

Sickle Cell Anemia and Morbidity in Rural Population of Chandrapur District, Maharashtra, India

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ABSTRACT The present study was carried out to assess the sickle cell anemia and morbidity pattern among rural population in Chandrapur district of Maharashtra. The subjects were screened by solubility test and positive samples were subjected to cellulose acetate membrane electrophoresis. The study showed that 18.3 % subjects were having sickle cell anemia. The common morbidity forms were joint pain (14.2 %) and attacks of abdominal pain (8.5 %). Sickle β -thalassaemia was not found in this population.

INTRODUCTION

Sickle cell anemia is caused by a point mutation in the β globin chain of haemoglobin replacing the amino acids glutamic acid with the less polar amino acid valine at the sixth position of the β chain. The association of two wild type α globin subunits with two mutant β globin subunits forms haemoglobin S, which polymerizes under low oxygen conditions causing distortion of red blood cells and a tendency for them to lose their elasticity. According to sickle cell statistics, 1 out of 400 Africans has sickle cell and sickle cell affects 8 out of 100,000.

Buechi (1953) confirmed that the presence of sickle cell disease in the Vedoids of South India. It was also found in Western India by Sukumaran (1955). In Maharashtra, Bankar et al. (1984) reported prevalence of the disease from 1.9 percent to 33.5 % in different communities. Shukla et al. (1985) were the first to report the sickle cell disease in Vidarbha region of Maharashtra with prevalence from 9.4 to 22.2 percent in non-tribal population. Prevalence of 5.5 percent from few villages of Wardha District has been reported by Ankushe (1993).

In India, the sickle cell disease is more common in central and southern parts of the country. It is the second most common haemoglobinopathy, next to thalassaemia in India. In India, Lehman et al. (1952) reported the

presence of sickle cell disease among the tribals of Nilgiri Hills for the first time. Almost at the same time, Dunlop (1952) reported the presence of the disease in Assam.

We have observed many cases of sickle cell disease among the rural population in Chandrapur district that were referred by various reports. The present study was carried out to find the magnitude of sickle cell anemia and morbidity pattern among this population.

Although the sickle cell disease is present from birth, symptoms are rare before the age of three to six months, due to the persistence of foetal haemoglobin (Hb F). In pregnancy, sickle cell disease is associated with increased risks to both mother and the baby. Affected pregnant woman should be looked after by a unit experienced in the care of women with this condition. Blood transfusion may be needed in some women with poor obstetric history or a severe form of sickle cell disease. Regular folic acid, prompt treatment of infections and crisis, and an increased fluid intake make it possible for most women to have a successful pregnancy.

MATERIAL AND METHODS

The present study is based on a cross-sectional sample, randomly collected from 294 individuals (165 male and 129 female) in different rural areas of Chandrapur district of Maharashtra. All participating individuals were 1 - 56 years of age. Detailed history of each individual was recorded with age, sex, smoking habit, food habit and family history etc. The population was screened by solubility test. One ml of phosphate buffer reagent was taken in a glass tube and a

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small quantity of sodium dithionite was added to it and was mixed well to dissolve. A small drop of washed red cells was added and was mixed well to produce light pinkish violet colour. The test was read after 3 to 5 min. It was read as positive, if the turbidity impaired the visibility of dark, bold lines on a white paper held against bright source of light at one inch distance. Negative test was indicated by visible lines. The sickle cell solubility test is a simple method that detects the presence of sickle haemoglobin, but does not distinguish between sickle cell trait and sickle cell disorders. The positive samples were subjected for cellulose acetate membrane electrophoresis at pH 8.8.

RESULTS

Age and sex wise distribution of study subjects is shown in Table 1. Out of 294, majority (56.12 %) were male and 43.87 percentage female subjects. Among the males, 78 subjects belonged to 41 and above years age group and 61 studied subjects belonged to 31-40 years age group. While female group, most (56.5 %) of the subjects were 41 and above years age group and 34.8 percentage were 31-40 years age group. Only (3.4 %) of the subjects were in 11-20 years age group. The prevalence of sickle cell anemia among rural population of Chandrapur District is shown in Table 2. Electrophoresis pattern revealed that high prevalence of sickle cell anemia was found to be 18.3 per cent. Comparatively, the prevalence rate was higher in this study as reported in other population of Maharashtra. No any case of HB S β

Table 1: Distribution of study subjects, age and sex wise (n=294)

Age in yr.	Male	Female	Total	Percentage
1-10	12	0	12	4.0
11-20	8	2	10	3.4
21-30	6	9	15	5.1
31-40	61	45	106	36.0
41 and above	78	73	151	51.3
Total	165	129	294	100

Table 2: Prevalence of sickle cell anemia among rural population of Chandrapur District (N=294)

Sickle cell disease	Percentage
Sickle cell Anemia	18.3
HB S β -Thal	0
Normal	169

Table 3: Age and sex wise distribution of sickle cell anemia

Age in yr.	Subjects with sickle cell anemia			
	M	F	Total	%
1-10	0	0	0	0.0
11-20	2	0	2	0.6
21-30	2	3	5	1.7
31-40	9	11	20	6.8
41 and above	12	15	27	9.1
Total	25	29	54	18.3

Table 4: Distribution of population as per present sickness during the study

Present sickness	No.	Percentage
Joint Pain	42	14.2
Attacks of Abdominal pain	25	8.5
Fatigue	18	6.1
Breathlessness	7	2.3
Weakness	12	4.0
Fever	4	1.3
Total	108	36.7
Normal	186	63.2
Total	294	100.0

Thalassaemia was found in the present study. Age and sex wise prevalence of sickle cell anemia is shown in Table 3. Sex wise prevalence was 8.5 percent in males and 9.8 percent in females. The prevalence of sickle cell anemia was higher in 41 and above years age groups followed by 31-40 years age groups. Present study found that sickle cell anemia among the study area increased with increasing age. Table 4 shows distribution of population as per the present sickness history. Of all subjects, 63.2 percent were found to be without any sickness history during the study and 36.7 percent were with one or more sickness problems. In the present study, 14.2 percent of subjects had joint pain problems and 8.5 percent had attacks of abdominal pain. Fatigue sickness was also recorded in 6.1 percent subjects.

DISCUSSION

In other studies, sickling test was used as a screening test. In the present study, solubility (DTT) test was used as a screening test, as it is a rapid method and easy to be carried out in the field setting. Bankar et al. (1984) had used it and ICMR network on Sickle Cell Disorders co-ordinated by institute of Immunohaematology, Mumbai, have also recommended the solubility test as a screening test.

In the present study, the prevalence of sickle cell anemia was highest in older age group and it

increased with increasing age. Leikin et al. (1989) in their study also found that the patients of sickle cell disease were distributed more in higher age groups. Ankushe (1993) and Kamble (1997) also recorded similar findings. Similarly, the prevalence of sickle cell anemia found in the present study was similar to other populations of Maharashtra while Hb S β Thalassaemia was found lacking in the present rural population of Chandrapur district of the Maharashtra state. During this study, out of 294 subjects 36.7 percent were with one or more sickness problem and 14.2 percent joint pain morbidity was found. The overall prevalence of prevalence of sickle cell anemia was found to be 18.3 per cent in study area.

CONCLUSION

The study shows that most of the subjects are in the age group of 41 plus years. Sickle cell anemia is more prevalent 18.3 percent in the present study.

RECOMMENDATIONS

On the basis of these findings, further studies should be encouraged in the field of sickle cell anemia. It is advised to arrange camps to make rural population aware of the programmes.

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