

A Study on Distribution of ABO and Rh (D) Allele Frequencies among Bishnoi, Sunar, and Kumhar of Haryana

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Abstract

The present investigation was planned on three endogamous groups of Haryana viz. Bishnoi, Sunar and Kumhar, and the distribution of serological traits like ABO and Rh (D) blood groups was determined. In the ABO blood group system the frequency of A allele ranged from 0.09-0.24, that of B allele ranged from 0.24-0.40 and of O allele from 0.36-0.67. In Rh (D) blood group system the frequency of d allele ranged from 0.26-0.35 while the frequency of D allele varied from 0.65-0.74. The frequency range of traits studied conformed to the range of other populations of North West India studied earlier.

Keywords: ABO; Allele frequency; Endogamous groups; Rh (D) blood group.

Introduction

Singh has identified 82 communities residing in Haryana.[1] 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.[2-13] The present investigation was planned to obtain the original data on these two serological markers of three endogamous groups, viz. Bishnoi, Sunar and Kumhar, of Haryana.

Subjects and Methods

Subjects

The study was approved by the Institutional Ethics Committee of the Kurukshetra

University, Kurukshetra. Blood samples from a total of 300 individuals of both sexes from three endogamous groups (Bishnoi, Sunar and Kumhar) were collected. A total of 100 unrelated individuals of both sexes (50 males and 50 females) were studied for each caste group. Donor subjects were selected randomly from all over Haryana.

Methods

Vacuum tubes containing EDTA (Vacutainer, Becton Dickinson, France) were used for intravenous blood sample collection from the subjects. ABO and Rh (D) blood group systems were typed using whole blood by slide method following the standard techniques of serology and manufacturer's directions enclosed with the different blood grouping reagents. The allele frequency in the ABO blood group system was calculated according to Yasuda The frequency of d allele was estimated by square root method.[14]

Results and Discussion

ABO blood group

The phenotypes and gene frequencies of ABO blood group are given in Table 1. In the ABO blood group system the frequency of A allele was found to be highest in Kumhar (0.24) and lowest in Bishnoi (0.09). The allele frequency of B allele was highest in Kumhar (0.40) followed by Sunar (0.33) and Bishnoi (0.24). While the allele frequency of O allele

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Table 1: Phenotypes and gene frequencies of ABO blood group in three endogamous groups of Haryana

Population group		ABO Phenotype				ABO Allele frequency			χ^2 value
		A	B	AB	O	A	B	O	
Bishnoi	Obs.	17	40	2	41	0.09	0.24	0.67	3.0224
	Exp.	12.87	37.92	4.32	44.89				
Sunar	Obs.	18	45	10	27	0.15	0.33	0.52	0.0033
	Exp.	17.85	45.21	9.90	27.04				
Kumhar	Obs.	26	48	14	12	0.24	0.40	0.36	2.4874
	Exp.	23.04	44.80	19.20	12.96				

Obs.= Observed, Exp.= Expected

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

Population group	Rh (D) Phenotype		Rh (D) Allele frequency	
	Rh (D) ⁺	Rh (D) ⁻	D	d
Bishnoi	93	7	0.74	0.26
Sunar	89	11	0.67	0.33
Kumhar	88	12	0.65	0.35

was lowest in Kumhar (0.36) it was found to be highest in Bishnoi (0.67). The chi-square values for the distribution of ABO blood group system were found to be non-significant in all the three castes indicating a homogeneous distribution of the trait.

The frequency of allele A in the different caste populations of North West India has been reported to range from 0.066 in Yadav[13] to 0.667 in Brahmin of Himachal Pradesh.[15] The frequency of allele A (0.09-0.24) in the present study fits well in the range recorded previously. Earlier studies on the North West Indian populations reported that the frequency of allele B vary from 0.185 in Sunar[6] to 0.566 in Sikh Harijans of Moga.[16] The frequency of B allele (0.24-0.40) in present study was in agreement with the previous work. Previously, the frequency of allele O has been found to vary from 0.170 in Sikh Harijans of Moga[16] to 0.689 in Maratha of Deccan Plateau[17] and the frequency of the O allele (0.36-0.67) as found in the present study falls well within the range of earlier studies.

Rh (D) blood group

The phenotypes and gene frequencies of Rh (D) blood group are given in Table 2. The gene frequency for d allele was highest in Kumhar (0.35) and lowest in Bishnoi (0.26). Earlier studies have reported that the frequency of d

allele varies from 0.000 in Kamboj[6] to 0.420 in Jat[8] in various populations of Haryana. Thus, the frequency range (0.26-0.35) of d allele recorded in the present study fitted well in the range reported in the past studies.

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References

1. Singh KS. People of India Haryana, Vol. XXIII. Anthropological Survey of India. New Delhi: Manohar Publishers; 1994.
2. Khurana BK. ABO blood group investigation among the Jats of Rohtak (Punjab). *Man in India*. 1956; 36: 224-227.
3. Malik DVS, Dhiman SR, & Bansal IJS. A study of some morphological, behavioural and genetic parameters among Jats of Haryana. *Bionature*. 1988; 8: 136-140.
4. Kushwaha KPS, Chahal SMS, Bansal IJS, Chugh OP, & Sorojani. Gene diversity and genetic distance among four caste groups of Haryana. *J Ind Anthropol Soc*. 1989; 24: 291-293.

5. Kushwaha KPS, Chahal SMS, Bansal IJS, Chugh OP, & Sorojani. Serogenetic variation in four caste population of Haryana India. *Hum Hered.* 1990a; 40: 262-266.
6. Kushwaha KPS, Gaur JR, Sangwan SK, Yadav AS, Thukral K, Kushwaha BP, Chopra IS, Chugh OP, & Chahal SMS. ABO and Rh (D) blood groups among 19 caste populations of Haryana. *Bionature.* 1990b; 10: 73-75.
7. Yadav JS, & Gupta MM. An anthropogenetic study of Jats of Haryana India. *J Hum Ecol.* 1992; 3(2): 147-148.
8. Yadav JS, Kaur M, Chahal SMS, & Yadav AS. Morphogenetic, behavioural and serological variations among five endogamous groups of Haryana. *J Cytol Genet.* 1997; 32(1): 21-28.
9. Yadav JS, Yadav AS, & Sukhpal. Morphogenetic, behavioural and blood group variation among four endogamous groups of North West India. *J Cytol Genet.* 2001; 2(NS): 29-34.
10. Yadav AS, & Singh S. Distribution of morphological, behavioural and serological traits in Meos and Sunni Muslims of Haryana. *J Cytol Genet.* 2002; 3(NS): 179-184.
11. Yadav AS & Jain R. Distribution of ABO and Rh (D) allele frequencies among four endogamous groups of Haryana. *J Cytol Genet.* 2008; 3(NS): 43-46.
12. Yadav S, Karwasra RK, & Yadav AS. Comparative study of ABO and Rh (D) allele frequencies in cancer patients and healthy individuals of Haryana. *Annals of Biology.* 2013a; 29(1): 79-81.
13. Yadav S, Karwasra RK, & Yadav AS. Distribution of ABO and Rh (D) allele frequencies in six endogamous groups of Haryana. *Annals of Agri Bio Research.* 2013b; 18(1): 79-81.
14. Yasuda N. A note on gene frequency estimation in the ABO and ABO like system. *Jpn. J Hum Genet.* 1984; 29: 371-380.
15. Ravikiran. Human genetic variability of traits, blood groups and genetic diseases of tribal population of Shimla district. (Unpublished M. Phil. Dissertation). H. P. University, Shimla: 2004.
16. Sidhu S. Distribution of the ABO blood groups among the Balmiki and Khatik Harijans of Punjab. *J Hum Ecol.* 1999; 10: 303-304
17. Karve I. Anthropometric measurements of the Marathas. Deccan College Monograph Series No. 2; 1948: 1-71.