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A Study and Screening of Sickle Cell Disease Patient of Sub District Hospital Daryapur, India

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Abstract: Sickle cell disease (SCD) is a very dangerous disease. In our study we collect 483 patients blood sample form different age group and all cast belong patients of sub district hospital Daryapur. First upon we perform solubility test, those blood sample show positive solubility test further used in electrophoresis test. In our investigation out of 483 bloods sample 77 blood sample show positive test of solubility test. And out of which 77 sample only 3 sample show sickle cell dieses and 29 show carrier patients in Daryapur tahshil during two months.
Keywords: Sickle cell disease, Electrophoresis. Solubility test.

I. INTRODUCTION e

Hemoglobinopathies are the most common monogenic disorders in India posing a significant health burden. Sickle cell anemia is a haemoglobinopathy due to a single point mutation in the B-chain of human hemoglobin. The amino acid valine replaces glutamic acid in the sixth position of the B-globulin chain [i]. An important clinical issue requiring further clarification is the effect of this abnormal hemoglobin on the physical growth and development of children with sickle cell disease. The disease damages and changes the shape of red blood cells (RBCs). The change in shape is a response to cell deoxygenation. When the oxygen uptake of the cell is low, cells change their shape from a healthy round disk to a crescent, holly leaf or other similarly distorted shape. This shape distortion is referred to as sickling. Initial studies on sickle cell disease patients from western Odisha demonstrated a mild clinical course with higher hemoglobin levels, lower reticulocyte counts, persistence of splenomegaly, infrequent leg ulcers and priapism compared to patients with the disease of African origin [ii]. Subsequently, in western and central India it was found that the disease was milder among tribal populations in Valsad in south Gujarat compared to non-tribal populations in Nagpur in Maharashtra. Apart from higher HbF levels, a significant ameliorating factor was the presence of associated _ thalassemia, which was very common in tribal populations in Gujarat [iii]. Since then, reports of more severe features, particularly from central India have raised the question of geographic variations in the manifestations of SCD within India. In a retrospective study, where 316 children with sickle cell anemia were followed up for a period of 5.8 _ 5.7 years in Nagpur, there were 1725 hospitalizations among 282 patients and 96 children had severe disease with severe vaso occlusive crises, severe anemia, splenic sequestration, stroke and hypersplenism being reported and 10 babies died during this period [iv].
In this study, first upon collect the blood sample form doubted patient and then check its sickle cell disease by using solubility and confirmatory test.

II. MATERIALS AND METHODS

In this study collection of blood sample from to the all cast people who show symptom like sickle cell patients group from Daryapur tahshil of Maharashtra. The age group of patients is 0-60 yr.

A. Collection Of Blood Sample

1) *Venipuncture:* Venipuncture is the most common way to collect blood from adult patients. Collection takes place from a superficial vein in the upper limb, generally the median cubital vein; this vein is close to the skin and doesn't have many large nerves positioned close by. This reduces pain and discomfort for the patient.
2) *Fingerstick:* Fingerprick sampling involves taking a very small amount of blood from the patient, usually from the end of a finger. It is over quickly and requires very little in the way of preparation; therefore, reducing concern and anxiety in patients, particularly in children and nervous adults. Patient welfare at the point of collection is not the only reason why this method should be considered the best way to collect a blood sample. The long-term benefits to the patient include the loss of less blood and the ability to carry out testing at home, as a phlebotomist is not required for the procedure.

B. Diagnosis Criteria

1) *Solubility/ Turbidity Test:* This test is based on solubility difference between HbS and HbA in solubility test reagent. When red cells are introduced into such a solution, they lyses immediately. The hemoglobin released from the lyses red cells, is reduced by Reagent mix provided by himedia kit. This reaction causes precipitation of HbS leading to turbidity of the mixture. However, HbA, as well as other hemoglobin's are soluble leading to clarity in the reaction mixture. This test is simple and stable screening test, however the samples that are tested positive should be confirmed by electrophoresis so as to reduce the chances of false positives. This test is simple and more rapid than the described test with the added advantage that no reagents need be weighed. It appears to be reliable [v].
2) *Confirmed test (Electrophoresis):* The electrophoresis process takes advantage of the fact that hemoglobin types have different electrical charges. During electrophoresis, an electrical current is passed through the hemoglobin in a blood sample, which causes the hemoglobin types to separate at different rates and form bands. The test can detect abnormal levels of HbS, the form associated with sickle-cell disease, by comparing the pattern formed with that of a normal blood sample, then can see the types and quantities of hemoglobin present in the blood sample... Electrophoresis is done by the use of cellulose acetate. After running electrophoresis at 150 to 200 volt, stain the cellulose acetate gel and observe the band on gel.

III. RESULTS AND DISCUSSION

In the present study we collected 359 patients blood sample in April 2016 months and 124 patient's blood sample in May 2016. Using all patients blood sample perform solubility test in himedia kit. This test is based on solubility difference between HbS and HbA in solubility test reagent. After adding patient's blood sample in a test reagent then we see most hemoglobin's are soluble in a high-molarity phosphate buffer; HbS is not. The buffer is made up of dibasic and monobasic potassium phophates, saponin, and dithionate. A 1:100 dilution of blood into buffer is made, incubated for 5 minutes, and turbidity was observed against a white background with black lines. A positive result (A below) is indicated by a turbid solution. A negative result (B below) is obtained when lines are visible through the solution. In April month out of which 359 patients 48 patients show positive test. However, the presence of false positives may also be attributed to the presence of other proteins which are soluble in the buffer giving it the appearance of Hb A, as observed previously [vi]. In May month out of which 124 patients 29 patients show positive test. But this test is not confirmed test, it is screening test. More than 50% of the total global sickle cell anemia (SCA) cases are in India **[vii].**

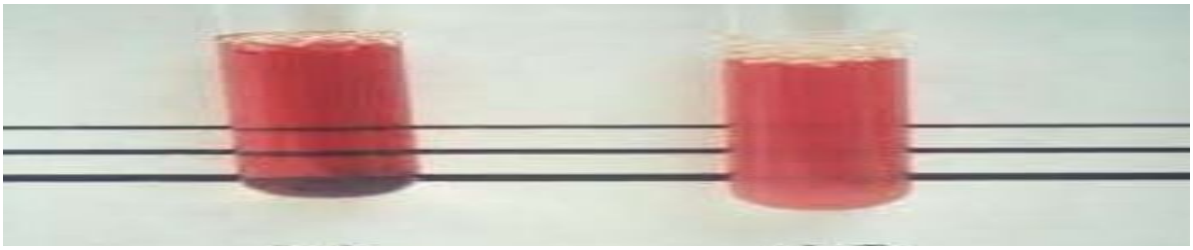

Figure 1: Positive and negative test tube

Month	Total solubility test	Positive test	Negative test
April 2016	359	48	311
May 2016	124	29	95

Table 1: Solubility test

Blood group distribution among different population groups is an important consideration in health care [viii]. After performing solubility test means screening of positive patients then we perform electrophoresis test that is a confirmatory test. In solubility test in April month we found 48 positive tests of patient's blood sample, and this 48 patient's blood sample use for further study. This 48 blood sample runs in electrophoresis, out of which 48 blood sample 29 patients show AS band. It means 29 patients are carrier they having defective gene but does not show any symptoms. Only 3 patients show SS pattern means 3 patients show sickle cell positive and 16 patients show AA Patterns, it means 16 patients were normal. Same further study done in May months of 2016, that time we collect 124 patients blood sample out of which 29 patients show positive test of screening test, then this 29 patients blood sample run in electrophoresis that time all sample show AA pattern, it means all patients are normal. We have identified weight as the clearly dominant factor in all genotypes, similar to observations elsewhere in the general population [ix].

Month	Total Electrophoresis	AS	SS	AA
April 2016	48	29	3	16
May 2016	29	0	0	29

Table 2: Electrophoresis results

In present study we collect 483 patients blood sample and out of 483 bloods sample 77 blood sample show positive test of solubility test. And out of which 77 sample only 3 sample show sickle cell dieses and 29 show carrier patients in Daryapur tahshil during two months.

IV. CONCLUSION

Comparing various studies in other parts of India, Our data highlight present study we collect 483 patients blood sample and out of 483 bloods sample 77 blood sample show positive test of solubility test. And out of which 77 sample only 3 sample show sickle cell dieses, percentage of sickle cell patients was 3.89% and 29 show carrier patients, percentage of carrier patients was 37.66% in Daryapur tahshil.

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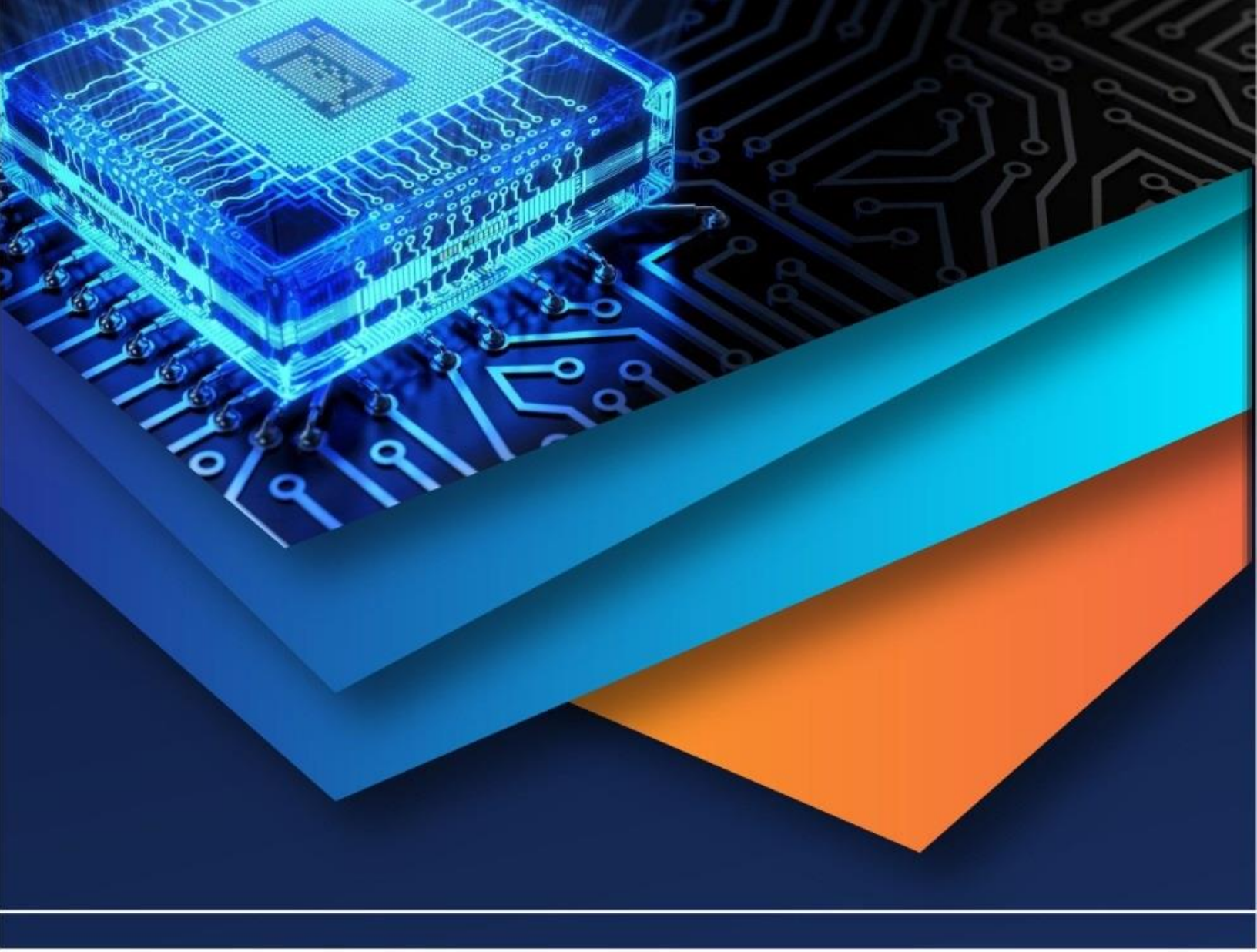

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