

Study of Blood Groups in Migrant Oraons and Mundas of Purnia District of Bihar, India

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ABSTRACT The present study reports the ABO blood groups among the Oraons and Mundas of Purnia district (Bihar), which are migrant of Chotanagpur. There is pre-dominance of blood group A among Oraons while Mundas revealed pre-dominance of blood group B. Blood group AB is lowest in Oraons and O in Mundas. Role of geographical isolation, temporal variation, natural selection and genetic drift in changing frequencies of blood groups in Oraons and Mundas of Purnia district in comparison to that of Chotanagpur Plateau have been discussed.

INTRODUCTION

The science of genetics suggests that the hereditary difference among populations of a single species are the results of the action of two sets of processes. On the one hand, the genetic composition of isolated population is constantly but gradually being altered by natural selection and occasional changes (mutations, genetic drift, geographical isolation and temporal variation in the material particles (genes) which control heredity.

Migration is a common phenomenon in human populations and quite often it influences the genetic structure of the population. The tribes of Purnia district of Bihar are migrant of Chotanagpur Plateau. The tribes came here nearly 150 years ago. As nothing is known about their ABO blood groups in this new ecological settlement, so the present work was undertaken which deals with the ABO blood groups of migrant Oraons and Mundas of Purnia district of Bihar.

MATERIALS AND METHODS

For the present work two tribal populations namely Oraons and Mundas were selected. These population were selected as they are migrant of Chotanagpur Plateau and are the major tribal

population of the district. Blood groups were determined by slide agglutination method using anti-A and anti-B. The ABO allele frequencies were calculated according to Mourant et al. (1976). The chi-square values were calculated by using woolf's 'G' table (1957).

RESULTS AND DISCUSSION

The frequencies of different blood groups and their allelic frequencies are shown in the table 1. It is necessary to discuss the present data from four points of view :

- (a) Internal consistency by comparison with similar studies on the Oraons and Mundas.
- (b) Comparison of the Oraons and Mundas of the present investigation with other tribal groups in India.
- (c) comparison of the Oraons and Mundas of present investigation with other population of Purnia district, other than tribes and
- (d) comparison of the Oraons and Mundas of present investigation, with other Indian population, other than tribes.

In the present investigation blood group A was found highest in the Oraons and blood group B in the Mundas of the Purnia district. The frequency of blood group AB was found lowest (11.8%) in Oraons while frequency of blood group O was lowest (12.4%) in Mundas. The allele frequencies of A, B and O in two groups are as follows - 0.26, 0.37 and 0.37 (in Munda) and 0.27, 0.23 and 0.50 (in Oraons). Thus there is much variation in the frequency of allele O in two groups.

However, several workers have reported pre-dominance of blood group B in Oraons and A in Mundas of Chotanagpur Plateau (Sarkar,

1949; Kirk et al., 1962 and Sharma, 1976). Bhatia et al., (1986) have reported pre-dominance of blood group A in the Oraons of Ambikapur (M.P.). Piplai et al. (1985) have reported pre-dominance of blood group B in the migrant Oraons of Jalpaiguri district of West Bengal. Lehman (1953) have also reported predominance of blood group B in the immigrant labourers of Andaman (South).

It has been reported that there is a considerable relation between geography and the distribution of blood groups. Blood groups are affected by environmental selection, temporal variation and geographical isolation (Das, 1991; Pandey et al., 1993). Oraons and Mundas have migrated to Purnia from Chotanagpur Plateau nearly 150 years ago. It might be possible that highest frequency of blood group A in Oraons and B in Mundas of Purnia is due to geographical

isolation. Bittles and Smith (1991) have reported changes in A and O allele frequencies against distance from north to south commencing from the northern most town in the Peninsula (Bangalore). They further reported considerable correlation between genetic and geographic distance matrices. Purnia district is located at a distance of 350 km in north of Chotanagpur Plateau. Thus variation in the blood groups in the Oraons and Mundas of present investigation might be due to the geographical distance. Sharma et al. (1985) have reported higher frequency of blood group O while in other studies high incidence of blood group B has been reported in Kond tribe of Orissa. They pointed out these minor variations are evidently due to geographical isolation, despite common ancestry which supports present finding.

It has been reported that identical gene

Table 1: Distribution of blood groups and the allele frequencies among Oraons and Mundas of Purnia district

Population	Blood groups				Allele frequencies		
	A	B	AB	O	A	B	O
Oraon	70 (34.65%)	58 (28.71%)	24 (11.88%)	50 (24.76%)	0.27	0.23	0.50
Munda	60 (28.03%)	94 (43.92%)	34 (15.88%)	26 (12.14%)	0.26	0.37	0.37

Table 2: Chi-square value of Oraon and Munda of Purnia district with other populations

Population	Chi-square value	Probability	Remarks
Oraon (P) X Munda (P)	18.47	<.001 P	Significant
Oraon (P) X Oraon (P)	44.80	.20 >P>.10	Non-significant
Oraon (P) X Santal (S)	09.51	.05 >P>.02	Significant
Oraon (P) X Munda (R)	01.59	.70 >P>.50	Non-significant
Oraon (P) X Brahmin (P)	04.65	.10 >P>.05	Non-significant
Oraon (P) X Musahar (P)	03.80	.30 >P>.20	Non-significant
Oraon (P) X Muslim (P)	33.39	<.001 P	Significant
Oraon (P) X Yadav (P)	16.89	<.001 P	Significant
Oraon (P) X Rajput (P)	18.38	<.001 P	Significant
Oraon (P) X Kayastha (P)	12.98	.01 >P>.001	Significant
Oraon (P) X Bania (P)	12.50	.01 >P>.001	Significant
Munda (P) X Oraon (P)	13.70	.01 >P>.001	Significant
Munda (P) X Munda (R)	15.27	.01 >P>.001	Significant
Munda (P) X Brahmin (P)	38.22	<.001 P	Significant
Munda (P) X Musahar (P)	41.43	<.001 P	Significant
Munda (P) X Muslim (P)	74.38	<.001 P	Significant
Munda (P) X Yadav (P)	45.16	<.001 P	Significant
Munda (P) X Bania (P)	19.97	<.001 P	Significant
Munda (P) X Rajput (P)	16.09	<.001 P	Significant
Munda (P) X Kayastha (P)	46.68	<.001 P	Significant
Munda (P) X Santal (P)	17.91	<.001 P	Significant

P - Purnia

R - Ranchi

S - Singhbhum

frequencies of small isolated population become different with time because of genetic drift (Sewall Wright, 1934). According to him smaller the population, the greater will be the importance of genetic drift. With a change in environmental conditions, the small population may develop superior pool of genes which would give it an advantage over its ancestors. Thus the chance variation of gene quantity brought through genetic drift can have evolutionary significance. Oraons and Mundas are migrant and are present in small population. Further, their mating takes place in the same geographical areas of Purnia district, they are strictly endogamous. Thus it can be concluded that the higher frequencies of blood groups A in the Oraons and B in the Mundas of the present investigation might be due to chance variation of gene quantity brought through genetic drift, which might be of selective advantage in their present environmental conditions. Such type of variations in blood groups have been found in the Dunkers of Eastern Pennsylvania who had immigrated over 200 years ago from West Germany (Glass, 1953).

It has been reported by Stein and Rowe (1978) that until relatively recent time all people existed in small groups. It can be easily hypothesized that differences developed from group to group because of genetic drift. Likewise, when a small group migrates from one population to establish a new population, it is expected that differences will develop. This also supports our present finding. In conclusion it can be said that as these tribes migrated to their new settlement, the changed frequency of blood groups in these tribes might be more suitable in this new ecological zone.

From the figure 1 it is clear that :

- In case of three upper castes (Brahmins, Rajputs and Kayasthas of Purnia district) alleles A, B and O show declined pattern ($A < B < O$).
- In case of Banias allele O shows marked increase trend while the frequency of A shows declined pattern with respect to allele B ($A < B < O$).
- In case of Muslims in comparison to allele A and B, allele O shows increased pattern ($A < B < O$).

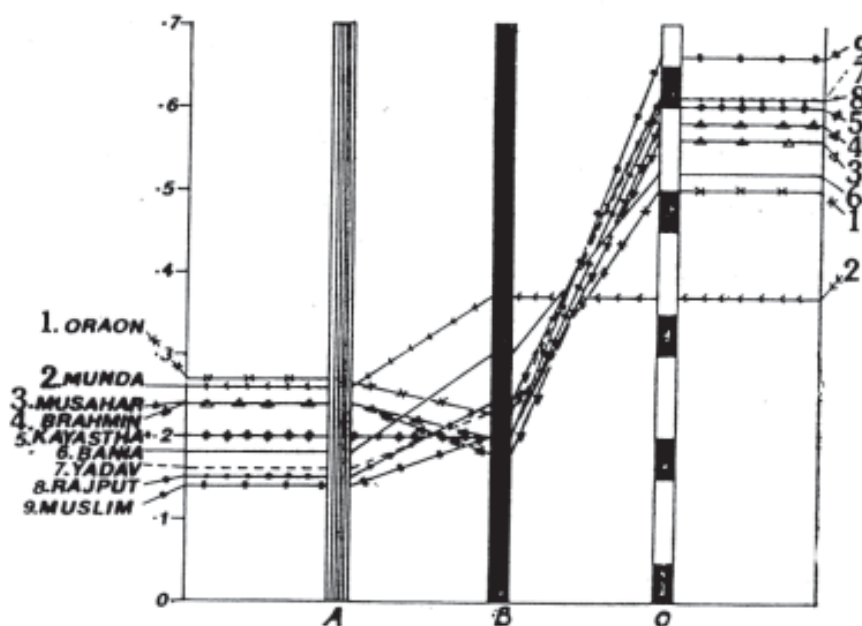


Fig.1. Frequencies of alleles A, B and O among nine populations of Purnia District, Bihar

- (d) In case of Yadavas allele A and B declined with respect to O ($A < B < O$).
- (e) In Muslims allele A show declined trend with respect to alleles A and B ($A > B > O$).
- (f) In case of Oraons the alleles A and B decline with respect to allele O ($A > B > O$).
- (g) In case of Mundas allele A declines with respect to allele O ($A > B > O$).

Statistically, the chi-square values (Table 2) are not significant between Oraons of Purnia and Oraons of Ranchi, Oraons of Purnia and Mundas of Ranchi, Oraons of Purnia and Brahmins of Purnia as well as Oraons of Purnia and Mushars of Purnia. With rest other populations of Purnia, Oraons and Mundas show significant values of Chi-square (Table 2). According to Lundman (1948) the correlation between racial relationship and serological similarity is not very close. Central Mongloids and Hindus who are physically so utterly unlike, exhibit practically the same serological pattern (Rao, 1977). The same thing can be said about the serological similarity in Oraons, Brahmins and Mushars of Purnia which differ physically as well as culturally but show same degree of serological pattern.

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