Research Paper

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Serogenetic Variation Among three Endogamous Groups of Shimla Hills

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KEYWORDS : Blood groups, traits, allele frequency, endogamous groups.

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ABSTRACT

The distribution of serological traits viz. ABO and Rh(D) blood group among three endogamous groups viz. Brahmin, Rajput and Harijan of Shimla Hills exhibit homogeneous distribution. For each endogamous group 200 unrelated individuals in age group of 15-60 years were randomly sampled by conventional slide agglutination method, using standard technique of Weiner and Lourie. The frequency of A allele ranges from 0.194 to 0.243, that of B allele varies from 0.158 to 0.252 and O allele ranges from 0.538 to 0.648. The frequency of d allele varies from 0.173 to 0.265 and that of D allele ranged from 0.735 to 0.827. The present range of frequency of traits falls within the range of other populations of Northwest India.

INTRODUCTION

Shimla Hills lie between the longitude 77°-0" and 78°-19" east and latitude 30°-45" and 31°-44" north. It is bounded by Mandi and Kullu in the north, Kinnaur in the east, the state of Uttaranchal in the south, Sirmaur, district in the west. The elevation of the Hills ranges from 300 to 6000 meters. The topology is rugged and tough. Shimla Hills derives its name from Shimla town which was once a small village. Shimla district in its present form came into existence from 1st Sept, 1972 on the reorganization of the districts of the state.[1]

The people of Shimla Hills are among the warmest and friendliest people of India. The people are proud of their traditions and are fiercely protective about it. Inspite of modernization, the people have not changed and they can still be seen following their traditions and rituals with much devotion and dedication. The main economic activity and source of livelihood is agriculture. Majority of the people work in fields or grow apple trees. Other sources of livelihood include animal husbandry, government services and handicrafts like weaving. The houses are built in an Indo-Tibetan style with slanted roofs and slates.[2] Social restrictions in marriages have apparently hampered the gene flow between different castes thereby resulting into isolated endogamous groups.

The population genetic studies carried out on the endogamous groups of Himachal Pradesh and similar other groups of northwest India are quite limited.[3] The present study is aimed at investigating the distribution of serological traits among three endogamous caste groups-Brahmin, Rajput, Harijan of Shimla Hills in Himachal Pradesh.

MATERIALS AND METHODS

Brahmins are priests: Rajputs are agriculturists and Harijans are working people who serves Brahmins and Rajputs in their fields. Serological data was collected from individuals residing in different localities in Kotkhai, Jubbal, Rohru, Rampur, Theog, and Seoni of Shimla Hills of Himachal Pradesh (Table 1). For each endogamous group 200 unrelated individuals in age group 15-60 years were randomly sampled. The following traits were investigated and their allele frequencies were analyzed:

TABLE 1: Phenotypes and gene frequencies of ABO blood groups among three endogamous group

Caste group	Sample size		Phenotypes				Allele Frequency			Chi-square (df=3)
			O	A	B	AB	A	B	O	
		Obs	*70*	*42*	*60*	*28*	**0.157**	**0.252**	**0.591**	5.731
Brahmin	200									
		Exp	*69.86*	*42.04*	*72.28*	*15.82*				
		Obs	*58*	*64*	*54*	*24*	**0.243**	**0.219**	**0.538**	0.239
Rajput	200									
		Exp	*57.88*	*64.10*	*56.72*	*21.28*				
		Obs	*84*	*58*	*42*	*16*	**0.194**	**0.158**	**0.648**	0.739
Harijan	200									
		Exp	*83.98*	*57.82*	*45.94*	*12.26*				

Serological traits: ABO and Rh(D) blood group system

Investigation were made following standard technique of Weiner & Lourie.[4] The red cells were typed for ABO and Rh(D) blood group system following standard serological techniques. Tests with antisera Anti-A, Anti-B and Anti D were performed by conventional slide agglutination method.

RESULT AND DISCUSSION

ABO blood group system:

The phenotypes and gene frequencies of ABO blood group system in three endogamous groups' studied are given in Table-1. The gene frequency for blood group A was found to be maximum (0.243) in Rajput and minimum (0.157) in Brahmins. The gene frequency for blood group B was found to be maximum (0.252) in Brahmins and minimum (0.158) in Harijan. The blood group O has maximum gene frequency (0.648) in Harijans and lowest (0.538) in Rajputs. The chi-square value for ABO blood groups in three endogamous groups have been found maximum (X^2 = 5.731) for Brahmin and lowest (X^2 = 0.239) in Rajputs. Inter-caste comparison showed non-significant distribution. The chi-square value of total group comparison indicate a homogeneous distribution (X^2 = 6.709, df = 3P> 0.001).

Rh (D) Blood group system

The result presented in Table -2 showed that the incidence of blood group Rh(d) negative varies from 3% in Rajput to 7% in Harijan. Therefore the d allele frequency was found to be minimum in Rajput (0.173) and maximum in Harijan (0.265). The inter-caste comparison showed non-significant differences. The total group comparison revealed homogeneous distribution (X^2 = 1.859, df = 1,0.05, P<0.02).

Table 2: Phenotypes and gene frequencies of Rh(D) blood groups among three endogamous groups

Caste group	Sample size (n)	Phenotypes		**Allele Frequency**	
		Rh^+ (D)	Rh^- (d)	**D**	**d**
Brahmin	200	192	8	**0.800**	**0.200**
Rajput	200	194	6	**0.827**	**0.173**
Harijan	200	186	14	**0.735**	**0.265**

The range of frequency recorded for A allele (0.157-0.243) falls within the range for other populations of north India i.e. 0.068 in Khatri.[5] to 0.356 in Bazigar.[6] The range recorded for B allele (0.158-0.252) is in agreement with an earlier report from north India i.e. 0.185 in Sonar to 0.387 in Khatri and 0.246 in Dakaut to 0.349 in khatik.[7]

ABO allele frequencies in the present Himahcal Pradesh groups also showed close resemblance with other population of north-west India.[8] The narrow range of d allele frequency (0.173-0.265) obtained in the present study fits well in the range recorded in earlier studies (0 to 0.420) from northwest India .[9-11]

CONCLUSION

The close resemblance of the frequencies of various alleles in the present caste groups with those reported in other northwest Indian population favour the view that the various caste groups of northwest India show similarity in form of biological structure of populations and many elements of social organization and evolution of Shimla Hill population as a part of north-western region of India.

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