

Distribution of A1A2BO, Rh₀ (D) Blood Groups and ABH Secretor Status Among Kolis and Chamars (Scheduled Castes) of Sundernagar, Himachal Pradesh

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INTRODUCTION

The study of variation within the populations is one of the main objectives of physical anthropologists. In the sphere of such studies, A1A2BO, Rh₀ (D) blood groups and ABH secretor status polymorphism secure a significant position as genetic markers in the understanding of human diversity.

Regarding secretor status, a new interest based on the distribution of secretor gene in man and non-human primates has been generated to establish correlation between lectins in diet, ABH polymorphism and with many diseases. A selection-relaxation hypothesis has been put forward to report the sustained high frequency of non-secretors in developed human societies as opposed to low frequency of recessive allele *se*, dropping to zero, in many primitive human societies and its almost absence in apes and monkeys (Bhalla, 1990).

The Mandi district is situated between 31°13'50" and 32°04'30" north and 76°37'20" and 77°23'15" east. The district being mountainous, the climate is temperate. The original inhabitants of this area are Rajputs, Brahmins, Khatri and Kanets. Among the scheduled castes, the important sub-castes are Badhi or Nagalu; Chamar, Mochi, Ramdasi or Ramdasia; Chahal; Daole-Daule; Dhaogri or Dhua; Dumne; Jogi; Kabirpanth, Julaha or Keer and Julaha; Koli; Lohar and Rehar.

Sundernagar is one of the six *Tahsils* that come under district Mandi of Himachal Pradesh. It is situated at a height of 1000 meters, above the mean sea level at a distance of 26 km from Mandi, the district headquarter.

MATERIALS AND METHODS

A total of 223 samples of blood (110 samples of Kolis and 113 samples of Chamars) were collected from the apparently healthy and unrelated individuals of both sexes and analysed for A1A2BO and Rh₀ (D) blood grouping and for secretor and non-secretor status. Serological

tests were performed using standard techniques as advocated by Boorman et al. (1988). Gene frequencies were calculated by methods given by Mourant et al. (1976).

RESULT AND DISCUSSION

The result of the analysis of A1A2BO and Rh₀ (D) blood groups and ABH secretions in saliva for Kolis and Chamars are shown in tables 1 and 2, respectively.

Table 1 shows that the B phenotype has the highest frequency (41.82%) among the Kolis followed by A (29.09%), O (19.09%) and AB (10%). The *ABO*B* allele incidence (0.3372) was higher than the combined incidences of *ABO*A1* (0.2424) and *ABO*A2* (0.0101) alleles. In case of Rh₀ (D) blood groups 90 per cent were positive and 10 per cent negative, the allele frequencies being 0.6838 for *D* and 0.3162 for *d*. The percentage frequency of secretors amongst Kolis is high: 85.45 per cent of secretors and 14.55 per cent of non-secretors.

The results of the analysis of A1A2BO, secretor status and Rh₀ (D) blood groups of Chamars have been summarised in table 2. It shows that A phenotype has the highest frequency (34.51%) followed by B (33.63%), O (19.47%) and AB (12.39%). The *ABO*A* allele incidence (0.2903) was higher than the *ABO*B* allele incidence (0.2843). In case of Rh₀ (D) blood groups, 97.35 per cent were positive and 2.65 per cent negative, the allele frequencies being 0.8372 for *D* and 0.1628 for *d*. Chamars show a very high frequency of secretors: 92.04 percent.

The Kolis and Chamars of Sundernagar showed the allele frequencies of the A1A2BO blood groups, which were well within the range of various population groups of north-western Himalayan region, particularly those of Himachal Pradesh (Bhasin et al., 1992, 1994). The distribution of Rho (D) blood group system of Kolis and Chamars of Sundernagar was compared with the distribution of the same among the Rajputs and Brahmins of northwest Kullu, Himachal Pradesh. Statistical comparison using

Table 1: A1A2BO, secretor/ nonsecretor and Rho (D) phenotypes and allele frequencies among 110 Kolis of Sundernagar

Phenotype	Observed number (%)	Expected number	Allele frequencies
<i>ABO Blood Groups</i>			
A1	31 (28.18)	28.886	$ABO^*A1 = 0.2424$
A2	1 (0.91)	0.935	$ABO^*A2 = 0.0101$
B	46 (41.82)	42.933	$ABO^*B = 0.3372$
O	21 (19.09)	18.513	$ABO^*O = 0.4103$
A1B	10 (09.09)	17.974	
A2B	1 (0.91)	0.759	
<i>Secretors Groups</i>			
Secretors	94 (85.45)	-	$Se = 0.6186$
Non-secretors	16 (14.55)	-	$se = 0.3814$
<i>Rhesus Blood Groups</i>			
Rh ₊ (D)+ve	99 (90.00)	-	$D = 0.6838$
Rh ₊ (D)-ve	11 (11.00)	-	$d = 0.3162$

chi square-test showed that the Koli population showed non-significant differences with both the Rajputs and Brahmins of northwest Kullu whereas the Chamar population showed a non-significant difference with the Rajputs and a significant difference with the Brahmins of north-west Kullu.

When the Koli and Chamar population groups of Sundernagar were compared with one another, a non-significant difference is obtained with respect to the A1A2BO blood groups ($\chi^2 = 2.5589$, df 2; non-significant) and a significant difference is obtained with respect to the Rho (D) blood group system ($\chi^2 = 5.1109$, df 1; significant).

Results on ABH secretor status of Kolis and Chamars show variation in the differences in terms of significance with the other populations of Himachal Pradesh when subjected to comparison.

Kolis of Sundernagar show non-significant relationships with some populations of Himachal Pradesh. They are Brahmins, Rajputs and Kolis of Kullu district. (Se allele frequency 68, 82.35 and 80.64 per cent, respectively and $\chi^2 = 3.77$, 0.25 and 0.40, respectively) (Bhasin et al, 1983). Similar relationship is observed with Brahmins and Rajputs of Bilaspur district (Se allele frequency 80 and 82.89 per cent respectively and $\chi^2 = 0.950$ & 0.33, respectively) (Bhasin et al., 1983) and with Brahmins of Manali (Se allele frequency 73.03 per cent and $\chi^2 = 2.08$) (Bansal and Kaur, 1978). Last but not the least with the Chamars of Sundernagar (Se allele frequency 92.03 percent and $\chi^2 = 2.45$) (Present study, 2001).

In contrast to Kolis, Chamars of Sundernagar show non-significant differences with Brahmins of North-West Kullu (Se allele frequency 88.33 percent and $\chi^2 = 0.62$) (Bhasin et al., 1983) and of

Table 2: A1A2BO, secretor/ nonsecretor and Rho (D) phenotypes and allele frequencies among 113 Chamars of Sundernagar

Phenotype	Observed number (%)	Expected number	Allele frequencies
<i>ABO Blood Groups</i>			
A1	36 (31.86)	34.567	$ABO^*A1 = 0.2615$
A2	3 (2.65)	2.959	$ABO^*A2 = 0.0288$
B	38 (33.63)	36.465	$ABO^*B = 0.2843$
O	22 (19.47)	20.453	$ABO^*O = 0.4254$
A1B	13 (11.51)	16.803	
A2B	1 (0.88)	1.853	
<i>Secretor Groups</i>			
Secretors	104 (92.04)	-	$Se = 0.7179$
Non-secretors	9 (7.96)	-	$se = 0.2821$
<i>Rhesus Groups</i>			
Rh ₊ (D)+ve	110 (97.35)	-	$D = 0.8372$
Rh ₊ (D)-ve	3 (2.65)	-	$d = 0.1628$

course with Kolis of Sundernagar (Se allele frequency 85.45 and $\chi^2 = 2.45$).

This suggests that as compared to Kolis, Chamars of Sundernagar show less degree of closeness with other populations of Himachal Pradesh if ABO (H) is taken as genetic parameter.

KEY WORDS A1A2BO, Rh₀ (D), ABH Secretions, Kolis, Chamars, Himachal Pradesh.

ABSTRACT The data are presented on the distribution of the A1A2BO, Rh₀ (D) blood groups and secretor status among the Kolis and Chamars of Sundernagar, endogamous populations of Himachal Pradesh. The sample size consisted of 110 Koli and 113 Chamar individuals. Among the Kolis, the blood group B had the highest frequency (41.82 per cent) followed by A (29.09 per cent), O (19.09 per cent) and AB (10 per cent). In case of Rh₀ (D), 90 per cent were +ve and 10 per cent -ve. Among the Chamars, the blood group A had the highest frequency (34.51 per cent) followed by B (33.63 per cent), O (19.47 per cent) and AB (12.39 per cent). In case of Rh₀ (D), 97.35 per cent were +ve and 2.65 per cent -ve. Among the Kolis, the frequency of Se (0.6186) was much higher than se allele (0.3814). Similarly, among

the Chamars, frequency of Se (0.7179) was again much higher than se allele (0.2821).

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