

SICKLE-CELL TRAIT IN SOME TRIBES OF WESTERN INDIA

BY

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SICKLE-CELL trait or sicklæmia has been reported in Negroes in many parts of Africa and America. Recently this trait has been found to be present among the white people of the Mediterranean region (Greece, Italy, Sicily, Egypt and Turkey). In India, Lehmann and Cutbush¹ found sickle-cell trait among the aboriginal tribes of Nilgiri Hills. Büchi² has repeated this study and confirmed the finding. Dunlop and Mozumdar³ reported cases of sickle-cell trait and some presumptive cases of sickle-cell anæmia among the tea garden labourers of Upper Assam, originating from the tribal populations of Orissa and Bihar. Foy *et al.*⁴ examined 5,000 samples in Eastern and Southern India and have reported a large percentage of sickle-cell trait in some of the tribes examined by them in both these regions. They have not reported their findings in detail so far. Bhatia *et al.*⁵ reported four cases of sickle-cell trait in a family of nine members of Danukh caste in Mainpuri District of Uttar Pradesh.

The purpose of the present communication is to report the incidence of sickle-cell trait among some tribes and castes of Western India. The tribal groups included Bhil, Dhodia, Dubla, Koli and Naika, selected by virtue of being the most numerous groups in Gujarat. Castes included Anavil Brahmins, Leva Patidars, Marathas and a mixed group consisting of Mohammadans, Parsis, Gujaratis and Maharashtrians. Care was taken to include, as far as possible, only unrelated individuals in this study.

Bhils were investigated from Mirakhedi and Limkheda villages near Dohad in the Panch Mahal district. The other four tribal groups were studied from the Surat District. Dhodias were taken from Puna village in Mahuwa taluka; Dublas, from Varad village of Bardoli taluka and Hansapore village of Navsari taluka; Kolis also from Hansapore village and Naikas, from Mandir village of Navsari taluka and Lavacha village of Pardi taluka. Anavil Brahmins were collected from Navsari taluka of Surat District and Leva Patidars of Charotar were collected from Nadiad of Kheda District. Marathas and the mixed group, from Bombay, also were included in this study.

Sickling test on the red cells was done on the spot using freshly prepared 2% sodium metabisulphite as described by Daland and Castle.⁶ Care was taken to read the results

within half-an-hour to avoid false positive reactions. The samples were preserved in ice and were again tested in the laboratory.

As an independent check, some of the samples were run by paper electrophoresis using horizontal pattern apparatus described by Smith and Conley.⁷ Hæmolysates were prepared from saline washed red cells, freed of cell stroma and diluted to 6-8 g.%. Filter-paper (Whatman 3MM) strips, 5 cm. × 38 cm., were soaked in Veronal buffer pH 8.6 with an ionic strength of 0.05 and blotted dry. A streak of hæmolysate was applied to the strip of paper which was supported between siliconized glass plates. Electrophoretic runs were made at 20-22° C., 200-220 volts, 3-5 ma, for 10-12 hours. Two known samples, one containing a mixture of hæmogoblin A (normal adult) and S (sickle-cell) from a case of sickle-cell trait and the other only hæmoglobin A (Lehmann and Sukumaran⁸) were used as controls in every run.

The results of the sickling test are given in Table I.

TABLE I

Caste or tribe	No. of persons tested	No. of persons with sickling	Percentage incidence
Bhils	206	32	15.53
Dhodias	107	22	20.56
Dublas (Talavia)	211	20	9.48
Kolis	51	0	0.0
Naikas or Naikadas	90	20	22.22
Anavil Brahmins	53	0	0.0
Leva Patidars	150	0	0.0
Marathas	201	0	0.0
Mixed group	222	0	0.0

Out of 94 samples that showed sickling, 78 were suitable for electrophoresis. All these samples showed mobilities similar to the mixture of hæmoglobin A and S used as control thus confirming the presence of sickle-cell hæmoglobin in the heterozygous form. 191 samples of Dublas that did not show sickling were also run for electrophoresis. All showed a pattern similar to hæmoglobin A, ruling out the presence of any other abnormal hæmoglobin in this sample.

The results thus showed a remarkable variation in the incidence of sickle-cell trait

among these tribal groups varying from practically no incidence among Kolis to more than 20% among Dhodias and Naikas. There was a low incidence of R_0 (cDe) chromosome among these tribes. The only other study in India, reported in detail so far, is from Nilgiris where incidence of sickle-cell trait ranged from 4% to, as high as 34%, with a low incidence of R_0 chromosome. It is hoped that the present finding will be of anthropological and medical interest.

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