International Journal of Research in Health and Allied Sciences

Journal home page: www.ijrhas.com

Official Publication of "*Society for Scientific Research and Studies*" [Regd.]

ISSN 2455-7803 Index Copernicus value 2016 = 68.10

Original Article

Periodontal Health in Patients with Sickle Cell Anemia

Pooja Mehra[1], Anchal Sood[2], Navdeep Kaur[3], Ruhani Khichy[4], Ritesh Sood[5], Sonia Bhatt[6]

[1]Senior Lecturer, [2]Professor, Department of Periodontology, [3]Reader, Department of Community Dentistry, [4]Senior Lecturer Department of Prosthodontics, [5]Senior Lecturer, Department of Endodontics, Baba Jaswant Singh Dental College, Ludhiana, Punjab, BDS, [6]Working at Sai Dental Clinic, New Delhi

ABSTRACT:

Background: Sickle cell anemia is a genetic disease caused by replacement of glutamic acid by valine in position 6 at the N-terminus of the beta-chain of globin, thus resulting in hemoglobin S. **Aim of the study:** To evaluate the periodontal health patients with sickle cell anemia. **Materials and methods:** The study was conducted in the Department of Periodontics of the Dental Institution. A total of 60 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 60 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. **Results:** A total of 60 patients in the study group and 50 subjects in the control group were selected for the study. The mean age of the patients was 43.12 years. The number of male patients was 32 and the number of female patients was 28. The mean plaque index in sickle cell disease group was 2.96±1.53 and in control group was 2.24 ± 0.32. The mean gingival index of sickle cell disease group was 2.56±1.12 and in control group was 2.02 ±0.75. **Conclusion**: The periodontal diseases are more prevalentin patients with sickle cell disease. Thus, preventive dental care is very important for patients with sickle cell anemia.

Key words: Periodontal health, sickle cell anemia, anemia.

Received: 12 May 2018 Revised: 18 June 2018 Accepted: 20 June 2018

Corresponding author: Dr. Pooja Mehra, Senior Lecturer, Department of Periodontology, Baba Jaswant Singh Dental College, Ludhiana, Punjab, India

This article may be cited as: Mehra P, Sood A, Kaur N, Khichy R, Sood R, Bhatt S. Periodontal Health in Patients with Sickle Cell Anemia. Int J Res Health Allied Sci 2018; 4(4):38-41.

INTRODUCTION:

Sickle cell anemia is a genetic disease caused by replacement of glutamic acid by valine in position 6 at the N-terminus of the beta-chain of globin, thus resulting in hemoglobin S.[1] Under conditions of hypoxia, erythrocytes that predominantly contain hemoglobin S take on a shape resembling a sickle.[2] This sickling is reversible through increased oxygen levels, although constant changes in shape result in cell membrane lesions that make the cells rigid, preventing them from returning to their normal state.[3]The literature has very few studies of the relationship between SCD and oral health. Comparatively speaking, three oral pain, two periodontal, and two dental caries studies constitute the bulk of the research on this relationship.[4] In one of the oral pain studies, dental caries was one of the outcomes measured so in fact there have been three studies looking at dental caries and its association with SCD excluding the pilot study previously conducted by this research group.[5] The three oral pain articles all reinforce the same theme: do not initially treat oral pain symptoms with extractions without properly diagnosing the situation as patients with SCD reported a higher frequency of undiagnosed oral pain episodes compared to patients without SCD.[6]Hence, the present study was conductedto evaluate the periodontal health patients with sickle cell anemia.

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 60 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 60 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 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:

A total of 60 patients in the study group and 50 subjects in the control group were selected for the study. Table 1 shows the demographic data of the study group. The mean age of the patients was 43.12 years. The number of male patients was 32 and the number of female patients was 28. 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 2.96±1.53 and in control group was 2.24 ± 0.32. The mean gingival index of sickle cell disease group was 2.56±1.12 and in control group was 2.02 ±0.75. On comparing the results, we observed that results are statistically significant for Plaque index and Gingival index ($p<0.05$). [Fig 1]

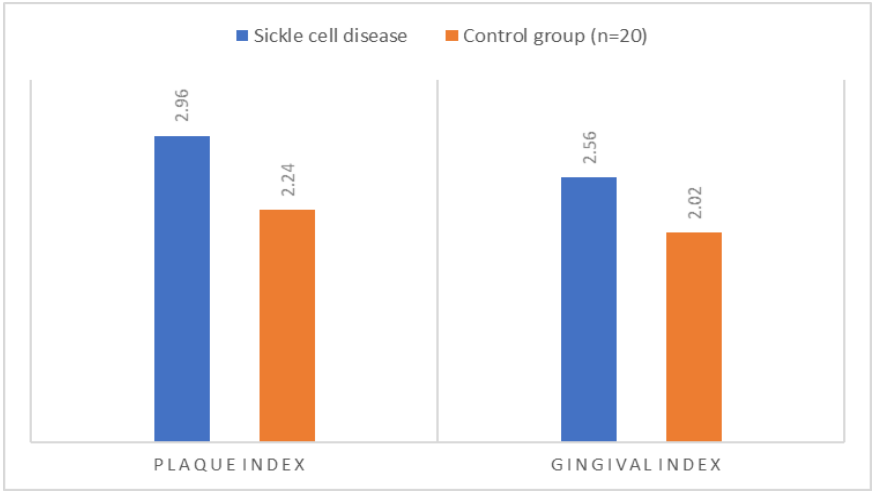
Table 1: Demographic data of the patients

Parameters	**Study group (n=60)**	**p-value**
Mean Age (years)	**43.12**	**0.41**
Number of male patients	**38**	**0.21**
Number of female patients	**22**	**0.09**
Socioeconomic status • Rich • Middle class • Poor	 • **20** • **32** • **8**	**0.12**
Dietary habits • Vegetarian • Non-vegetarian	 • **32** • **28**	**0.21**

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=30)**	**Control group (n=20)**	**p-value**
Plaque index (Mean±SD)	2.96±1.53	2.24 ± 0.32	0.001
Gingival index(Mean±SD)	2.56±1.12	2.02 ±0.75	

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



DISCUSSION:

In the present study we assessed the periodontal health in patients with sickle cell disease. We observed that Plaque index score and Gingival index score are significantly raised in patients with sickle cell disease as compared to normal healthy individuals. This predicts that patients with sickle cell disease are more prone to periodontal diseases. The results were statistically significant. The results were compared with previous studies and results were consistent with previous studies. 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. 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 data suggested that patients with SCD have increased susceptibility to dental caries, with a higher prevalence of tooth decay and lower prevalence of filled teeth. 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.[7, 8]

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. Caries prevalence as measured through the Decayed, Missing and Filled (dmft and DMFT) indices. 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. The experience of dental caries among teens with SCD was similar to healthy peers. 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. They 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. Hasegawa S et al investigated the propensity of nucleated erythroid precursors to undergo sickling; both cultured and fresh marrow-derived erythroid precursors from patients with homozygous sickle cell anemia were studied. The results revealed that upon deoxygenation cultured erythroblasts underwent characteristic morphological deformation in the form of fine, fragile, elongated spicules. Ultrastructural analysis demonstrated highly organized and tightly aligned hemoglobin fibers in the protruded regions. Bone marrow cells examined under partial or complete deoxygenated conditions displayed similar morphological changes. When cultured SS erythroid precursors were exposed to hydroxyurea or butyrate, drugs that may increase fetal hemoglobin (HbF) and inhibit intracellular polymerization, a significant decrease was observed in the propensity of these precursors to undergo sickling, accompanied by a three- to fivefold increase in HbF. These results suggest that, in addition to mature erythrocytes, nucleated erythroid precursors in the bone marrow have the capacity to undergo characteristic sickling as a result of HbS polymerization and may be involved in several aspects of the pathophysiology of sickle cell anemia. Treatment with HbF-stimulating drugs may benefit patients with this disease by inhibiting polymerization-induced sickling of erythroid precursors in the marrow as well as mature erythrocytes in the peripheral blood.[9, 10]

CONCLUSION:

From the results of the current study, we conclude that the periodontal diseases are more prevalentin patients with sickle cell disease. Thus, preventive dental care is very important for patients with sickle cell anemia.

REFERENCES:

1. Alhamdan N.A., Almazrou Y.Y., Alswaidi F.M., Choudhry A.J. Premarital screening for thalassemia and sickle cell disease in Saudi Arabia. Genet. Med. 2007;9:372–377.
2. Andrews C.H., England M.C., kemp W.B., Jr. Sickle cell anemia: an etiological factor in pulpal necrosis. J. Endod. 1983;9:249–252.
3. Nagel RL, Fabry ME, Steinberg MH. The paradox of hemoglobin SC disease. Blood Review. 2003;17(3):167–178.
4. Arowojolu M.O. Periodontal probing depths of adolescent sickle cell anaemic (SCA) Nigerians. J. Periodontal Res. 1999;34:62–64.
5. Okafor LA, Nonnoo DC, Ojehanon PI, Aikhionbare O. Oral and dental complications of sickle cell disease in Nigerians. Angiology. 1986 Sept;37(9):672–5.
6. Laurence BE, Reid BC, Katz RV. Sickle cell anemia and dental caries: A literature review and pilot study. Spec Care Dentist. 2002;22(2):70–4.
7. Al-Alawi H, Al-Jawad A, Al-Shayeb M, Al-Ali A, Al-Khalifa K. The association between dental and periodontal diseases and sickle cell disease. A pilot case-control study. The Saudi Dental Journal. 2015;27(1):40-43.
8. Passos CP, Santos PR, Aguiar MC, Cangussu MC, Toralles MB, da Silva MC, Nascimento RJ, Campos MI. Sickle cell disease does not predispose to caries or periodontal disease.Spec Care Dentist. 2012 Mar;32(2):55-60.
9. Fernandes ML, Kawachi I, Corrêa-Faria P, Pattusi MP, Paiva SM, Pordeus IA. Caries prevalence and impact on oral health-related quality of life in children with sickle cell disease: cross-sectional study.BMC Oral Health. 2015 Jun 18;15:68.
10. Hasegawa S, Rodgers GP, Dwyer N, Noguchi CT, Blanchette-Mackie EJ, Uyesaka N, Schechter AN, Fibach E. Sickling of nucleated erythroid precursors from patients with sickle cell anemia.ExpHematol. 1998 Apr;26(4):314-9.

Source of support: Nil **Conflict of interest:** None declared