IMPACT: International Journal of Research in Applied, Natural and Social Sciences (IMPACT: IJRANSS)
ISSN(E): 2321-8851; ISSN(P): 2347-4580
Vol. 2, Issue 2, Feb 2014, 77-80

DISTRIBUTION OF ABO AND RH (D) ALLELE FREQUENCY AMONG FOUR ENDOGAMOUS POPULATIONS OF HARYANA

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ABSTRACT

In the present study, the distribution of ABO and Rh (D) blood groups has been investigated in four endogamous groups of Haryana (Mallah, Banjara, Kumhar and Saini). In ABO blood group system, the frequency of A allele ranged from 0.040-0.286, that of B allele ranged from 0.322-0.368 and of O allele ranged from 0.354-0.604 whereas the frequency of D allele varied from 0.421-0.900. The frequency of different alleles falls well within the range of other castes of Haryana.

KEYWORDS: ABO, Allele Frequency, Endogamous Groups, Haryana, Rh Blood Groups

INTRODUCTION

Haryana is situated in north-west Indian region. There has been considerable migration and mixing in the population of Haryana in past. 82 communities in Haryana have been identified (Singh, 1994). Although these communities are quite widely distributed yet only sporadic studies are available with regard to the distribution of ABO and Rh (D) blood groups in different endogamous groups of Haryana (Malik *et al.* 1998, Yadav *et al.* 1992, 1994a,b, 1997a,b,c, 1998, 2000, 2001, Yadav & Gupta 1992, Yadav & Singh 2002, Yadav & Jain 2008, Chhikara & Yadav 2011, Jain *et al.* 2013, Yadav *et al.* 2013a,b).

The present study investigates the distribution of ABO and Rh (D) blood groups in four endogamous groups of Haryana (Mallah, Banjara, Kumhar and Saini).

MATERIAL AND METHODS

Sample Collection

Blood samples were collected by finger-prick method from 800 healthy, unrelated individuals of both sexes belonging to Mallah, Banjara, Kumhar and Saini populations of Haryana. Mallah, Banjara, Kumhar and Saini populations belong to backward class and samples were collected from Faridabad, Gurgaon, Karnal, Panchkula, Kurukshetra, Rohtak and Jind district of Haryana.

Laboratory Analysis

ABO and Rh (D) blood grouping was performed simultaneously. Slide agglutination method was followed. On a clean, labeled glass slide a drop of antisera-A, antisera-B and antisera-D was placed and a drop of blood was added to each and mixed immediately. Agglutionation with antisera-A showed A blood group, with antisera-B showed B blood

group and with both A and B showed AB and with neither of these showed O blood group. Agglutination of blood with D showed positive test for D antigen.

Statistical Analysis

Allele frequencies of ABO blood group system was calculated according to Yasuda (1984) and d allele frequency was calculated by square root method. Statistical calculations were done using chi-square test.

RESULTS

The phenotypes and allele frequencies of ABO blood group are given in table 1. In ABO blood group system, the frequency of A allele was found to be highest in Banjara (0.286) and lowest in Mallah (0.040). Kumhar (0.368) has the highest frequency of B allele while Saini (0.322) has the lowest B allele frequency. The allele frequency for O blood group was found to be highest in Mallah (0.604) and lowest in Banjara (0.354). Chi-square value for ABO blood groups was significant only in Mallah population group indicating heterogenous distribution and the remaining population groups showed non-significant differences indicating homogenous distribution.

The phenotype and gene frequencies of Rh (D) blood group are given in table 2. The gene frequency of D allele was found to be maximum in Mallah (0.900) and minimum in Banjara (0.594). d allele frequency was highest in Banjara (0.406) followed by Kumhar (0.339), Saini (0.200) and lowest in Mallah (0.100).

DISCUSSIONS

Past studies have reported that the A allele frequency varies from 0.066 in Yadav (Yadav *et al.* 2013) to 0.356 in Banjara (Yadav *et al.* 1997). The frequency of A allele (0.040-0.286) found in the present study fits well in the range of data reported earlier. The value of B allele frequency fits well in range of earlier studies i.e. 0.185 in Sunar to 0.387 in Khatri (Kushwaha *et al.*, 1990b).

In Haryana, d allele frequency ranges from 0 in Kamboj (Kushwaha *et al.*, 1990a,b) to 0.420 in Jat (Yadav *et al.* 1997). The allele frequency range for d allele (0.100-0.406) recorded in present investigation fits well within the range of earlier reported studies.

ACKNOWLEDGEMENTS

The authors are grateful to the authorities of Kurukshetra University, Kurukshetra for providing the laboratory facilities and to all the subjects who voluntarily gave blood sample.

Table 1: Phenotype and Allele Frequencies of the ABO Blood Group among Four Endogamous Groups of Haryana

Population Group	Number Tested	ABO Phenotype				ABO Allele Frequency			df	χ^2	Probability	Remarks
		A	B	AB	O	O	A	B				
Mallah	200 Obs	10	80	37	73	0.604	0.040	0.356	3	180.891	0.001	Sig.
	Exp	10.000	111.400	5.696	73.000							
Banjara	200 Obs	57	68	50	25	0.354	0.286	0.360	3	2.940	0.401	Non- sig.
	Exp	56.800	77.000	41.184	25.000							
Kumhar	200 Obs	46	86	34	34	0.412	0.220	0.368	3	0.111	0.990	Non- sig.
	Exp	45.800	87.600	32.384	34.000							
Saini	200 Obs	52	72	36	40	0.447	0.231	0.322	3	1.834	0.608	Non- sig.
	Exp	52.000	78.400	29.753	40.000							

Obs = Observed, Exp = Expected.

Table 2: Phenotype and Allele Frequencies of the Rh (D) Blood Group among Four Endogamous Groups of Haryana

Population Group	Number Observed	Rh (D) Phenotype		Rh (D) Allele Frequency	
		Rh (D)+	Rh (D)-	D	d
Mallah	200	198 (99%)	02 (1%)	0.900	0.100
Banjara	200	133 (66.5%)	67 (33.5%)	0.594	0.406
Kumhar	200	177 (88.5%)	23 (11.5%)	0.661	0.339
Saini	200	192 (96%)	08 (4%)	0.800	0.200

The value in the paranthesis shows the percentage frequency

CONCLUSIONS

The pattern of ABO and Rh blood groups distribution of Haryana is in accordance with North-West Indian population. It could be observed from the study that most frequent allele is O in Mallah, Banjara and Saini population while it is B allele in Kumhar population. The least frequent allele in all the populations is A and d. Knowledge of blood group systems helps in efficient management of regional blood bank and transfusion services. It provides insight into possibilities of future burden of diseases and help us to take preventive measures against it.

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