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ORIGINAL ARTICLE

FREQUENCY OF ABO AND RHESUS (D) BLOOD GROUPS IN TRIBAL POPULATION OF MADHYA PRADESH: A STUDY FROM TERTIARY CARE TEACHING HOSPITAL IN MADHYA PRADESH

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ABSTRACT: BACKGROUND: ABO and Rh blood groups are most important blood groups in human beings. The frequency of four main blood group systems varies in population throughout the world and even in different parts of country. Objective if this study was to identify distribution of ABO and Rh blood group system. **MATERIALS AND METHODS:** Blood samples from 10680 tribals were collected in Jhabua district of Madhya Pradesh during the month of June 2012. Among 10680 tribals, 5670 were male. Blood groups were done in tribals belonging to Bhil, Bhilala & Katthiwar tribes. For the blood grouping of the patients, 5cc of clotted blood was collected & transported to Department Pathology, Peoples College of medical sciences, Bhopal. **RESULTS**: A total 10680 samples were analyzed, out of which 5670 (53%) samples were of male. The frequency of blood group B in our population was 36.9 %; n= 3950 (35.37% B Rh positive and 1.61% B Rh negative) and frequency of blood group B remain highest in our study group. The frequency of blood group O in our population was 31.8%; n=3400 (30.43% O Rh positive and 1.4% O Rh negative) followed by blood group A was 24.3%; n=2600 (23.15% A Rh positive and 1.18% A Rh negative) and blood group AB was 6.8%; n=730 (6.63% AB Rh positive and 0.2% AB Rh negative) The overall phenotypic frequencies of ABO blood groups were B>O>A>AB. Rh (D) positive were 95.59%; n=10210 and Rh (D) negative were 4.41%; n=470. **DISCUSSION:** B positive blood group is significantly high in our population. Every transfusion center should have a record of frequency of blood group system in their population. It helps in inventory management. Knowledge of blood group distribution is important for clinical studies, for reliable geographical information and for forensic studies in the population.

KEYWORDS: Blood group, ABO Blood group, Rh (D) Blood group, Tribals.

INTRODUCTION: Since 1901, more than 20 distinct blood group systems have been identified but the ABO and Rhesus (Rh) blood groups remain clinically most important. Furthermore, they are also well-defined genetic markers employed in population genetic and anthropological studies.[1,2] Karl Landsteiner in 1901 discovered the first human blood group, which was the ABO group.[3] Landsteiner and Wiener defined later Rh blood group in 1941.[4] Together these two systems have proved to be the most important for blood transfusion purposes. In modern medicine, the need for blood group frequency and prevalence studies is multipurpose, as besides their importance in evolution, their relation to disease and environment is being increasingly important.[5,6] Besides being important in relation to blood transfusion and organ transplantation, blood group antigens can also be utilized in genetic research, forensic pathology and anthropology and training ancestral relation of human.[7] Blood groups are genetically inherited. Frequency of blood groups varies from race to race one country to another and even different regions of a country. The aim of this study was to find frequency of ABO & Rhesus blood groups of Tribal individuals from Madhya Pradesh.

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MATERIAL & METHODS: Blood samples from 10680 tribals were collected in Jhabua district of Madhya Pradesh during the month of June 2012. Among 10680 tribals, 5670 were male. Blood groups were done in tribals belonging to Bhil, Bhilala & Katthiwar tribes. For the blood grouping of the patients, 5cc of clotted blood was collected & transported to Department Pathology, Peoples College of medical sciences, Bhopal. The blood samples were collected by venipuncture in EDTA containing vacutainer. ABO and Rh blood grouping were done by agglutination test using anti-A, anti-B and anti-D human sera. Blood group (ABO) and Rhesus factor was done by the antigen antibody agglutination test.

STATISTICAL ANALYSIS: Frequency, percentage and proportions for each variable were calculated and 95% confidence interval (CI) was taken to define normal range.

RESULT: A total 10680 samples were analyzed, out of which 5670 (53%) samples were of male. The frequency of blood group B in our population was 36.9 %; n= 3950 (35.37% B Rh positive and 1.61% B Rh negative) and frequency of blood group B remain highest in our study group. The frequency of blood group O in our population was 31.8%; n=3400 (30.43% O Rh positive and 1.4% O Rh negative) followed by blood group A was 24.3%; n=2600 (23.15% A Rh positive and 1.18% A Rh negative) and blood group AB was 6.8%; n=730 (6.63% AB Rh positive and 0.2% AB Rh negative). The overall phenotypic frequencies of ABO blood groups were B>O>A>AB. Rh (D) positive were 95.59%; n=10210 and Rh (D) negative were 4.41%; n=470. [Table I & II] [Figure 1, 2 & 3].

Blood Groups	Total Study Subjects	Prevalence	Confidence limit (95%)
ABO Blood Group			
A	2600	24.34	23.53 - 25.15
B	3950	36.99	36.07 - 37.91
AB	730	6.83	6.35 - 7.31
O	3400	31.83	30.95 - 32.71
Rhesus (D) Blood Group			
Rh positive	10210	95.59	95.20 - 95.58
Rh negetive	470	4.41	4.02 - 4.80

Table I: Frequency of ABO & Rh blood group systems

Blood Groups	Total Study Subjects	Prevalence	Confidence limit (95%)
A positive	2473	23.15	22.35 - 23.45
B positive	3778	35.37	34.46 - 36.28
AB positive	709	6.63	6.16 - 7.10
O positive	3250	30.43	29.56 - 31.30
A negative	127	1.18	0.98 - 1.38
B negative	172	1.61	1.37 - 1.85
AB negative	21	0.2	0.12 - 0.28
O negative	150	1.4	1.18 - 1.62

Table II: Distribution of ABO and Rhesus (D) blood group among study population (n=10, 680)

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The caste wise distribution was as follows, Among Bhils, 1254 individuals had B group followed by O, A & AB with 1199, 1125 and 194 individuals respectively. In Bhilalas, Highest number was with B group with 1457 individuals while O and A was with nearly equal frequency of 1337 and 1291 individuals and AB in 240 individuals. In Katthiwars, B and A groups constituted the majority with 930 and 904 cases each. O group was positive in 600 individuals followed by 149 subjects with AB group. [Table III][Figure 4].

Caste	A	B	AB	O	Rh positive	Rh negative	Total
Bhil	1125	1254	194	1199	3614	158	**3772**
Bhilala	1291	1457	240	1337	4130	195	**4325**
Khattiwar	904	930	149	600	2466	117	**2583**

Table III: Caste wise distribution of ABO and Rh blood group

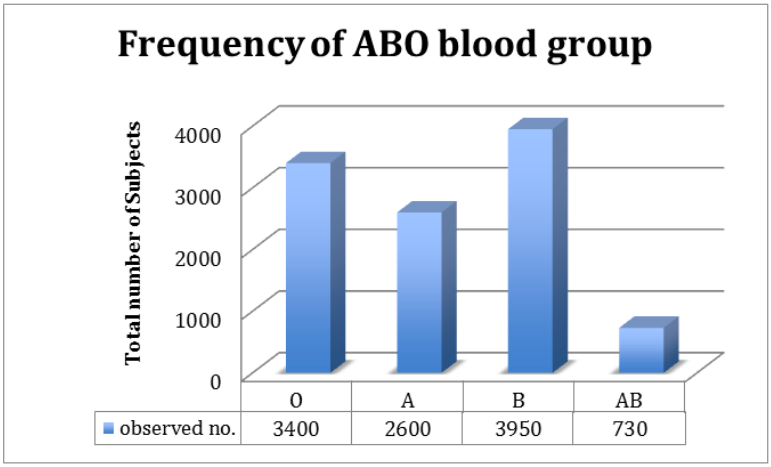

Figure 1: Distribution of ABO blood group

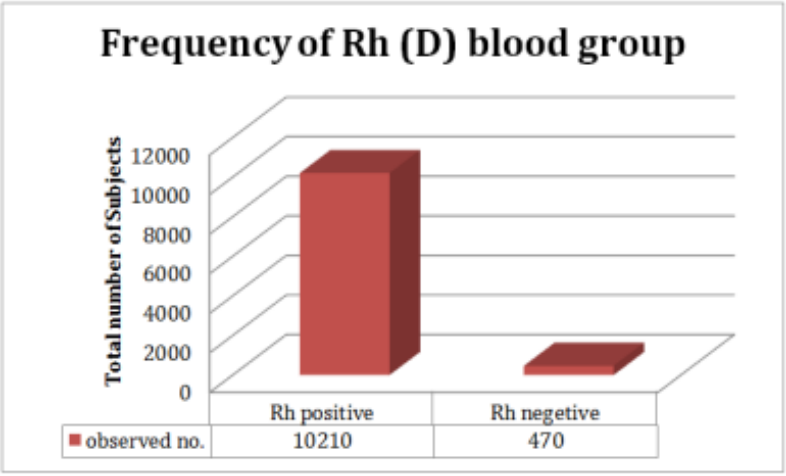

Figure 2: Frequency of Rhesus (D) blood group

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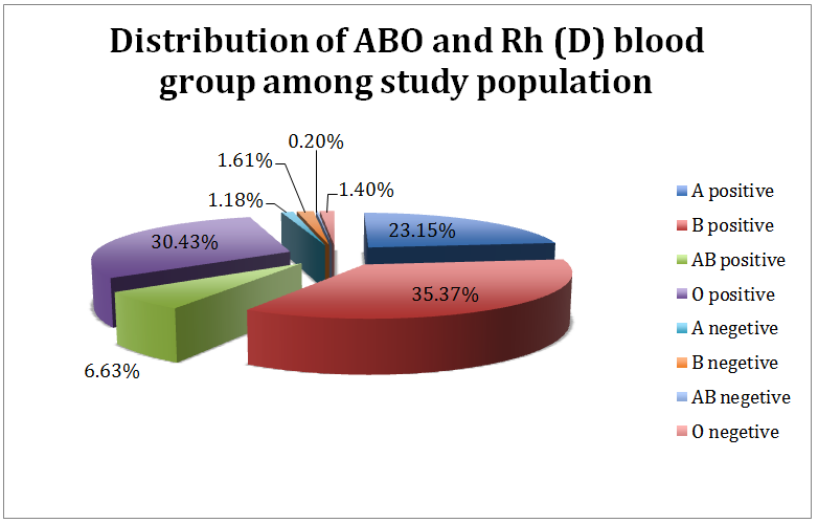
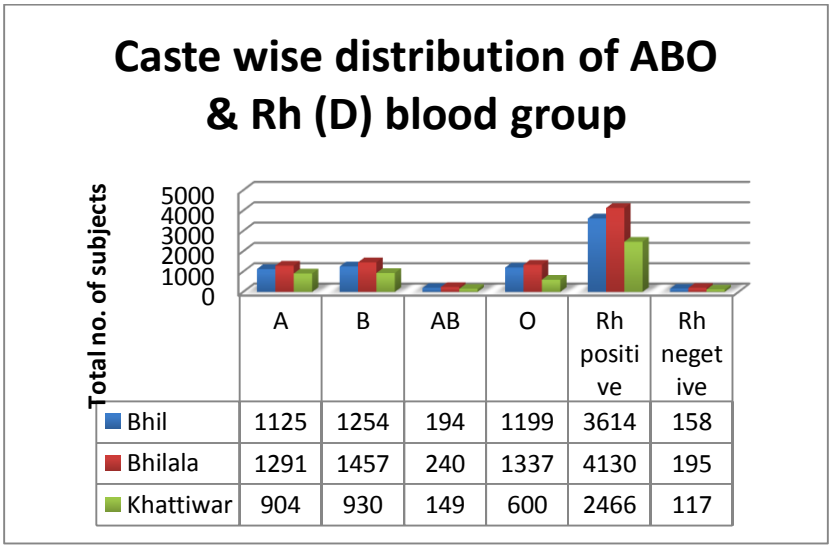


Figure 3: Prevalence of ABO and Rhesus (D) blood groups among study population



	A	B	AB	O	Rh positive	Rh negetive
Bhil	1125	1254	194	1199	3614	158
Bhilala	1291	1457	240	1337	4130	195
Khattiwar	904	930	149	600	2466	117

Figure 4: Caste wise distribution of ABO and Rh (D) blood group among study population

DISCUSSION: Blood groups and Rh antigen are hereditary. Gene for ABO antigens is on the 9th chromosome and Rh antigen gene is on the 1st chromosome.[8] The distribution of ABO blood group varies regionally, ethically and from one population to another. In the present study, the ABO blood group typing in the total sample showed the same trend of prevalence as in the general Indian subcontinent (B≥O>A>AB) . The study of distribution of blood groups is important as it plays a vital role in blood transfusion, organ transplantation, genetics research, human evolution, forensic pathology and some groups have shown associations with diseases like duodenal ulcer, diabetes mellitus, urinary tract infection and Rh and ABO incompatibilities of newborn.

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We compared our result with other studies carried out in different part of our country [Table IV], The studies done in North India by Nanu et al,[9] in parts of Rajasthan by Behra et al[10] and other comparatively northern and central part of India like Indore, Punjab, Maharashtra showed blood group B is the commonest followed by O, A and AB. The similar kinds of result were found in our study. But study carried out in Kashmir by Latoo JA[11] et al showed that O blood group is more common followed by B followed by A and AB respectively.

Population	A	B	AB	O	Rh positive	Rh negative
North India[9]	24.7	37.5	5.3	32.5	95.37	4.63
Kashmir[11]	22.95	32.05	6.55	38.43	95.92	4.08
Western Rajasthan[10]	22.2	36.4	9.4	31.7	91.75	8.25
Jhalwar, Rajasthan[12]	25.02	31.76	10.4	32.8	93.4	6.6
Tripura[13]	23.77	32.8	9.64	32.75	97.06	2.94
Maharashtra[14]	23.38	31.89	8.72	30.99	95.36	4.64
Indore[15]	24.15	32.25	9.1	31.5	95.43	4.57
punjab[16]	21.91	37.56	9.3	31.23	97.3	2.3
lathur[17]	29.35	31.25	9.74	29.64	93.1	6.9
Hyderabad[18]	19.57	34.11	5.76	40.54	95.37	4.63
Pondicherry[19]	39.5	20.5	6.5	34	97	3
Banglore[20]	23.85	29.95	6.37	39.82	94.2	5.8
Vellore[21]	21.86	32.69	6.7	38.75	94.5	5.5
Dakshina Kannada[22]	25.8	27.3	4.8	42	94.64	5.36
Thiruvananthapuram[23]	26.21	27.39	6.36	40.05	94.42	5.58
Present study	24.34	36.99	6.83	31.83	95.59	4.41

Table IV: Comparison of frequency percentage of ABO and Rhesus blood group in different areas of India

While studies carried out in comparatively Southern part of India by Swarajya Kumari Koran et al[18] at Hyderabad, Subhashini AB et al[19] at pondicherry, Periyavan et al at Bangalore,[20] found that commonest blood group was O followed by B, A and AB. These results were not similar to the results of our studies.

Internationally, a study done in Pakistan[24] showed that the frequency of blood group B > O > A >AB while other studies[25-29] showed O blood group to be the most prevalent.

The incidence of Rhesus (D) positive blood group in most of the part of India varies from 94% to 98% and 2% to 6% were Rh negative. The present study results are within this range. These figures are similar to the other studies carried out in different part of India[9-23] Rh-positive groups are predominant group and the frequency is more or less the same.

CONCLUSION: The frequency of ABO and Rh phenotypes in Tribal population appears to be similar to Asian data. The B blood group is significantly higher in our study population and comparatively low AB blood group. Generation of simple database of blood groups, not only provides data about the

availability of human blood in case of regional calamities, but also serves to enable insight into possibilities of future burden of diseases. It is hoped that the data generated in this study would assist in the planning and establishment of a functional blood service that would meet the ever-increasing demand for safe blood and blood products. Hence this study is useful in providing information on the status of ABO and Rh blood group distribution in tribal population of Madhya Pradesh.

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