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Sunit Pal
Associate Professor Orthopedics
Late Baliram Medical College
Jagdalpur, Chhattisgarh India

Gargi Yadu Pal
MO Police Hospital Jagdalpur
Chhattisgarh, India

Anita Yadu
Associate Professor Obstetrics
Gynaecology Pt Jawaharlal
Medical college College Raipur
Chhattisgarh, India

Shristi Yadu
Consultant NRHM Baster,
Chhattisgarh, India

Assessment of health status of sickle cell disease patients with special reference to joint pain and oral health among children and adolescent

Sunit Pal, Gargi Yadu Pal, Anita Yadu and Shristi Yadu

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Abstract
The main aim of the study is to "evaluate the health status of sickle cell disease patients with reference to joint pain and oral health among children and adolescent". The main idea to conduct this study is to determine the General health status, Oral health status of Sickle Cell Anaemia patients among children and adolescent (6 month to 19 year) admitted to AVBR Hospital, Sawangi, Wardha District. Another focus of this study is to find out Socio-Demographic factors affecting the general and oral health status of Sickle Cell Anemia patients.

Method: A total of 79 participants were recruited for the study, of which 49 were males and 30 were females. Maximum study participants were in the age group of 6 month - 9 years (40), remaining 10-14 yrs were (21) and 15 -19 years (18). All the patients with a history of SCA from age 6 months to 19 years, admitted to Acharya Vinoba Bhave Rural Hospital, Sawangi, Wardha. Between October 2013 to July 2014 were included in the study. This study was conducted in Acharya Vinoba Bhave Rural Hospital, Sawangi (Meghe), Wardha district. This district has three tertiary hospitals i.e. District hospital, Wardha MGIMS, Sewagram, and AVBRH The data on Sickle cell anemia collected from Acharya Vinoba Bhave Rural Hospital, (AVBRH) Sawangi (Meghe), Wardha. The study was conducted on the basis of Hospital based cross sectional study. All the cases with SCA admitted to Acharya Vinoba Bhave Rural Hospital, Sawangi, Wardha district during 1st September, 2013 to 31st July, 2014 formed the sample size. Statistical tool such as Chi-square was used to find the association between the demographic variable and General and oral health status.

Result: Educational status of parents was statistically significant in development of dental caries and oral mucosal lesion. Income was significantly associated with dental caries and gingival bleeding where as social category (caste) was significantly associated with splenomagely

Conclusion: It has being concluded that majority of the patients presented with high grade fever, joint pain and splenomagaly. Educational status of parents had bearing on poor oral health status (caries, gingival bleeding, and oral mucosa lesion). Poor socio-economic condition also a contributing factor for development of caries, gingival bleeding, and oral mucosa lesions. Lower social categories i.e. SC and ST had more severity of anemia as compared to General and OBC categories. Prealbumin should not be incorporated as monitoring tools for patients with fascial space infections of odontogenic origin.

Keywords: General health status, oral health status, joint pain, sickle cell anaemia, splenomagaly

Introduction

Sickle cell disease (SCD) is a vascular disorder characterized by chronic, ongoing organ damage that is punctuated by episodes of acutely painful vascular complications [1].

Approximately 5% of the world's population are healthy carriers of a gene for sickle-cell disease or thalassaemia. The percentages of people who are carriers of these genes are as high as 25% in some regions. It is estimated that each year over 300,000 babies with severe forms of these diseases are born worldwide, the majority in low and middle income countries.

Sickle cell disease had affected millions throughout the world. It was particularly common among people with ancestral origin in Sub-Saharan Africa, South America, Cuba, Central America, Saudi Arabia, India, and Mediterranean countries such as Turkey, Greece, and Italy. In United States of America, it affected around 72,000 people mostly having ancestral origins in Africa. This disease occurred in about 1 in every 500 African-American births and 1 in

Corresponding Author:
Gargi Yadu Pal
MO Police Hospital Jagdalpur
Chhattisgarh, India

every 1000 to 1400 Hispanic-American births. About 2 million Americans, 1 in 12 African Americans, carry the sickle cell allele. SCD is the most common genetic blood disorder in the United States of America, with about 2,000 infants being identified through routine blood screenings annually. (4) An estimated 104,000-138,000 was affected individuals living in the United States of America Approximately 0.3 – 1.3% of African-Americans were affected by sickle cell disease. The highest frequency of Sickle Cell Disease was found in tropical regions, particularly Sub-Saharan Africa, India and the Middle-East. Migration of substantial populations from these high prevalence areas to low prevalence countries in Europe has dramatically increased in recent decades. In 1952, sickle hemoglobin in India was first time reported by Dunlop KJ and Mazumder UK, who detected five cases of sickle cell trait and three presumptive cases of sickle cell anemia. They were among the tea garden laborers of Upper Assam, originating from the tribal populations of Bihar and Orissa states. In the same year, Lehmann H and Cutbush M detected SCD in the Nilgiri Hills of South India, among the aboriginal (Pre-Dravidian) tribe (Toda).

Objective

Assessment of health status of Sickle Cell Anemia in children and adolescent patients (6 months - 19 years) with special reference to oral health among patients admitted in a tertiary care hospital in Wardha district.

Procedure

All admitted patients were approached in paediatric and Medicine ward with the help of nurses and Medical intern at AVBR Hospital. The IPD wards were visited twice a week. The age of the patients was confirmed from available age related proof and in case of unavailability, the approximate age was considered according to their parents. The study subjects/parents were interviewed face to face in the presence of their family members as per the availability of the respondents. The questionnaires were translated to the local language as per convenience of the respondent. Patients who were admitted in the paediatric ward and medicine ward in the AVBR hospital were examined. Oral health assessment was done by using WHO Proforma. The oral condition of patient had been assessed by using dental instrument i.e mouth mirror and periodontal probe. For the assessment of dental caries and periodontal condition of patient in all age group were has loss of attachment, pocket depth, denture were recorded in the late adolescent, i.e those who had completed their 15 year to 19 years rest all variable were same. The patients' data was recorded at the bed side and basic questions were asked from the parents.

Results

Gingival Bleeding and Oral mucosal lesion among study subjects.

Table 1: Distribution of sample respondents for caries in line with their educational background

Education	CARIES		χ2	P-Value
	Present	Absent		
Illiterate	13(16.50%)	2(02.50%)		
Primary school (0 - 4)	20(25.30%)	1(01.30%)		
Middle school (5 - 9)	15(19.00%)	3(03.80%)		
High school (9 - 10)	7(08.90%)	3(03.80%)	13.951	0.004
Intermediate (10-12)	3(03.80%)	3(03.80%)		
Graduation	4(05.10%)	1(01.30%)		
Post graduation	2(02.50%)	2(02.50%)		

Table 2: Distribution of Sample respondents for Gingival Bleeding in line with their educational background

Education	Gingival Bleeding		χ2	P-Value
	Present	Absent		
Illiterate	11(13.90%)	4(05.10%)		
Primary school (0 - 4)	17(21.50%)	4(05.10%)		
Middle school (5 - 9)	14(17.70%)	4(05.10%)		
High school (9 - 10)	7(08.90%)	3(03.80%)	2.55	0.635
Intermediate (10-12)	3(03.80%)	3(03.80%)		
Graduation	3(03.80%)	2(02.50%)		
Post graduation	2(02.50%)	2(02.50%)		

Table 3: Distribution of Sample respondents for Oral Mucosal Lesion in line with their educational background

Education	Oral Mucosal Lesion		χ2	P-Value
	Present	Absent		
Illiterate	13(16.50%)	2(02.50%)		
Primary school (0 - 4)	17(21.50%)	4(05.10%)		
Middle school (5 - 9)	13(16.50%)	5(06.30%)		
High school (9 - 10)	4(05.10%)	6(07.60%)	10.585	0.018
Intermediate (10-12)	3(03.80%)	3(03.80%)		
Graduation	2(02.50%)	3(03.80%)		
Post graduation	3(03.80%)	1(01.30%)		

Educational status of parents had bearing on poor oral health status i.e. caries, gingival bleeding and oral mucosa. Dental caries was more (25.30%) in patients were parents educated up to primary level, and decreases and education increases. similar findings were also observed for Gingival Bleeding and Oral Mucosal Lesion. Statistical significant association was found with parent's education and Dental caries i.e. ($P<0.004$) and oral mucosa lesion ($P<0.018$). However, there was no significant association between parent's education and gingival bleeding. (p=0.635). Socio-Economic status of parent wise distribution of Dental caries, Gingival bleeding and Oral Mucosa Lesion among study subjects.

Table 4: Distribution of Sample respondents for CARIES in line with their Socio-Economic Status

Socio-Economic Status	Caries		χ2	P-Value
	Present	Absent		
Class I	16(20.30%)	4(05.10%)		
Class II	22(27.80%)	4(05.10%)		
Class III	19(24.10%)	3(03.80%)	9.669	0.046
Class IV	2(02.50%)	4(05.10%)		
Class V	3(03.80%)	2(02.50%)		

Table 5: Distribution of Sample respondents for Gingival Bleeding in line with their Socio-Economic Status

Socio-Economic Status	Gingival Bleeding		χ2	P-Value
	Present	Absent		
Class I	14(17.70%)	6(07.60%)		
Class II	20(25.30%)	6(07.60%)		
Class III	19(24.10%)	3(03.80%)	9.623	0.047
Class IV	4(05.10%)	2(02.50%)		
Class V	1(01.30%)	4(05.10%)		

Table 6: Distribution of Sample respondents for ORAL MUCOSA LESION in line with their Socio-Economic Status

Socio-Economic Status	Oral Mucosa Lesion		χ2	P-Value
	Present	Absent		
Class I	18(22.80%)	2(2.50%)		
Class II	17(21.50%)	9(11.40%)		
Class III	14(17.70%)	8(10.10%)	8.510	0.075
Class IV	2(02.50%)	4(05.10%)		
Class V	4(05.10%)	1(01.30%)		

Socio-Economic condition of parents was also a contributing factor on oral health status of study subjects. Dental caries, Gingival Bleeding and Oral Mucosal Lesion were more in class I, II and III, as compared to class IV, and V. May be due to better affordability of sugary products (chocolates, ice-cream etc.) by upper class. Statistical significant association within parent's socio- economic status and Dental caries ($P<0.046$) and Gingival bleeding ($P<0.047$) was noted. There was no statistical significant found in oral mucosal lesion (P=0.075). (Table No. XVII).

Social category (caste) wise distribution of Anemia, Joint Pain, Splenomegaly among study subjects.

Table 7: Distribution of sample respondents for ANEMIA in line with their Caste

Anemia					
Caste	Mild	Moderate	Severe	χ2	P-Value
General	7(8.90%)	5(06.30%)	1(01.30%)	14.762	0.005
OBC	3(3.80%)	8(10.10%)	1(01.30%)		
SC	34(43.00%)	6(07.60%)	2(02.50%)		
ST	7(8.90%)	4(05.10%)	1(01.30%)		

Table 8: Distribution of Sample respondents for JOINT PAIN in line with their Caste

Caste	Joint Pain		χ2	P-Value
	Present	Absent		
General	6(07.60%)	7(08.90%)	6.707	0.107
OBC	7(08.90%)	5(06.30%)		
SC	34(43.00%)	8(10.00%)		
ST	8(10.10%)	4(05.10%)		

Table 9: Distribution of Sample respondents for SPLENOMEGALY in line with their Caste

Caste	Splenomegaly		χ2	P-Value
	Present	Absent		
General	7(08.90%)	6(07.60%)	7.464	0.076
OBC	6(07.60%)	6(07.60%)		
SC	34(43.00%)	8(10.00%)		
ST	10(12.70%)	2(02.50%)		

Table reveal that lower social category caste i.e. (SC and ST) had more severity of sickle cell anemia as compared with General and OBC category. Among SC category, mild anemia (43.00%), moderate (7.60%) and severe (2.50%) as compared to General category i.e 8.90%. 6.30% and 1.30% respectively, where as OBC category 3.80%,and 10.10% and 1.30% respectively. Joint pain (43.00%) and splenomagaly (43.00%) was found in SC category and less for other category there was a significant association found between caste and severity of SCA at ($P<0.005$) and no significant association with joint pain (P=0.107) and splenomegaly (P= 0.076).

Discussion
This study was conducted on sickle cell anemia (SCA) patients who were admitted in AVBRH
Wardha, aged (6 months to 19 years). Half 50.00% of study participants were in childhood, and rest 50.00% early and late adolescent.
The current studies showed that majority (62.03%) of the respondents were educated up to high school. Statistical significance was observed for Dental caries ($P<0.004$) and oral mucosal lesion ($p<0.018$) among study subjects. The highest respondents belonged to farmers 22 (27.85%) followed by daily

labourers19 (24.05%) and self employed 20 (25.32%) respondents. Female respondents were either maids or working on daily wages, while few females were involved in agriculture and 1/3 female respondents were housewife. There was statistically significant association found between parents socio-economic status and dental caries ($p<0.046$) and gingival bleeding ($P<0.047$) was seen in study subjects. It was observed in our study that maximum number of respondents belonged to the Scheduled Caste (SC) 53.17%. It was observed in present study that participants were suffering from multiple clinical sign and symptom i.e. fever, pallor, joint pain and splenomegaly. Out of total 79 participants Pallor (74.69%) joint pains (69.92%) 48.11% cases had fever. Sickle cell anemia shows episode of vaso occlusive crisis, fever and pallor. In this study it was observed that maximum number 58.23% of study participants had mild splenomegaly, with ratio of 2:1 with males and females, followed by moderate splenomegaly 11.38% and massive were 2.54%. There was statistically significant association found between caste and severity of SCA patient at ($P<0.005$). There were no other positive findings on systemic examination noted in case files

In this study it was observed that the children and adolescent who were admitted are mostly having SS pattern 54 (68.35%) and AS pattern were 25 (31.65)

The present study showed that maximum number (43.70%) of the study subjects were having mild anemia. The present study indicated higher prevalence (78.48%) of Dental caries among both children and adolescent. There was a statistically significant association between level of education and dental caries ($p<0.004$) and socio-economic and Dental caries ($p<0.046$). The present study found that Gingival Bleeding was present among 73.41% of study participants, of which 43.04% were males and 30.37% were females. There was a statistically significant association was found between respondents socio-economic status and Gingival bleeding ($p<0.0047$) of study participant's.

The present study revealed that Pocket formation was present (44.44%) in late adolescent (15-19yrs) However, 55.56% had no pocket formation. Those who had PPD (probing pocket depth) 4-5 mm were 75% as compared to Rathod S. *et al.*, 36% had PPD in the range of 2-4mm, 48% had PPD in the range of 4-6mm while 16% had PPD of more than 6mm. However Passos *et al*. also reported that known risk factors, and periodontal disease had more influence on oral health than the direct impact of SCD. (59, 63) The present study found out that loss of attachment in late adolescent was 55.55%. The present study revealed that majority (56.96%) of participants was having pallor which were usually present in the buccal mucosa and tongue. Very less subjects were having other complication i.e abscess and candidacies 10.12%. There was a significant association was seen between socio-economic status of parents and Gingival bleeding ($P<0.047$).

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