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DISTRIBUTION OF THE ABO BLOOD GROUPS AND RH (D) FACTOR AMONG NOMAD TRIBAL POPULATIONS OF RAJASTHAN, INDIA

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ABSTRACT
The frequencies of ABO and Rhesus-D blood groups show a discrepancy from one population to another. There were no data available for Nomadic population of Rajasthan, India. Blood samples from a total of 1286 unrelated individuals of both sexes were drawn at random from the Tribal settlements in Jhunjhunu and Sikar districts of Rajasthan. The Chi-square ($\chi 2$) test for intergroup comparisons revealed that the distribution trend of ABO blood groups among different tribes were found to be significant (chi-square=70.058, $p< 0.001$). For the ABO blood groups, all the Nomad tribe groups selected for this study showed a heterogeneous distribution in terms of phenotypic presentation. The genotypic trend of ABO blood groups distribution among different tribal population was similar except for Bhopa tribe. The trend of the overall allele frequency distribution of q i.e. Blood group B was higher among the entire tribal group except the Bhopa tribe with increased allele frequency of Blood group A.

KEY WORDS: Blood grouping, incidence, Nomads Screening,

INTRODUCTION

RAJASTHAN is one of the major states with quite a good number of tribal population groups like Bhils, Damors, Saharias, Minas and Banjara. In India, roughly seven per cent of population is nomadic. Yet, despite such large numbers, most of these communities have been largely ignored by policy makers. Nomads, or traditional communities on the move, are today a worried lot. As the urban sprawl of cities increases and village commons shrink, they find themselves being displaced constantly. They are economically poor. Their activities include hunting gathering, rat trapping, agriculture labor and wage labor. Majority of them are illiterates and most aren't schooled. The present study deals with the incidence of ABO and Rh (D) blood types among different tribal population of Rajasthan, India. The ABO and Rh blood groups are among the most significant blood groups [1]. Karl Landsteiner [2] first described the ABO blood group in 1900, and it served the beginning of blood banking and transfusion medicine [3]. It has been reported that the ABO blood group distribution varies in different geographical and ethnic groups, and socio-economic groups [4]. In India, the ABO blood groups frequencies are variable, the frequency for B ranges from 6% in negritos of Andamans to 48% in Birijas of Bihar, while group A has a frequency of 20-30% in Western and Eastern Himalayas [5]. The blood groups frequencies in North India are B >O>A>AB [6]. The literature on the blood genetic markers among the Nomad tribal population of Rajasthan is inadequate. In the present study I attempted to explore the frequency distribution of ABO and Rh (D) blood groups among the different tribal populations of Rajasthan and to compare the results with each other and with the other available data of tribal populations of neighboring states.

MATERIALS & METHODS

The present study was conducted during September to November 2010 in the two districts of Rajasthan, namely Jhunjhunu and Sikar are known the major districts in this state for Nomad tribal populations. In these two major districts the tribal population are huge and a majority of nomad population had been living in the outskirts of cities most of them have permanent illegal residence. The younger population of tribes keeps on roaming in the search of work whereas the elder populations stayed back and look after the house and children. The initial contact with tribals' living conditions and life styles was through elders of tribal community and other people living in and around tribal habitations. As the exact percentage and location of nomadic population of Shekhawati region was not known snow and ball method of sampling was used for data collection. It was not easy though to locate their places of living because they had been living away from easily accessible locations or open public view. It had taken repeat rounds to trace more and more such nomad habitations. Many camps were traced situated in Shekhawati region of Rajasthan including both types of nomads: temporary and permanent. In temporary nomads' camp the nomads stayed at one place from minimum ten days to maximum six months. In permanent camp the nomads stayed at one location for a numbers of years like fifteen to fifty years as it was noticed that in particular, Fatehpur, Ward number six, in Jhunjhunu district found a huge number of nomads. They were living in the specified locality for the last so many years having their houses built of mixed types: either kachcha or mud type or a mix of mud and concrete but a few fully pacca or concrete houses. A similar situation had been observed in Sikar city where the maximum numbers of nomads were living near Bus Depot. They were living in that place for the last fifty years but still they had not given legal right to live there. A huge number of nomads belonged to wandering tribes or non-pastoral category. Other categories of nomads such as semi nomads and pastoral nomads were also found. Semi nomads and pastoral nomads had their

houses at their place but those were not concrete houses. They were built just like tents even though some had constructed slightly better type of houses. In the course of our field study it was found that the nomad population was engaged in different kinds of work for livelihood such as making of murtis or idols, chaaz, decorative pieces and so on. And some others were involved in selling multani soil, pickles, and groundnuts while a few nomads were involved in the business of selling animals like cow, camel and sheep. However, it was also observed that a huge number of nomads were engaged in varied types of labor work such as construction, repair, and renovation depending upon the need of people on a day to day basis. In total of 18 visits to survey and collect data of nomadic communities of various parts of Jhunjhunu and Sikar Districts of Shekhawati region in Rajasthan was undertaken. A total sample of twelve hundred and eighty-six respondents were studied. The objectives and procedural details of the study were explained to the subjects in their local language. Blood samples from a total of 1286 unrelated individuals of both sexes were drawn at random from the Tribal settlements in Jhunjhunu and Sikar districts of Rajasthan with a finger prick method. Since sex differentiation is known to be inexistent in the ABO blood type system, the samples collected from both males and females were pooled for the various analyses. For the ABO blood types, standard serological procedures were followed using the anti-A, anti-B and anti-D antisera. The gene frequencies for these two systems were calculated after Mourant *et al.* (1976) [7]. Statistical calculations were done using the chi-square test to find out if there was a significant association between the different groups and tribal populations. The study was approved by the institutional human ethics committee at BITS, Pilani and performed according to the Declaration of Helsinki.

RESULTS

ABO Blood Group System: The percentile and allele frequencies of the ABO blood groups are presented in Table 1. It was observed that blood group A ranges from 10.9 to 39.1 , group B from 21.8 to 56.4 , group AB from 0% to 13.9% and group O from 16.7 to 34.8 . In the combined data, the most frequently occurring blood group was B (40.4%), followed by O (25.6 %), A (25,5 %), and AB (8.6%).A chi- square test was done to analyze if there was a significant difference between the different groups of tribal population which was found (chi-square=70.058,p<0.001).

TABLE 1: Phenotype and Allele Frequencies of the ABO Blood Groups among the Nomad Population of Rajasthan

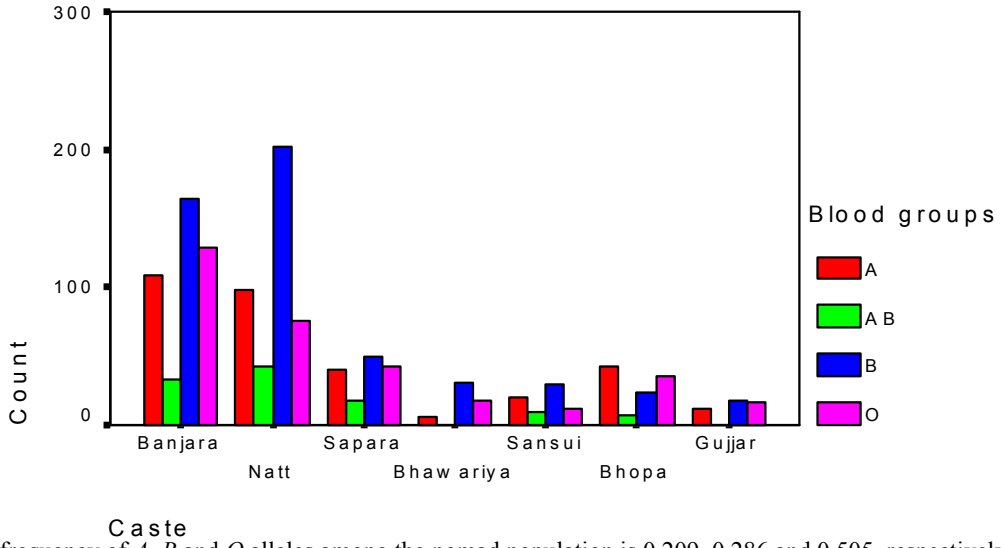
Population	Number Observed	ABO Phenotypes				Allele Frequency		
		A	AB	B	O	p	q	r
Banjara	435	09 (25.1)	33 (7.6)	164 (37.7)	129 (29.7)	0.195	0.261	0.544
Natt	418	98 (23.4)	42 (10.0)	202 (48.3)	76 (18.2)	0.219	0.355	0.426
Sapara	150	40 (26.7)	18 (12.0)	50 (33.3)	42 (28.0)	0.210	0.261	0.572
Bawariya	55	6 (10.9)	0 (0)	31 (56.4)	18 (32.7)	0.088	0.340	0.572
Sansui	72	20 (27.8)	10 (13.9)	30 (41.7)	12 16.7)	0.258	0.334	0.408
Bhopa	110	43 (39.1)	7 (6.4)	24 (21.8)	36 (32.7)	0.275	0.209	0.572
Gujjar	46	12 (26.1)	0 (0)	18 (39.1)	16 (34.8)	0.191	0.220	0.589
Total	1286	328 (25.5)	110 (8.6)	519 (40.4)	329 (25.6)	0.209	0.286	0.505

Chi-square= 70.058, p< 0.001

In the Banjara nomad tribe the trend of distribution of ABO blood group was B>O>A>AB. The Natt tribe's blood group distribution was B>A>O>AB. It was observed that the distribution of ABO blood group in Sapara tribe was similar as in Banjara Tribe i.e. B > O>A > AB.Similarly, in other tribes like the Bawariya, the ABO blood group distribution was B > O> A. I have not come across any AB blood group individual. In the Sansui the blood group distribution was similar to the case of the Natt tribe i.e. B > A >O >AB. In the Bhopa tribe the trend of ABO blood group distribution was A> O > B> AB. In the Gujjar the trend of blood groups distribution was similar to that of Banjara, Sapara, and Bawariya tribe Fig.1

Rh factor: Out of the 1286 subjects tested, 1268 were found to be Rh-positive and 18 Rh negative. The frequency of *D* and *d* alleles among the combined data is 0.886 and 0.114, respectively. It is apparent from Table 2 that there was no variability in Rh-negative incidence in the Tribal nomad populations of Rajasthan. For the Rh (D) blood groups, all the Nomad tribe endogamous groups showed homogeneous distribution. But it was seen that in the Bhawariya and the Gujjar tribe groups I have not found any Rh (D)-negative subject as compared to other groups .The Banjara and Natt tribes had almost equal distribution of Rh-negative subjects. Similarly, the Bhopa and the Sansui had the same distribution. But the overall tendency of frequency of D and d alleles was equivalent to other findings of other castes.[16]

FIGURE 1. ABO Blood Group Distribution among Different Population of Nomad Tribes



The frequency of *A*, *B* and *O* alleles among the nomad population is 0.209, 0.286 and 0.505, respectively.

TABLE 2. Phenotype and Allele Frequencies of Rh (D) Blood Groups among the Nomad Population of Rajasthan

Population	Number Observed	Rh (D) Phenotypes		Allele Frequencies	
		Rh (D) +	Rh (D) -	D	d
Banjara	435	430 (98.2)	5 (1.1)	0.895	0.105
Natt	418	413 (98.8)	5 (1.2)	0.891	0.109
Sapara	150	146 (97.3)	4(2.7)	0.836	0.164
Sansui	72	70 (97.2)	2(1.8)	0.865	0.135
Bawariya	55	55 (100)	0(0.0)	----	----
Bhopa	110	109 (97.3)	2(1.8)	0.865	0.135
Gujjar	46	46 (100)	0 (0.0)	----	----
Total	**1286**	**1269 (98.7)**	**18 (1.3)**	**0.886**	**0.114**

DISCUSSION

Few studies of ABO and Rh blood group prevalence among the various populations of India have been carried out. Study done by Nanu and Thapliyal [8] in the north Indian population report that group B is the most predominant one, as also reported in a study in neighboring Pakistan [9] which is in agreement with my study and also, the finding regarding Rh negativity was almost similar to that from my study. The south Indian study by Das et al [10] shows that group O is the most predominant one, followed by group B and group A, Another south Indian study [11] conducted on the population of the Chittoor district of Andhra Pradesh also showed similar pattern of distribution of blood groups. Mourant et al [12] have quoted other studies like in Oraon and Santhal tribes [13] the trend of distribution of ABO blood group B>A>O>AB as similar to Sansui and Natt tribe group of my study. In the Munda tribe studied by Tyagi [14] quoted by Mourant et al the trend of blood group distribution was A>O>B>AB similar to that of the Bhopa tribe of my present study of Rajasthan State as citied in the article of Banerjee and Datta [15]. For the ABO blood groups, the Banjara, Bhawariya, Gujjar and Sapara nomad tribe groups selected for this study showed a similar phenotypic similar distribution phenotypic distribution trend of ABO blood groups as compared to the Natt, Sansui and the Bhopa tribes. But the trend of genotypic distribution of frequency of allele q was higher among different tribal population except the Bhopa tribe with high frequency of allele p distribution. A similar frequency distribution of the ABO alleles has been reported in several other Scheduled Caste populations of India, such as, Meghwal and Salvi of Rajasthan (Thukral and Bhasin, 1990) [16], Harijans of Haryana (Kushwaha et al., 1990) [17], Scheduled Castes of Uttar Pradesh (Mandal, P.K, 1992) [18]. Scheduled caste of Panjab (Sharda Sidhu) [19]

CONCLUSION

The present study revealed that the ABO and Rh (D) blood group distributions among different caste of tribal communities are similar in the distribution of the frequency of the q allele. It was found that the banjara, sapara, gujjar and the bawariya tribe groups had a similar phenotypic trend of ABO blood group distribution i.e. B>O>A>AB. Whereas the Natt and Sansui tribe had a similar phenotyphic trend of ABO blood group distribution B>A>O>AB .It can be concluded from the study that the phenotypic distribution of ABO blood group among the banjara, sapara, gujjar and bawariya were different as compared to the rest of the three groups. Natt and Sansui is phenotypically closer to each other in the trend of ABO blood group distribution where as Bhopa tribe had different trend of blood group distribution. The trend of overall distribution of frequency allele of q (B Blood group) was higher among the entire tribal group except the Bhopa tribe with higher allele frequency of p (A Blood group)

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