \pm 1.87$ . The mean gingival index of the beta thalassemia patients was  $2.71 \pm 1.51$  and of Sickle cell anemia patients was  $2.92 \pm 1.23$ . On comparing the results we observed statistically significant results. **Conclusion:** There is high prevalence of periodontal diseases in patients with beta thalassemia and sickle cell anemia. Thus, preventive dental care is must for thalassemic and SCD patients.

**Keywords:** Beta thalassemia, sickle cell anemia, periodontal disease, oral health.

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#### INTRODUCTION:

Worldwide, patients with hemoglobin E-beta-thalassemia (Hb E/ $\beta$ -thalassemia) represent approximately 50 per cent of those affected with severe beta thalassemia. The highest frequencies are observed in India, Bangladesh and throughout Southeast Asia, particularly in Thailand, Laos and Cambodia, where it is common for individuals to inherit alleles for both hemoglobin E (Hb E) and beta-thalassaemia.<sup>1-3</sup> Sickle cell disease is a chronic disorder has been linked to hypoxia. The pathophysiology of Sickle Cell Disease is thought to result from polymerization of hemoglobin S in red blood

cells (RBCs) under hypoxic conditions, which results in the occlusion of blood vessels. The single amino-acid change in the beta subunit causes sickle hemoglobin to polymerize, especially under low oxygen tension. Polymerization causes the RBCs to deform into the characteristic sickle shape, thus plugging blood vessels.<sup>4</sup> Numerous oral manifestations of these diseases that affect the oral mucosa, gingival tissue, mandible, nerve supply, and tooth enamel and pulp have been reported.<sup>5,6</sup> Hence, the present study was conducted to evaluate the prevalence of periodontal diseases in patients with sickle cell anemia and beta thalassemia.

**MATERIALS AND METHOD:**

The study was conducted as a joint effort by the Department of Periodontics and Department of Human Physiology of the dental institution. A total of 40 patients were included in the study. The patients were randomly divided into three groups I and II. Group I comprised of beta thalassemic patients (n=20) and Group II comprised of sickle cell anemic patients (n=20) of both sex and varying age groups. Study was conducted for a period of one year. Patients who were earlier diagnosed with sickle cell anemia and beta thalassemia, of age ranging from 18-33 years, were only included in the study. Those suffering from other diseases known to influence dental caries or severity of periodontal disease were excluded from the study. After performing a thorough general examination, including their demographic data, intraoral examination was done using Plaque index given by Silness&Loe and Gingival index given by Loe&Silness. Autoclaved Plane mouth mirror & pig tail explorer were used to examine the oral cavity.

The statistical analysis of the data was done using statistical software SPSS 17.5 version. Chi square test & student t test was used for the comparison of study and control groups. The level of significance was set at P<0.05.

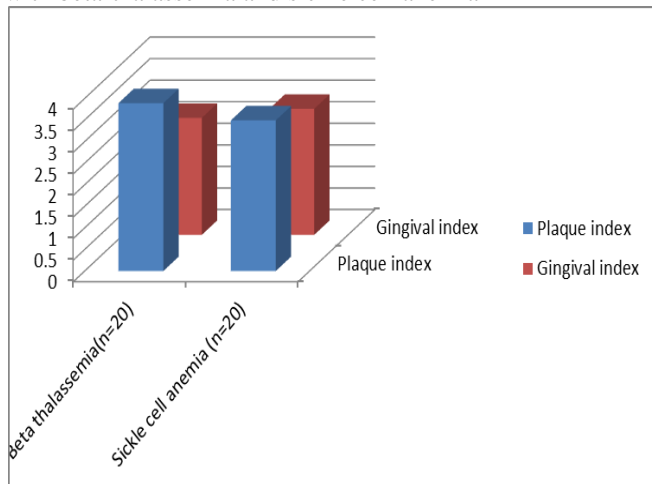
**RESULTS:**

In the present study, a total of 40 patients were selected. 20 patients had beta thalassemia and 20 patients had sickle cell anemia. The plaque index and gingival index of the patients was calculated and mean of the patients was calculated.

**Table 1:** Prevalence of periodontal diseases in patients with beta-thalassemia and sickle cell anemia

Indices	Beta thalassemia(n=20)	Sickle cell anemia (n=20)	P-value
Plaque index (Mean±SD)	3.89±1.23	3.49±1.87	0.003
Gingival index (Mean±SD)	2.71±1.51	2.92±1.23	

**Figure 1:** Prevalence of periodontal diseases in patients with beta-thalassemia and sickle cell anemia



**Table 1** shows the prevalence of periodontal diseases in patients with beta-thalassemia and sickle cell anemia. We observed that mean plaque index of beta thalassemia patients was 3.89±1.23 and of Sickle cell anemia patients was 3.49±1.87. The mean gingival index of the beta thalassemia patients was 2.71±1.51 and of Sickle cell anemia patients was 2.92±1.23. On comparing the results we observed statistically significant results (p<0.05) [Fig 1].

**DISCUSSION:**

The present study was conducted to compare the prevalence of periodontal diseases among beta thalassemic and sickle cell anemic patients in a systematic way. We observed that there is high prevalence of periodontal diseases in beta thalassemic and sickle cell anemic patients. We observed that there was statistically significant difference on comparing the results. The results were compared with other studies from the literature. Fernandes ML et al assessed the impact of oral conditions of children with sickle cell disease (SCD) on their parents' quality of life (QoL). A cross-sectional study was performed with parents of outpatients suffering from SCD at a hematology referral center in Belo Horizonte, MG. A qualified dentist performed an intraoral exam. The Family Impact Scale (FIS) was used to assess the parents' perception of QoL. The parents answered some questions regarding sociodemographic and medical information about their children. The dmft/DMFT score, DAI, gum bleeding and SCD severity were evaluated in terms of their impacts on the overall mean FIS scores and subscale scores. The chance of more frequent impacts was greater in parents of adolescents (OR = 2.04; 95%CI = 1.2, 3.4) than of younger children. Dental caries (dmft/DMFT ≥ 1) had a negative impact on the QoL of parents of younger children and adolescents (p < 0.05 and p < 0.01, respectively). Among the parents of younger children, dental caries and SCD severity significantly affected the subscales for parental activities (PA) and parental emotions (PE) (p < 0.01, p < 0.05, respectively). Among parents of adolescents, dental caries (DMFT) and severe malocclusion adversely affected the PE and PA subscales (p < 0.01, p < 0.05, respectively). SCD severity affected the overall FIS score among young children's parents (p < 0.05). In conclusion, dental caries, age and SCD severity were associated with a negative impact on the QoL of parents of children with SCD. 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 due to oral hygiene negligence. The mean number of filled teeth was significantly lower in individuals with SCD when compared to the control group 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.<sup>7, 8</sup>

Passos CP et al investigated the prevalence of dental caries and periodontal condition in a population with sickle cell disease (SCD), analyzing some associations with disease severity. The Decayed, Missing and Filled Teeth index (DMFT) and Community Periodontal Index (CPI) were recorded for 99 individuals with SCD and 91 matched controls. Socio-demographic status, oral health behaviors, and history of clinical severity of SCD were assessed. Statistical comparisons were performed between the group with SCD and the control group, as well as multivariate logistic regression analyses with DMFT index and CPI as the dependent variables. The mean number of decayed teeth was significantly higher in individuals with HbSS. Older age, female gender, and daily smoking were identified as risk factors for higher DMFT, while older age and absence of daily use of dental floss were risk factors for the development of periodontal disease. In conclusion, risk factors known to cause caries and periodontal disease had more influence on oral health than the direct impact of SCD. Fernandes ML et al assessed caries prevalence in children with sickle cell disease (SCD), and the association of dental caries with socioeconomic factors, disease severity, and oral-health related to quality of life (OHRQoL). The sample was comprised of 106 children with SCD aged 8 to 14 years who were attending the Center for Hematology (Hemominas) in Belo Horizonte, Brazil. They were matched to 385 healthy peers. Data collection included interviews with guardians concerning SCD characteristics, and previous social and oral examinations to determine the caries prevalence. Caries prevalence as measured through the Decayed, Missing and Filled (dmft and DMFT) indices. OHRQoL was evaluated through the Brazilian versions of the Child Perceptions Questionnaires (CPQ8-10, and CPQ11-14 short-form version). Statistical analyses were performed using the chi-square test or Fisher's exact test and the Mann Whitney test, as well as linear regression. The DMFT index was 1.3 (SD: 2.1) in

younger children with SCD and 1.5 (SD: 1.9) in SCD teens. Younger children with SCD had lower caries experience compared to healthy peers ( $p = .03$ ). The experience of dental caries among teens with SCD was similar to healthy peers ( $p > 0.05$ ). In addition, we did not see a significant difference on the mean overall scores of CPQ8-10 between SCD younger children and controls. There was no statistically significant difference in the mean overall scores of teens CPQ11-14 between SCD and the control group. Socioeconomic variables were not associated with dental caries in the participants with SCD. However, SCD severity was associated with higher DMFT indexes ( $p < 0.05$ ). It was concluded that younger children with SCD had a low experience of dental caries. The dental caries experience in teenagers with SCD was similar to their healthy peers. OHRQoL was similar between SCD participants and controls.<sup>9, 10</sup>

### CONCLUSION:

From the results of present study we conclude that there is high prevalence of periodontal diseases in patients with beta thalassemia and sickle cell anemia. Thus, preventive dental care is must for thalassemic and SCD patients.

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