FREQUENCY OF ABO AND RHESUS BLOOD GROUPS IN DISTRICT SWAT, PAKISTAN

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Background: Up till now about 400 red cells antigen have been identified. The majority are inherited by Mendelian Fashion. The ABO blood group system was first to be identified and RH blood group system was the 4th one, both are most important for blood transfusion purposes. This study is conducted to determine the frequency of ABO and Rhesus (Rh) blood groups in District Swat, NWFP, Pakistan. It is a cross sectional prospective study and was conducted at Saidu Teaching Hospital district Swat, over a period of one year. (1st Jan, 2007 to 31st Dec, 2007). **Methods**: A total of 22897 subjects were included in this study. Patients were collected from different wards of Saidu Teaching Hospital while the donors from common population. From each subject blood was collected, ABO and Rh blood grouping were carried out by tile method using commercially prepared anti sera. The frequency of each type was calculated. **Results**: Out of 22897 subjects 17141 (74.86%) were male subjects and 5756 (25.14%) were female. Out of 17141 male subjects 15597 (90.99%) and out of 5756 female subjects 5040 (87.56%) were found to be Rh-positive. The frequency of Rh-negative group in male subjects were (9.01%) where as in female subjects were (12.22%). The frequency of A, B, O and AB groups in Rh-positive male subjects were 25.63%, 29.54%, 26.04% and 9.78%, amongst female subjects, it was 24.53%, 28.06%, 25.54% and 9.43% respectively. In Rh-negative male subjects the frequency of A, B, O and AB is 2.25%, 2.88%, 3.01% and 0.88%, while amongst females it is 3.54%, 4.24%, 3.74% and 0.92% respectively. **Conclusion**: It is concluded from this study that frequency of Rh-positive blood group is B, O, A, and AB in both gender. Where as the most common Rh-negative in male and female subjects are O, B, A, AB, and B, O, A, and AB respectively.

Keywords: ABO blood group, Rh blood group, Swat, Pakistan

INTRODUCTION

Up till now approximately 400 red blood cells antigens have been described. The vast majority are inherited in a simple Mendelian fashion and are stable characteristics which are useful in paternity testing.[1] The ABO blood group system was the first human blood group system to be discovered by Landsteiner in 1901.[2] Later Landsteninger and Wiener defined the Rh blood group in 1941.[3] Together these two systems have proved to be the most important, for blood transfusion purposes.

All human populations share the same blood group systems; although they differ in the frequencies of specific types. The incidence of ABO and Rh groups varies very markedly in different part of the world and in different races. Even in Pakistan, there is some variations in different areas reflecting racial differences.[4] 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 sought in modern medicine.[5,6] Blood group antigens are not only important in relation to blood transfusion and organ transplantation, but also can be utilized in genetic research, anthropology and training ancestral relation of human.[7] It was therefore worth while to document the frequency of ABO and Rh blood group in the different regions of Pakistan. [8] This study was carried out to determine the frequency of various ABO and Rh blood groups in the population of district swat, North west Frontier Province (NWFP), Pakistan and to compare our results with other studies conducted in Pakistan and else where in the world and its multipurpose future utilities for the health planners.

MATERIAL METHODS

A total of 22897 subjects (donors and patients) of both sex (male and female) were included in this study for a period of one year from 1st Jan, 2007 to 31st Dec, 2007 Essential information was noted and recorded on a printed proforma From each subject blood samples were collected under aseptic condition from anti-cubital vein for determination of blood groups. Only subjects belonging to District Swat were included in this study. ABO blood grouping was determined by tile method using commercially prepared anti sera, anti A, anti B, anti AB **(**Plasmatec Kent, UK). Presence of Rh D antigen was determined by anti-D (Biotec Laboratories Ltd UK). For Rh-negative D^u test was done. This data has been reviewed and analyzed for sex distribution and frequency of ABO and Rh blood group.

RESULTS

Out of total 22897 subjects, 17141(74.86%) were male subjects, while 5756 (25.14%) were female subjects. The total Rh-negative group were 2260 (9.87%). Female subjects show a relatively higher frequency of

Rh-negative group 716 (12.44%) as compared to male subjects (9.01%) (Table-1).

The frequency of ABO and Rh blood groups in the studied population with gender distribution is shown in table (II). Amongst Rh-positive male subjects blood group B was found to be the most prevalent group (29.54%) followed by group O (26.04%), Group A (25.63%) and group AB (9.78%). Amongst Rh-positive female subjects blood group B was found to be the most prevalent group (28.06%) followed by O (25.5%), A (24.50%) and group AB (9.43%). Among Rh negative males blood group O is the commonest (3.01%) follow by group B (2.88%), group A (2.25%) and group AB (0.88%). where as among Rh-negative female subjects, Blood group B is the commonest (4.24%) followed by group O (3.74%), group A (3.54%) and group AB (0.92A%) (Table-2).

Table-1: Shows comparison of Rh positive and Rh-negative (%) between male and female subjects

Gender	subjects	%	Rh+ subjects	%	Rh- subjects	%
Male	17141	74.86	15597	90.99	1544	9.01
Female	5756	25.14	5040	87.56	716	12.44
Total	22897	100	20637	90.13	2260	9.87

Table-2: Frequency Distribution of ABO and Rh Blood Groups between male and female

	MALE				FEMALE			
Blood Groups	Rh+	%	Rh-	%	Rh+	%	Rh-	%
A	4394	25.63	385	2.25	1412	24.53	204	3.54
B	5063	29.54	493	2.88	1615	28.06	244	4.24
O	4464	26.04	516	3.01	1470	25.54	215	3.74
AB	1676	9.78	150	0.88	543	9.43	53	0.92
Total	15597	90.99	1544	9.01	5040	87.56	716	12.44

DISCUSSION

The ABO and Rh blood group systems are the most commonly utilized grouping systems in blood transfusion. These systems also play an important role in transplantation, hereditary diseases, genetics and determining migration of races.[4] The association of different blood groups with diseases is important, as some of the blood groups are particularly prone to develop certain diseases.[9,10] The frequency of ABO and Rh blood group varies in different populations throughout the world. There are studies from Pakistan describing the frequency and distribution of ABO and Rh blood groups in different region.[11,12]

In this study we are able to determine the frequency of ABO and Rh blood group in donors and patients of district Swat, NWFP, Pakistan. Blood group B was found to be the most prevalent group (32.40%) followed by group O (29.10%), Group A (27.92%) and group AB (10.58%). In a study from Baluchistan showed blood group O was (37.07%), group B (34.32%), group A (21.12%) and group AB (7.57%).[13] The blood group O was (36%), blood group B (30%), blood group A (25%) and blood group AB was found to be (7.59%) in a study from Sindh.[14] A study from Bannu NWFP described ABO blood group distribution as B, A, O and AB as (36.23%), (31.03%), (25.07%) and (7.67%) respectively.[5] A study from Punjab revealed blood group frequency as B group (32.4%), O group (30.50%), A group (22.60%) and group AB (8.60%).[3] Another study from Punjab also showed that group B is the most prevalent group (38.24%), group O (28.16%), group A (23.26%) and group AB (9.98%).[15] In Pakistan racial variation is seen in the different provinces. All the previous studies showed group B is the commonest in Punjab and NWFP. Our results are similar to them.[3,5,10,11] Whereas predominant group in Sind and Baluchistan is Group O which is contrary to our study.[13,14,16]

A study from South India blood group O was found to be the most common group (38.75%) followed by group B (32.69%) and group A (18.85%).[17] Blood group A is the most prevalent in Russian Federation.[18] South American Indians all belong to group O. The commonest group in Australians are O and A while in Africans B group is the much commoner.[19] In the USA 46% group O, 41% group A, 9% group B and 4% group AB.[20] In Saudi Arabia, 52% are group O, 24% group A, 17% group B and 4% group AB.[21] According to an Iranian study blood group O is the most common as (41.16%).[22]

In our study the frequency of Rh-positive was 90%, while 10% was Rh-negative. These figures are similar to the other studies carried out in different part of Pakistan. Rh-Positive groups is predominant group and the frequency is more or less the same (Table-3).

Table-3: Comparison of Frequency (%) of ABO and Rh Blood Groups in different countries of the world and in different areas of Pakistan

Population	A	B	O	AB	Rh+	Rh–
Britain	41.70	8.60	46.70	3.00	83.0	17.0
USA	41.0	9.0	46.0	4.0	85.0	15.0
Nigeria	24.43	23.88	48.94	2.75	95.67	4.33
Kenya	26.20	22.0	47.48	4.40	96.10	3.90
India	18.85	32.50	38.75	9.90	94.45	5.55
Saudi Arabia	24.0	17.0	52.0	4.0	93.0	7.0
PAKISTAN						
Punjab	22.4	32.4	30.5	8.4	93.0	7.0
Peshawar	28.00	34.00	31.00	7.00	94.60	5.40
Bannu	31.03	36.23	25.07	7.67	89.27	10.73
Sindh	25.00	30.00	36.00	9.00	91.80	8.20
Baluchistan	21.12	34.32	37.07	7.59	94.75	5.25
Skardu	30.62	26.80	26.60	15.98	94.83	517
Present Study Swat	27.92	32.40	29.10	10.58	9.0	10

The distribution and frequency of the Rh positive group in the British population is 95%.[23] In the USA,85% belong to the Rh positive,[20] while in Saudi Arabia, 93% of male blood donors were found to be Rh positive.[21] The frequency to Rh negative varies from 20–40% in Basques to 0–1% in Japanese,

Chinese, Burmese, Melanesians, Mauris, American Indians and Eskimos.[24]

The frequencies for ABO along with Rh-negative were different in both sex, in male most common Rh-negative blood group was O (3.01%), B-negative (2.88%), A-negative (2.25%) and AB-negative (0.88%). Whereas in female B-negative was (4.24%), O-negative (3.74%), A-negative (3.54%) and AB-negative (0.92%). This is similar to the previous studies done in Pakistan.[3]

CONCLUSION

The study has a significant implication regarding the management of blood bank and transfusion services in this area. Knowledge of blood group distribution is also important for clinical studies, for reliable geographical information and for forensic studies in the population. Such studies need to be carried out at all the regional levels of Pakistan.

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