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RESEARCH ARTICLE

Allelic Frequency of ABO Blood Group typing & Rh-D factor in Muslim and Hindu caste of Amravati district (Maharashtra)

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ABSTRACT

The distribution of ABO blood groups and Rh(D) factor has been studied among the Hindu & Muslim caste of Amravati district (Maharashtra). In Muslim & Hindu caste of Amravati district people the ABO Blood group percentage distribution in Muslim were type A, 19.2%; type B, 31.2%; type O, 33.6% and type AB,16%. In Hindu caste, the distribution were types A, 24.8%; type B, 33.6%; type O,34.4% and type AB; 7.2%. The estimated allele frequencies were 0. 195016 for A, 0.266798 for B and 0.542293 for O,in Muslim caste & 0.175379 for A,0.238106 for B, 0.592496 for O, in Hindu caste were calculated. The distribution of Rh(D) group varies among the ABO blood groups. The Rh(D) positive allelic frequency was 0.677510 and the Rh(D) negative incidence was recorded as 0.322490 in the Muslim caste& Rh(D) positive allelic frequency was 0.959166 and the Rh(D) negative incidence was recorded as 0.045775 in Hindu caste studied population. The frequencies of Rh(D) positive in Muslims and Hindu caste were greater as compare to Rh(D) negative in both caste. The genetic relationship among different caste groups is not uniform. Polymorphism are now considered useful tool for studying differentiation in human population.

KEYWORDS

Blood Group, Rh(D) factor, Allelic frequency, Hindu, Muslim caste.

INTRODUCTION

The Amravati is considered as a second largest city in Vidarbha region in Maharashtra. It has an average elevation of 343 meters and located 156 km away from Nagpur in west side. The population of district is 2,60,7160 (census of India 2001) comprising, Brahmin, Hindus, Buddhist, Muslims and various tribal populations. The discovery of the ABO blood group, over 100 years ago, caused great excitement. Until then, all blood had been assumed to be the same, and the often tragic consequences of blood transfusions were not understood. As our understanding of the ABO group grew, not only did the world of blood transfusion become a great deal safer, but scientists could now study one of the first human characteristics proven to be inherited. A person's ABO blood type was used by lawyers in paternity suits, by police in forensic science, and by anthropologists in the study of different populations Tekade et al.,(2011). The ABO locus, which is located on chromosome 9, contains 7 exons that span more than 18 kb of genomic DNA. Exon 7 is the largest and contains most of the coding sequence. The ABO locus has three main allelic forms: A, B, and O. The A allele encodes a*glycosyltransferase* that bonds α-N-acetylgalactosamine to the D-galactose end of the H antigen, producing the A antigen. The B allele encodes a *glycosyltransferase* that bonds α-D-galactose to the D-galactose end of the H antigen, creating the B antigen. In the early days of genetic studies, the genetic relationships among different populations were studied by examining the geographical distributions of gene frequencies at a few loci such as the ABO and Rh blood group systems mainly from Indian region Bhasin et al., (1992).

The present study is carried out to record the phenotypic and genotypic frequency of alleles in the blood groups of two caste population of Amravati district (Maharashtra).The study has suggested that the blood group frequencies of this region are nearly similar to the Asian communities (Lyko, J et al., 1992). But in the present study we observed a series of O>A>B>AB, with the highest allele frequency of Rh(D) positive in the studied in Amravati people. During the last five decades, numerous studies have been carried out on the

distribution of blood groups and genetic composition of various endogamous population groups in India (Bhasin et al. 1992; 1994). The ABO blood types are not found in equal numbers. In Caucasians in the United States, the distribution is type O, 47%; type A, 41%; type B, 9%; and type AB, 3%. Among African American, the distribution is type O, 46%; type A, 27%; type B, 20%; and type AB; 7%. Among Western Europeans, 42% have group A, 9% group B, 3% group AB and the remaining 46% group O (Pramanik and and Pramanik, 2000).

The ABO blood group system is the most important blood type system (or blood group system) in human blood transfusion. The associated anti-A and anti-B antibodies are usually IgM antibodies, which are usually produced in the first years of life by sensitization to environmental substances such as food, bacteria, and viruses. ABO blood types are also present in some other animals, In human, the majority of cell types investigated have A, B, or O antigen on their surfaces. This includes some tissues like platelets (Brian *et al*., 2000), lung tissues (Clausen *et al*., 1990), intestinal mucosa (Takeya, 1990), mucous cells, epidermis, nervous receptors and vascular endothelium (Oriol *et al*., 1992).

MATERIALS AND METHODS

Blood Samples from a total of 250 unrelated individuals of both sexes were drawn from the Hindu and Muslim caste (from each caste125 blood sample were collected) of Amravati district of Maharashtra. Blood samples were taken from finger pricks, and the samples were analyzed for ABO and Rh (D) blood groups following Race and Sanger (1962) with the antisera procured from Haffikine Institute, Bombay. Gene frequencies are calculated by Bernstein's Equation (1930) Hardy-Weinberg principle using the Win Bug program S2ABO.

RESULTS AND DISCUSSION

A gene for the specification of antigens A or B or type O determines the blood type. There are DNA differences, or polymorphisms, that determine the function of glycosyltransferase, resulting in different ABO blood types. The ABO blood group system is widely credited to have been discovered by the Austrian scientist Karl Landsteiner, who found three different blood types in 1900; Landsteiner K (1900). Distribution of ABO phenotypes and their percentages among the 250 Amravati district people blood donors revealed that ABO phenotypes were: (19.2%) A, (31.2%) B (33.6 %) O and (16%) AB in Muslim caste & (24.8%) A, (33.6%) B, (33.6%) O, and (7.2%) AB in Hindu caste. The frequencies of O was greater as compare to A & B in Muslim caste, and frequencies of O was also greater as compare to A & B in Hindu caste that is O>B>A in both the cases of Muslims & Hindu caste.The ABO alleles frequencies of the I^o, I^a and I^b alleles were calculated using the statistical methods based on Hardy-Weinberg Law of equilibrium. The frequency of the usual ABO phenotypes (A_1, A_2, B, A_1B, A_2B and O) varies between different populations (Mourant *et al*., 1976; Roychoudhuri and Nei, 1988). ABO allele frequency was determined in Asian, African and European population (Bandyopadhyay, 1994; Yip *et al*, 1995; Omotade *et al*., 1999; Varsahr *et al*., 2001; Al-Bustan *et al*., 2002).

Table 1: ABO blood groups percentages and allele frequencies of Muslim caste of Amravati District (Maharashtra)

Phenotype	Observed	Number	Percentage observed	Allele frequency
A		24	19.2 %	0.195016
B		39	31.2 %	0.266798
O		42	33.6 %	0.542293
AB		20	16 %	-
Total		**125**	**100**	**1.0000**

Table 2: ABO blood groups percentages and allele frequencies of Hindu caste of Amravati District (Maharashtra)

Phenotype	Observed	Number	Percentage observed	Allele frequency
A		31	24.8 %	0.175379
B		42	33.6 %	0.238106
O		43	34.4 %	0.592496
AB		09	7.2 %	-
Total		**125**	**100 %**	**1.0000**

Table 3: Rh (D) phenotypes, percentage and allele frequency of Muslim caste.

Phenotypes	Number Allele	observed frequencies
Rh (D) +ve	115	0.959166
Rh (D) –ve	10	0.045775
Total	125	1.0000

Distribution of the ABO blood group and their phenotypic and allele frequencies among the Muslim & Hindu caste of Amravati District, Maharashtra. The estimated allele frequencies were 0.195016 for A, 0.266798 for B and 0.542293 for O, in Muslim caste and 0.175379 for A, 0.238106 for B, 0.592496 for O, in Hindu caste were calculated by Bernstein's Equation (1930). These results showed that O gene frequency is higher than that of *B* or *A* followed by *B* then *A* and indicated the global predominance of B gene over O. These findings are nearly similar in agreement with (Al-Bustan *et al*., 2002; Varsahr *et al*., 2001; Omotade *et al*., 1999; Revazov *et al*., 1983; Tills *et al*., 1983; McArthur and Penrose, 1951).

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