

The Study of Blood Group A1A2BO and Rh Among the Brahmins of Mussoorie, Uttaranchal

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ABSTRACT The present paper reports the distribution of A1A2BO and Rh(D) blood groups among the Brahmins of Mussoorie, Uttaranchal. The frequency of blood group A is found to be highest. Frequency of Rh(D) positive is as much as 67.24%. When compared with the other studies available from Uttaranchal, present caste group - Brahmins falls in closer to the other population groups of Uttaranchal.

INTRODUCTION

As a branch of classical genetics, population genetics aims to clarify the laws of biological populations, particularly those forming reproductive communities or species. It is a branch of genetics that describes in mathematical terms the consequences of Mendelian genetics at the population level. Population geneticists are concerned with the frequencies and interactions of alleles in a Mendelian population, i.e., an interbreeding group of organisms sharing a common gene pool.

Since, blood group is a polymorphic trait, it provides us with a model by which we can study the segregation of a single pair of autosomal alleles having intermediate inheritance in the human population. These alleles are especially well adapted for a beginning study of gene frequency because dominance is not expressed. In the present study, an attempt has been made to study blood group systems ABO and Rhesus among the Brahmins of Mussoorie, Uttaranchal.

MATERIAL AND METHODS

In the present area of study, the different population groups comprise of the Brahmins, Rajputs, Scheduled castes and scheduled tribes of Bhotias and Rajis. The present study was carried out among the Brahmins of Mussoorie, Uttaranchal. A total of 177 blood samples were collected and analyzed for ABO and Rh blood groups. The details of each subject such as name, age, sex, caste etc. were collected using a brief questionnaire.

The blood samples were analyzed for A1A2BO and Rh(D) blood groups using standard techniques as described by Bhasin and Chahal (1998). Gene frequencies were calculated after Mourant et al. (1976).

RESULTS AND DISCUSSIONS

ABO Blood Group: The frequency distribution of phenotypes and alleles of ABO blood group system, among the Brahmins of Mussoorie is given in table 1. It has been observed that the frequency of blood group A1 is highest with percentage frequency of 40.69% which is followed by blood group O with percentage frequency of 23.72%, blood group B with the percentage frequency of 22.03, A1B with a frequency of 11.86 and the least percentage frequency is that of blood group A2B which is 0.57%. The allele frequency of O is highest which is 48.70 followed by A1 31.12, B having 19.04. The allele frequency of A2 is 1.25. The differences between observed and expected percentile frequencies are statistically not significant.

In the present population group frequency of allele ABO*A is high as compared to allele ABO*B, and this pattern of distribution has been explained by Bhasin and Walter that in the Himalayan region, among some population groups of Western and Central Himalayas a high frequency of allele ABO*A as compared to allele ABO*B has been observed (Bhasin et al., 1983) and a similar pattern of distribution has been observed among Old Nepalese groups and Indo-Nepalese groups which show their contact to the North Indian population groups particularly from

Table 1: Phenotype and allele frequencies distribution of A1A2BO blood groups among Brahmins of Mussoorie.

Blood groups	Observed number	Percentage frequency	Expected number	Allele frequency	Percentile frequency
A1	72	40.69	72.05	ABO*A1	0.3110
A2	2	1.13	2.17	ABO*A2	0.0125
B	39	22.03	39.15	ABO*B	0.1904
O	42	23.72	41.84	ABO*O	0.4862
A1B	21	11.86	20.96		
A2B	1	0.57	0.83		
Total	177	100.00	177.0		1.0000

the Himalayan region. Among the Tibetans, the frequency of allele *ABO*B* is high as compared to allele *ABO*A* except among the studies of Tennant (1936) and Saglio et al. (1979). In Bhutanese reported by Mourant et al. (1968) the frequency of allele *ABO*A* is higher than allele *ABO*B*. From Eastern Himalayas, as compared to allele *ABO*B* the frequency of allele *ABO*A* is observed to be quite high among almost all the population groups studied (Bhasin and Walter, 2001).

The high frequencies of allele *ABO*A* as compared to allele *ABO*B* among population groups in Western and Central Himalayas may be explained by contacts with Central Asiatic populations, whereas populations of those regions in which the allele *ABO*B* frequencies are high as compared to that of allele *ABO*A* may have had contacts with Tibetans. Further, population groups of the Eastern Himalayas, where the frequency of allele *ABO*A* is quite high as compared to allele *ABO*B*, may have had contacts with population belonging to the Northern Mongoloid stock. However, as the communication facilities in the Himalayan regions are meager and the different groups are therefore living rather isolated from one another, locally acting factors like drift or founder effects have also to be taken into consideration (Bhasin and Walter, 2001).

Rh Blood Group: In the present population the frequency of allele *RH*D* is 67.24 and allele *RH*d* which is 32.76% (Table 2). In general, the frequency of allele *RH*D* varies from 53.2 to 100.0 among Indians which averages around 0.803. Among the scheduled tribes, the frequency of allele *RH*D* is highest (0.876) as compared to rest of the ethnic groups - scheduled caste (0.804), caste (0.776) and community (0.756). Among the population groups of Uttranchal, the frequency of allele *RH*D* varies from 58.1 to 100.0 with an average frequency of 79.8 (Bhasin et al., 1992, 1994) and a similar pattern of distribution is observed in the present study.

Table 2: Phenotypes and allele frequencies of Rh blood group among Brahmins of Mussoorie

Phenotype	Number	Percentage	Allele frequency
Rh+	158	89.27	<i>D</i> = 67.24
Rh-	19	10.73	<i>d</i> = 32.76
Total	177	100.00	

It has been observed that the present population that in the blood group ABO, the frequency of allele *ABO*A* high as compared to allele *ABO*B* and *RH*D* is low (67.24) and a similar pattern of distribution has been observed in some of the population groups for example Brahmins and Rajputs of Garhwal of Uttaranchal. This pattern of distribution may be explained as the communication facilities in the Himalayan regions are meager and the different groups are therefore living rather isolated from one another, locally acting factors like drift or founder effects have also to be taken into consideration.

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