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Research Article

SICKLE CELL ANEMIA AND MORBIDITY IN TRIBAL POPULATION OF POMBHURNA, DISTRICT CHANDRAPUR, MAHARASHTRA, INDIA

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ABSTRACT

The present study was carried out to assess the sickle cell anemia and morbidity pattern among tribal population in Pombhurna Tahsil of Chandrapur district in Maharashtra, India. The subjects were screened by solubility test and positive samples were subjected to cellulose acetate membrane electrophoresis. The study showed that 5.54% subjects were having sickle cell anemia. The common morbidity forms were joint pain (56%) and attacks of abdominal pain (24 %).

INTRODUCTION

Sickle cell disorder is a group of diseases caused by a point mutation at sixth position in beta globin chain, valine substituting glutamic acid due to which in deoxygenated state, shape of erythrocytes change to sickle shape and also the fragility of cell membrane increases. (1) Sickle cell disease (SCD) is the structural disorder of haemoglobin that results in anemia. In India, it is reported mainly in tribal populations of central and southern parts of India.(2)

When both parents are carriers of sickle cell trait, there is a 25% chance in each pregnancy for the baby to inherit two sickle cell genes and have sickle cell anaemia disease. Correspondingly, there is a 50% chance the baby will have sickle cell trait and a 25% chance that the baby will be normal. (3)

Out of the Total Population India (As per Census 2011) was 1,21,01,93,422. Estimated Prevalence of suspected Sickle Trait at 10.0 % is 1,78,62,455 while estimated Prevalence of Suspected Sickle Cell Disease Patients at 0.75 % appears 13,39,684. It is prevalent in many parts of India including Central India, where the prevalence in different communities has ranged from 9.4-22.2%. (1) Prevalence of Sickling in Maharashtra was 0-45.5 %.(4) Overall prevalence of SCD in Chandrapur district was 13.29 % in 2006. 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 18.3 percent from few villages of Chandrapur District has been reported by Dhumne (1993). (6)

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.(5) Almost at the same time, Dunlop (1952) reported the presence of the disease in Assam. There is no study conducted yet for tribal population of chandrapur and we have observed many cases of sickle cell disease among the tribal population of Pombhurna tahsil 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.

Patients with sickle cell disease experience both chronic and episodic pain and have a reduced quality of life.[7] Painful crisis is the most common reason for emergency department use by patients with sickle cell disease.[8] The pathophysiology of a painful crisis is not entirely clear, and its determinants are uncertain. Some patients have frequent crises and severe disability, whereas others are able to lead relatively normal lives. Much of what we have learned about the incidence of complications in people with sickle cell disease comes from the Cooperative Study of Sickle Cell Disease (CSSCD).[9]

MATERIAL AND METHODS

The present study is community based crosssectional study conducted in between June 2009 to November 2013 in whole Pombhurna tehsil of Chandrapur district in Maharashtra. All 26,352 participating individuals were 1 - 30 years of age. By arranging screening camps village by village at various places like Anganwadi, primary school, sub center, gram panchayat, primary health center the investigator was contact & screen each and every 1 to 30 year age group population by doing solubility test. Detailed history of each individual was recorded with age, sex, cast, smoking habit, food habit, family history and morbidity status etc.

The population was screened by solubility test. One ml of phosphate buffer reagent was taken in a glass tube and a 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 to confirm the diagnosis and classify HbSS and HbAS pattern at Sub district Hospital Mul and District Hospital Chandrapur.

General health and morbidity status was assessed by using **Predesigned Pretested Questionnaire**. Data collected and entered in Microsoft Excel SPSS 16. The descriptive analysis was done in depicted terms of percentages, graphs, and tables.

RESULTS

Out of 26,352 screened population prevalence of sickle cell affected person was 5.54% (n=1460). Electrophoresis pattern revealed that out of all 1460 subjects, 1385(94.86%) were found heterozygous state (Hb AS) and 75(5.13%) had homozygous state (Hb SS). No any case of HB S β Thalassaemia was found in the present study. Male: Female ratio was 0.41: 1 (22males:53females) in Hb SS and 0.72 : 1 (580 males:805 females) in HbAS cases. The prevalence of sickle cell anemia was higher in 11 to 20 years age group followed by 1 to 10 years age group and then 21 to 30 year age group.

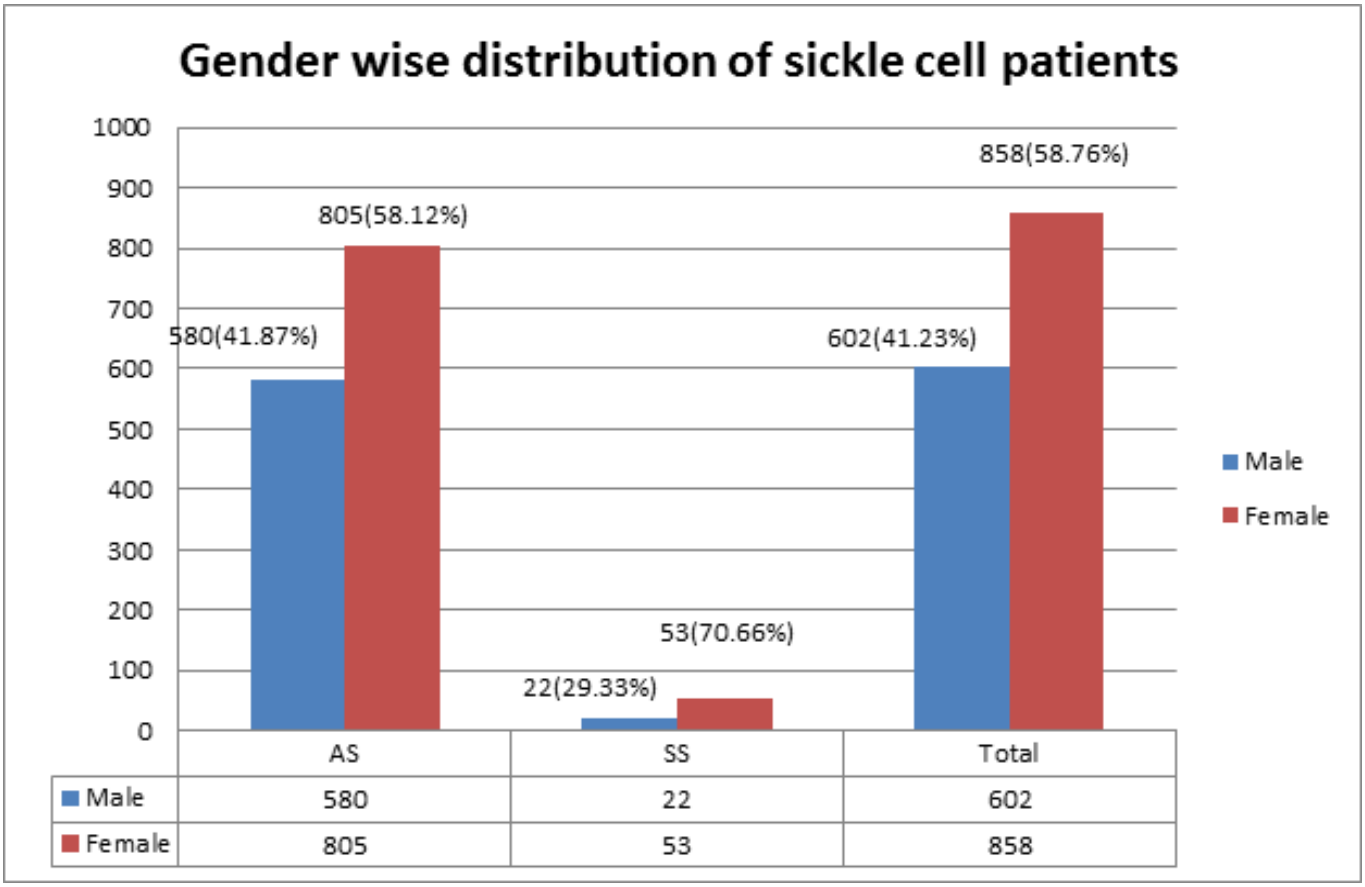
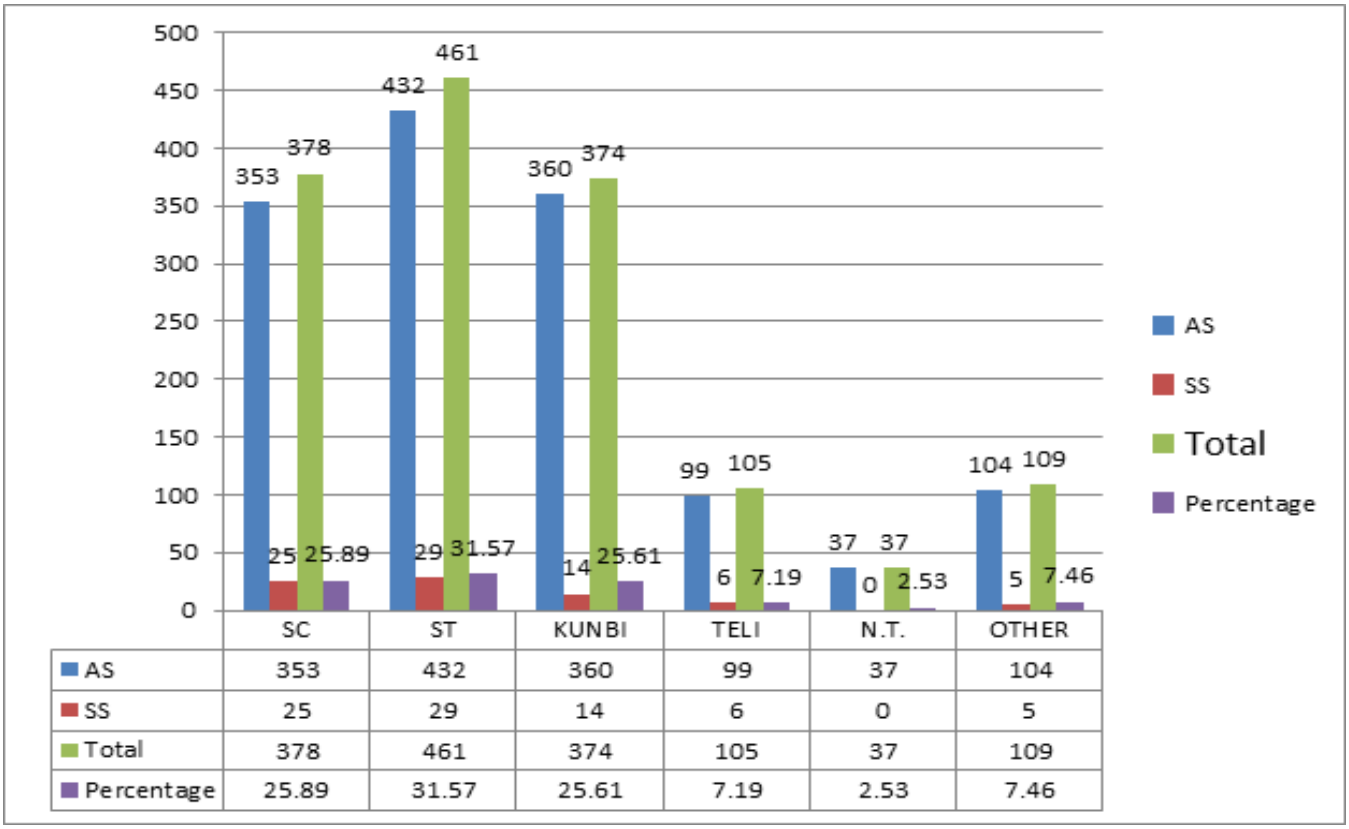


Figure 1 shows gender wise distribution of sickle cell patients.

Incidence was maximum in scheduled tribes (38.66%) followed by scheduled caste (33.33%) then Kunbi (18.66%), Teli(08%), other(6.66%) in Hb SS cases (figure 2). In Hb AS cases incidence was maximum in Scheduled Tribes(31.19%) followed by Kunbi(25.99%) then Scheduled Cast(25.48%), Teli(7.50%), Other(7.14%) and NT(2.67%).



	SC	ST	KUNBI	TELI	N.T.	OTHER
AS	353	432	360	99	37	104
SS	25	29	14	6	0	5
Total	378	461	374	105	37	109
Percentage	25.89	31.57	25.61	7.19	2.53	7.46

Figure 2 showing caste wise distribution of Sickle cell patients.

Of all Hb SS cases, 36.7 percent were with one or more sickness problems. In the present study, 56% of subjects had joint pain problems and 26% had attacks of abdominal pain. Fatigue sickness was also recorded in 20% subjects. Haemoglobin <7gm was 9.33% and 7 to 10gm was 82.66% in Hb SS cases.

DISCUSSION

In the present study, solubility 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 coordinated 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 11 to 20 year age group. 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 75 subjects 36.7 percent were with one or more sickness problem and 56 percent joint pain morbidity was found .The overall prevalence of sickle cell anemia was found to be 5.54 per cent in this study area.

CONCLUSION

The study shows that most of the subjects are in the age group of 11 to 20 years. Sickle cell anemia is more prevalent 5.54 percent in the present study.

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