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FREQUENCY DISTRIBUTION OF ABO BLOOD GROUPS AND RH (D) FACTOR IN THE FEMALE POPULATION OF DISTRICT MULTAN, PUNJAB, PAKISTAN

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ABSTRACT

This study was conducted on 630 women from three age groups 18-25, 26-35 and 36-45 years having pregnancy induced hypertension and admitted in hospitals of Multan District from September 2015 to December 2016. By using slide method the antigen antibody agglutination test was done for the determination of ABO blood grouping while Rh(D) factors were done by using monoclonal reagents of IgM and IgG. Antisera were used from Bio-laboratory, USA. Out of total 630 samples, 595 (94.44%) Rh positive and 35 (5.56%) were Rh negative. The blood group distribution was 220 (34.93%), 228(36.18%), 129 (20.48%), 53(8.41%) for blood groups A, B, O and AB, respectively. Subjects having blood group B were dominant, followed by A and O while AB was rare. In blood group B, Rh(D) positive 221(37.15%) is dominantas compared to A 207(34.79%), O 118(19.83%) and 49(8.23%) which is rare while in blood group A, Rh(D) negative 13(37.15%) is more as compared to O 11(31.42%), B 7(20.00%) and AB 4(11.43%) which is rare in this population. The age group from 18 to 25 years was found to be dominant in this population followed by the age group from 26 to 35 years and from 36 to 45 years.

Key-words: Population, ABO, Rh(D), Frequency, Blood group, Multan.

INTRODUCTION

In the large group of people the ABO blood groups and Rh(Rhesus) – D blood group antigens are the most frequently studied genetic markers (Worlledge *et al.*, 1974). In view of the safety of blood or blood products transfusion to date the ABO blood groups hold a respectable position despite the long list of several other blood groups discovered so far (Calhoun and Petz, 2001). A series of glycolipids and glycoproteins which constitute blood group antigens are present on the surface of human red blood cells. These antigens developed under genetic controlled and inherited in Mandelian fashion and appear in early fetal life and remain unchanged till death (Firkin *et al.*, 1989). According to the International System of Blood Transfusion (ISBT) nearly 780 erythrocyte antigens are described and these are organized into 38 blood group systems of which Rh(Rhesus) and ABO blood groups are most important (ISBT, 2008).

In 1901, Landsteiner discovered ABO blood groups system (Garratty *et al.*, 2000), while in 1941, Landsteiner and Wiener defined the Rh (Rhesus) blood group system (Rahman and Lodhi, 2004).

Across the world in the population and within human subpopulations the distribution of ABO and Rh (Rhesus) blood groups vary from one race to another race. Due to racial differences these differences are present even in Pakistan (Alam, 2005). Prevalence of blood group plays an important role in blood transfusion, evolution, organ transplantation and genetics research. Within environment, modern medicine is also working an important relationship of blood group (Anees *et al.*, 2007).

The aim of the present study was to evaluate the frequency distribution of ABO and Rh (D) blood groups in the female population of District Multan (Punjab), Pakistan and to generate data for multipurpose future facilities.

MATERIALS AND METHODS

For the purpose of the study on pregnancy induced hypertensive women after taking informed consent a total of 630 females were screened for blood grouping between September 2015 and December 2016 in hospitals of different localities of Multan District. By aseptic techniques and blood transfer to ethylene – di-amine tetra acetate (EDTA) containing tubes blood samples were taken. By using slide method the antigen antibody agglutination test was done for the determination of ABO blood grouping and Rh (D) factor. In this study, Bio-laboratory, USA anti-sera were used. The ABO monoclonal reagents secreting mouse cell-line are of hybridized immune-globulins. For determining Rh (D) factor IgM+IgG monoclonal reagents were used (Dacie and Lewis, 2001). Data was analyzed through percentage calculations.

RESULTS

Blood grouping of 630 donors was done. The donors belonged to age group between 18-25 years (51.60%), 26-35 (30.32%) and 36-45 years (18.08%)(Table 1A).

Table 1A. Distribution of Blood group donors among study of population (n=630) during September 2015-December 2016.

Age Groups (in years)	Number of Donors N(%)
18-25	325 (51.60)
26-35	191 (30.32)
36-45	114 (18.08)

Table 1B. Distribution of Rh(D) positive and Rh(D) negative among study blood donors population of females during September 2015-December 2016.

Name of Blood Group	Number of donors N(%)
Rh(D) positive	595 (94.40)
Rh(D) negative	35 (05.56)
Total	630 (100)

Table 2.Age wise ABO blood grouping pattern and Rh (D) factor in females of district Multan during September 2015- December 2016.

Name of Blood Group	Age	Total Subjects N(%)	Rh+ N(%)	Rh- N(%)
A	18-25	118(18.74)	112(18.82)	6(17.15)
	26-35	59(9.36)	55(9.25)	4(11.42)
	36-45	43(6.83)	40(6.73)	3(8.58)
B	18-25	110(17.46)	107(17.99)	3(8.58)
	26-35	93(14.76)	90(15.12)	3(8.58)
	36-45	25(3.96)	24(4.04)	1(2.85)
O	18-25	74(11.75)	70(11.76)	4(11.42)
	26-35	28(4.45)	25(4.20)	3(8.58)
	36-45	27(4.28)	23(3.86)	4(11.42)
AB	18-25	23(3.65)	21(3.53)	2 (5.72)
	26-35	11(1.75)	10(1.68)	1(2.85)
	36-45	19(3.01)	18(3.02)	1(2.85)
Total	`	630(100)	595(100)	35(100)

Out of total 630 subjects, Rh(D) positive blood groups were found 595 (94.44%) while Rh(D) negative blood groups were to be found of 35(5.56%) (Table 1B). ABO and Rh blood grouping in the subjects is shown in Table 2. In the total samples the blood group distribution between age 18-25 was 118 (18.74%), 110 (17.46%), 74 (11.75%) and 23 (3.65%) for blood groups A, B, O and AB respectively. Similarly the blood group distribution between age 26-35 was 59 (9.36%), 93 (14.76%), 28 (4.45%) and 11 (1.75%) for blood groups A, B, O and AB respectively while the blood groups distribution between age 36-45 was 43 (6.83%), 25 (3.96%), 27 (4.28%) and 19 (3.01%) for blood groups A, B, O and AB respectively. In our study the dominant blood group found is B 228(36.18%) followed by group A 220 (34.94%), group O129 (20.48%) while blood group AB 53 (8.41%) was rare in these females (Table 3). Blood group A is common in Rh(D) negative females 13 (37.15%) and then blood group O 11(31.42%), blood group B 7(20.00%) and group AB 4(11.43%), while blood group B is common in Rh(D) positive females 221 (37.15%), followed by blood group A 207 (34.79%), group O 118 (19.83%) and group AB 49 (8.23%) (Table 4). As compared to age wise distribution, blood group A is common in Rh (D) negative females 6 (17.15%) between age 18-25 while rare in group B 1(2.85%) between age 36-45 and common in between are groups 26-35 and 36-45 of

blood group AB 1 (2.85%). Similarly blood group A is common in Rh (D) positive females 112(18.82%) between age 18-25 years while rare in group AB 10 (1.68%) between age 26-35 years (Table 2).

Table 3.Distribution of ABO blood grouping among females population of District Multan during September 2015- December 2016.

Name of Blood Group	Total Subjects N(%)
A	220 (34.93)
B	228 (36.18)
O	129 (20.28)
AB	53 (8.41)
Total	630 (100)

Table 4. Distribution of ABO blood group on the basis of Rh(D) factor among females population of District Multan during September 2015- December 2016.

Name of Blood Group	Rh (D)+ N(%)	Rh(D)- N(%)
A	207 (34.79)	13 (37.15)
B	221 (37.15)	7 (20.00)
O	118 (19.83)	11 (31.42)
AB	49 (8.23)	4 (11.43)
Total	595(100)	35(100)

DISCUSSION

Pursuing a line of investigation on the Rh and ABO blood group systems has been of significance for years due to its medical importance in relation to different diseases. It is well known that in blood transfusion and organ transplantation these blood group systems are of great importance (Chandra and Gupta, 2012).

In all over the world the frequency of ABO and Rh(D) blood group vary from one population to another population. Blood group is also important in determining hereditary diseases and migration of races (Alam, 2005). In certain blood groups some diseases are more common to develop, hence relationship of different blood groups with different diseases is most important (Majeed and Hayee, 2002).

Studies in different regions in different areas of Pakistan show the incidence and division of ABO and Rh(D) blood groups (Zafar *et al.,* 1997; Mian and Farooq, 1999). The present study showed the blood group B was more prevalent 228 (36.18%) followed by group A 220 (34.93%), group O 129(20.48%) and group AB 53(8.41%). While Rh(D) positive blood groups were 595 (94.44%) and Rh(D) negative blood groups were found to be 35 (5.56%).

In different provinces of Pakistan, studies showed variations in blood groups. A study from Balochistan province reported blood group A (22.13%), group AB (7.45%), group B (34.33%) and group O as (37.09%) (Hussain *et al.,* 2001). Similarly, a study conducted from province Sindh showed that blood group O was most prevalent (35%) as compared to blood group B (31%), group A (24%) and blood group AB (10%) (Khaskheli *et al.,* 1994).

A study from Bannu region of KPK (Khyber Pakhtunkhwa) province revealed that the distribution of ABO blood groups is in the order of 35.24% (B), 32.02% (A), 24.06% (O) and 8.68% (AB). In the studied population the Rh(D) positive and Rh(D) negative distribution was found to be found 88.22% and 11.78%, respectively (Khan *et al.,* 2004).

As reported in an study from Swat, Khyber Pakhtunkhwa Province (KPK) blood group B Rh(D) positive in female subjects was fond to be dominant (35.57%) followed by group O (27.50%), group A (26.50%) and group AB (10.43%) (Khattak *et al.,* 2008).

Another study conducted from Islamabad and Rawalpindi revealed that the distribution of ABO blood groups among female subjects is in the order of 31.86% for blood group B, 30.92% for blood group O, 25.01% for blood

group A and 12.21% for blood group AB. In the consider population the distribution of Rh(D) positive was 91.35% while Rh(D) negative was 8.65% (Khan *et al.,* 2006).

Province of Khyber Pakhtunkhwa (KPK) and Punjab studies show blood group B is known as commonest. Our results are also related to these studies (Anees *et al.,* 2007; Majeed and Hayee, 2002; Zafar *et al.,* 1997; Rahman and Lodhi, 2004). Blood group O is found to be dominant in the province of Sindh and Baluchistan which is contrary to our study (Khaskheli *et al.,* 1994; Hussain *et al.,* 2001; Bhatti and Sheikh, 1999).

Studies conducted in different regions of the world show that blood group is more prevalent (53%) in Saudi Arabia, (42.32%) in Iran and (47%) in the population of USA. In African population the most prevalent blood group is B while in Australian population A and O are the much commoner blood group (Mollison *et al.,* 1993).

In our study, Rh(D) positive blood groups were 94.44% and Rh(D) negative blood groups were 5.56%. In Saudi Arabia Rh(D) positive male donors are 94% (Bashwari *et al.,* 2001). In British population 96% are Rh(D) positive male donors (Mollison *et al.,* 1993) while in the USA 86% of the population are of Rh(D) positive male donors (Frances, 2002).

Age group 18-25 is of the main work force of any of the society. For donating blood this is the most common age group encountered. This age group is compared with other age groups like 26-35 and onward (Patel *et al.,* 2012; Mallikarjuna, 2012). The least donors were of age group 40 and above because many of the people among this age group suffer from low hemoglobin, diabetes mellitus, ischemic heart diseases and hypertension (Girish *et al.,* 2011). In our study age group 18-25 years is dominant in all blood groups A, B, O, AB and Rh(D) positive and Rh(D) negative as compared to that of age groups 26-35 and 36-45 years.

Other studies done in different regions of Pakistan match the results of our study.Rh(D) positive blood group is predominant group and its frequency is almost found to be same.

CONCLUSION

The present study concludes that the most dominant blood group is B while blood group AB is rare. Regarding Rhesus blood group system, Rh(D) positive were 94.44% and Rh(D) negative were 5.56%, and the most dominant age group is 18-25 among female population of Multan District for blood donors. The evaluation of the frequency of blood groups among female population of different age groups in this region would not only help in blood transfusion services, but also reduce the risk factor of erythro- blastosis foetalis in the neonates.

DECLARATION OF CONFLICTING INTEREST

The authors about this study declare no conflicts of interest. The authors are only responsible for the content and writing of the paper.

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