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Occurrence of Sickle Gene and Malaria Among the Mehra (Jhariya) Caste of Mandla District, Madhya Pradesh, India

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KEY WORDS Sickle Cell. Malaria. Mehra (Jhariya) Caste

ABSTRACTS Madhya Pradesh State and Mandla district is heart place of India. In the present survey 43 per cent people of Mehra (Jhariya) caste of Mandla district where found to be sicklers; the frequency of the HbS gene was recorded 0.245 in this population. Furthermore, it was seen that 44.18 per cent normal individuals were affected by the malarial parasite in last one year, either once or twice; the sicklers (23.25 per cent) were more frequently affected as compared to normal individuals (17.54 per cent). The percentage of never affected individuals was found to be more among normal individuals (17.54 per cent) as compared to sicklers (9.30 per cent). The sicklers were more susceptible towards different types of infections due to their anaemic conditions.

INTRODUCTION

It is now established fact that most of the populations in the world, except European, possess HbS gene in different frequencies. Initially the gene was considered as a characteristic of Black African population and in Indiart context, it was considered to be a tribal characteristic (Bhatia and Rao, 1987). But a recent investigation showed that beside tribals, in India HbS is possessed by other population groups also such as Scheduled Castes, Backward Castes and Various Castes viz. Brahmin, Thakur and Vaisya (Pandey, 1993). In other words the sickle cell gene is transmitting from one population group to another or its occurrence by mutation is still continuing due to its selective advantages. Sickle cell gene is a lethal gene in early age for homozygotes. According to Allison (1954, 1956) and Livingstone (1985), it provides protection against the severe consequences of falsiparum malaria. The disadvantages of sickle cell gene may be lower :clinical and molecular studies of Indian sickle cell homozygotes attending hospitals indicate a mild form of the disease, as in Eastern Saudi Arabia (Kulozick et. al., 1986). In this report attempt has been made to study the health consequences among Sicklers of Mehra (Jhariya) caste of Mandla district, Madhya Pradesh.

MATERIAL AND METHODS

Blood samples from a total of 100 unrelated Mehra (Jhariysa) caste individual's inhabiting Deogaon, Singarpur, Manot, Linga (Pondi), Khairy (Chabi), Ram Nagar, Ghughari, Bichhiya, Anjaniya, Sahalwara, Theva and Suktara villages of Mandla district, Madhya Pradesh constituted material for the present investigation. From each individual 5 ml blood was collected by vein puncture technique in a vial containing EDTA as an anticoagulant. Testing for sickling was done on the spot, by using freshly prepared solution of sodium metabisulphite ($Na_2S_2O_5$) in the manner described by Daland and Castle (1948) and Sood (1994) which ensured complete reduction of hemoglobin even in the presence of foetal hemoglobin (Alison, 1954). A two percent solution of the salt was prepared in sterilized distilled water immediately before the tests. A small droplet of fresh blood was mixed with a drop of the solution on a clean microscopic slide and the mixture was immediately covered with a glass cover slip and sealed with paraffin wax. The first observation was made after 15 minutes when sickling could be seen in most of the positive cases. To avoid false sickling final reading was taken within half an hour under the dry objective of the microscope. All the positive cases were retested in order to ensure the reliability of the results. Information regarding different health consequences was collected by pre-tested schedule. Information regarding occurrence of malaria was taken from respondent directly as well as from pathological laboratories where they avail treatment and test.

RESULTS AND DISCUSSION

Today malaria is an epidemic and sickle cell provides selective advantages against this epidemic but here results are different from previous studies. In the present study 43 out of 100 blood samples were found to be sicklers giving a very high frequency (43 per cent) of sicklers among Mehra (Jhariya) of Mandla district M.P., India. The frequency of gene HbS was found to be 0.245 (Table 1). It could be observed from table 2 that most of the sicklers (44.18 per cent) and normal individuals (47.37 per cent) were not affected by the malarial parasite in the last one

Table 1: A and S Gene frequencies among Mehra (Jhariya)

S. No.	Gene	Frequency
1.	S	0.2450
2.	A	0.7550

(Frequencies calculated by square root method)

Table 2: Percentage incidence of malaria among sicklers and normal individuals

Occurrence of Malaria	Sicklers	Normal
Twice in a year	11.62	8.8
Once in a year	23.25	17.54
Not in recent year but once or twice before this year	44.18	47.37
Frequently	11.62	8.7
Never	9.30	17.54
Total	100.00	100.00

year but affected before this year, either once or twice. The sicklers (23.25 per cent) were more frequently affected in last one year as compared to normal individuals (17.54 per cent). Occurrence of malaria was found to be more frequent among sicklers (11.62 per cent). The percentage of never affected individuals among sicklers was 9.30 per cent. The percentage of never affected individuals was found to be more among normal individuals (17.54 per cent) as compared to Sicklers (9.30 per cent). Sickle cell gene provides protection against falsiparum malaria(Allison, 1954, 1956, 1957; Livingstone, 1985). Mehras (Jhariya) of Mandla district possess the gene in very high frequency. Occurrence of malaria among them is also frequent, which may be due to infection by Plasmodium ovale, Plasmodium malariaii and Plasmodium vivex. It was observed in the records of the pathological laboratories of the field area that the frequency of Plasmodium ovale infection was comparatively more than Plasmodium falsiparum. The person who possess the sickle cell gene is always anaemic in comparison to those who do

Table 3: Frequency of Sickness among the subjects during last one year

	Sicklers		Normal	
	Number	Percent	Number	Percent
Sickness	30	69.76	32	56.14
No Sickness	13	30.24	25	43.86
Total	43	100.00	57	100.00

not posses it. Due to anaemic condition, they are more susceptible towards disease, and infection; it is evident from Table 3 that 69.76 per cent sicklers fell sick during last one year in comparison to 56.14 per cent normal individuals. Table 4 shows prevalence of different types of ailment among the subjects. It could be observed from the table that fever, pain and weakness are common and most frequent ailment among sicklers (69.76 per cent) and normal individuals (17.54 per cent). The same trend was found in body pain, weakness and waist pain and epitaxis alongwith the other health problems. It may be concluded that all types of ailment show higher frequencies among sicklers as compared to normal individuals, during last one year. The major health problems among sicklers were joint pain, body pain, weakness, waist pain and, cough and cold. Table 5 exhibits the prevalence of the frequency of sickness during last one year. 58.14 per cent sicklers fell sick frequently during last one year in comparison to 38.59 per cent of normal individuals, while 41.86 per cent normal individual fell sick occasionally. It is clear that frequency of sickness is more among sicklers during last one year.

REFERENCES

Allison, A.C.: The distribution of the sickle - cell trait in East Africa and elsewhere, and its apparent relationship to subtertian malaria. *Trans. Roy. Soc Trop. Med. Hyg.*, **48**: 312-318 (1954).

Allison, A.C.: The Sickle and haemoglobin C genes in some African populations *Ann. Hum. Genet.*, **21**:

Table 4: Prevalence of different types of ailment among the subjects during the last one year

S. No.	Type of Ailment	Sicklers		Normal	
		Number	Percent	Number	Percent
1.	Fever, Pain, Weakness	30	69.76	32	56.14
2.	1 & cold & cough	30	69.76	31	54.38
3.	1, 2 & joint pain	25	58.13	10	17.54
4.	1, 2, 3 & body pain	22	51.16	1	1.75
5.	1, 2, 3, 4 & weakness	20	46.51	—	—
6.	1, 2, 3, 4, 5 & waist pain	15	34.88	—	—
7.	1, 2, 3, 4, 5, 6 & epitaxis	5	11.62	2	3.50

67-89 (1956).
Allison, A.C.: Malaria in carriers of sickle cell trait and in new born children. *Exp. Parasitol.*, **6**: 418-447 (1957).
Bhatia, H.M. and Rao, V.R.: Genetic Atlas of Indian Tribes.Indian Council of Medical Research ,Bombay (1987).
Daland G.A. and Castle, W.B.: A simple and rapid method of demonstrating sickling of red blood cells: the use of reducing agent. *J. Lab. Clin. Med.*, **33**: 1085-8 (1948).
Kulozick, A.E. et.al.: Geographical Survey of β^S globin gene haplotypes. Evidence for an independent origin of the sickle cell mutatoin. *Am. J. Hum. Genet.*, **39**: 239-244 (1986).
Livingstone, F.B.: Frequencies of Haemoglobin Variants. Thalassemia, the Glucose – 6 – Phosphate Dehydrogenase deficiency, G – 6 – PD pariants and Ovalocytosis in human populations. New York (1985).
Pandey, P.L.: High prevalence of heamoglobinpathies and G6PD deficiency among the tribals of Madhya Pradesh - need of effective genetic counselling and health education programme. *Tribal Health Buletin.* **2**: 1-6 (1993).
Reddy, P.H. and Modell, B.: Reproductive behaviour and natural selection for the sickle cell gene in the Baiga tribe of Central India: The role of social parenting. *Ann. Hum.Genet.*, (1996).
Sood, R.: *Medical Laboratory Technology : Methods and Interpretations.* Jaypee Brother, Medical Publishers (P) Ltd., Delhi. pp. 180- 249, 272-291 (1994).

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