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Distribution of ABO and Rhesus Blood Groups in Kashmir Valley

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Abstract: ***Background:*** ***ABO and Rh blood group systems are major clinically significant blood group systems despite that more than 400 red cell antigens have been identified. Blood groups are genetically determined. ABO and Rh blood groups systems besides being most important in blood transfusion, also are important in forensic pathology, disease susceptibility and population genetics. This study aims to determine frequency and distribution of ABO and Rh blood groups among the population in Kashmir valley, J&K, India.*** ***Material and Methods:*** ***Study was done for a period of one year (March 2013 to February 2014) in the Department of Haematology and Transfusion Medicine, SMHS Hospital, Srinagar, J&K, India. Blood grouping for ABO and Rh status was done by tile agglutination method using commercially available anti-seras.*** ***Results:*** ***In ABO blood grouping of 7022 blood donor population most prevalent was 0 (34.72%) closely followed by B (33.34%) than A (23.88%) and lastly AB (8.06%) while in Rhesus grouping, Rh positive donors were maximum (91.17%) and Rh negative being only 8.83%.*** ***Conclusion:*** ***Blood group O is commonest in kashmir valley and AB happens to be rarest.***

Keywords: Blood groups, ABO, Rhesus (Rh), Donors, Kashmir

1. Introduction

The ABO and Rh blood group system remains so far the most significant in blood transfusion. The magnificent discovery of ABO blood group system is credited to Austrian scientist Karl Landsteiner in 1900[1]. He discovered three blood groups (A, B & O) for which he was awarded Nobel prize in 1930. Fourth blood group, AB was discovered by Alfred Von Decastello and Adriano Sturli in 1902[2].

Although Rh (Rhesus) system was fourth blood group system to be discovered (1940)[4] but it stands second as far as clinical importance is concerned. It can be Rh positive or Rh negative depending upon the presence or absence of antigen respectively. ABO and Rh system are genetically predetermined, genes located on chromosome9 and chromosome1 respectively.

Incidence of ABO and Rh blood groups varies in different parts of world. Factors attributed to such difference includes racial differences, geographical variation, different ethnic groups, external environment and genetic make up[4-6]. Role of ABO and Rh blood group system is not limited to transfusion safety and organ transplant only. Research on ABO blood group has been of great interest as besides primary role in immunohaematology and blood transfusion,ABO blood group system play vital role in clinical studies, genetic studies, medico-legal issues like disputed paternity and anthropology[7,8]. Further, importance of ABO blood group distribution is greatly increasing because of their association with certain diseases. ABO blood group has also been found to be predictor of national suicide rate and genetic marker of obesity[9,10]. Rh blood group system involved in hemolytic disease of Newborn, commonly arise when Rh negative mother carries Rh positive foetus[11].

Therefore it becomes imperative to have information about distribution of blood groups in any population besides generating data for health planners with multipurpose utilities in future.

2. Aims And Objectives

The present study was designed to determine frequency and distribution of ABO and Rh blood groups among donors in Kashmir valley, J&K India and compare with other data available from similar studies.

3. Material And Methods

Present study was carried out for a period of one year from March 2013 to February 2014 at Department of Haematology and Transfusion Medicine, SMHS (a tertiary care teaching hospital), Srinagar J&K, India. Total of 7022 blood donors were taken from in-house/ replacement at blood bank and outdoor blood donation camps (includes universities, colleges, coorporate sectors, etc.).

Blood donors were selected after proper history and complete examination fulfilling all eligibility criteria's for blood donation.
Determination of ABO and Rh status was done by tile method of agglutination. Drop of blood was placed on clean white tile at 3 places in a row. A drop of commercially available Anti-A, Anti-B and Anti-D (monoclonal antisevas) were added respectively (by Tulip Diagnosis Ltd. India). On basis of agglutination of serum by respective anti-sera, blood groups were determined.

4. Results

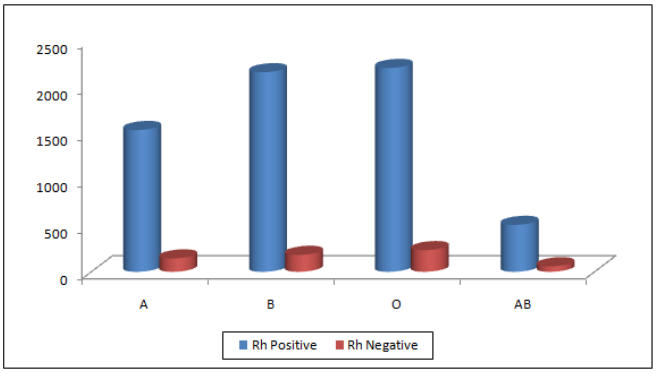
Frequency of ABO blood group in a total donor population of 7022 was compared (table 1). Group O was found to be most prevalent with 34.72% followed by B (33.34%), A

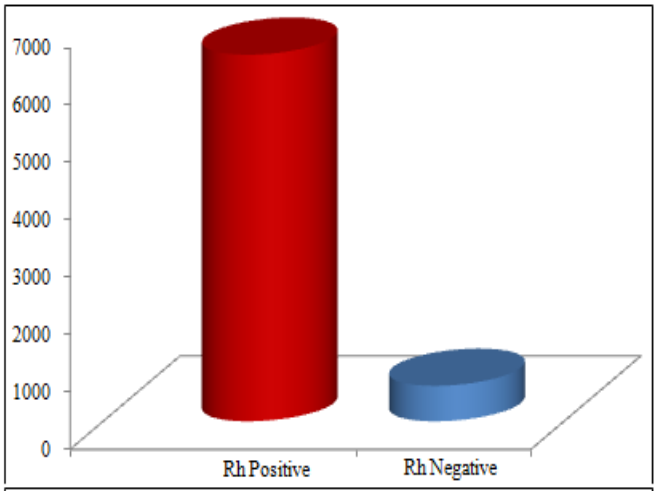
(23.88%) and least prevalent being AB (8.06%) (Fig. 1). On further analysis prevalence of Rh positive donors was found to be maximum with 91.17% while Rh negative donors make only 8.83% (Fig. 2). Trend of distribution being O negative (3.33%) > B negative (2.61%) > A negative (2.05%) > AB negative (0.84%).

O > B > A > AB i.e. 34.72% > 33.34% > 23.88% > 8.06%

Table 1: Distribution of ABO and Rh Blood Groups

Blood Group	Rh Positive	Rh Negative	Total
A (%age)	1533 (21.83%)	144 (2.05%)	1677 (23.88%)
B (%age)	2158 (30.73%)	183 (2.61%)	2341 (33.34%)
O (%age)	2204 (31.39%)	234 (3.33%)	2438 (34.72%)
AB (%age)	507 (7.22%)	59 (0.84%)	566 (8.06%)
TOTAL	6402 (91.17%)	620 (8.83%)	7022 (100%)





5. Discussion

The study under discussion has determined the distribution frequency of ABO and Rh blood group in blood donors in a tertiary care teaching hospitals. Our results states that in Kashmir valley blood group O is the commonest followed by a close second blood group B and AB happens to be the rarest. Also the Rh positive blood groups constitute 91.17% and Rh negative less common with frequency of only 8.83%. Among the negative blood groups O negative again was the commonest followed by B negative, A negative and AB negative was the rarest.

This study of frequency distribution of blood groups in donor population is very important for generation of simple database of blood groups to find out the easily available ones and the blood groups which are difficult to procure and hence an important tool to determine the direction of recruitment of voluntary donors as required for each zone across the state. This information is useful in management of blood bank inventory and transfusion services to needy patients.

The distribution of ABO blood groups varies from one population to another. The comparison of frequency and distribution of ABO and Rh blood groups in blood donors at Kashmir (present study) with the similar studies carried out within and outside India is given in table (2) and table (3).

While looking at the table it can be read that our study was comparable to the studies done at southern India states like Vellore, Bangalore and Chittoor while in states like Punjab and Eastern Ahmedabad B happens to be most frequent blood group. In countries like Britain, USA and Niger delta blood group O is the most prevalent followed by blood group A.

Apart from transfusion services, knowledge of blood group systems helps to take preventive measures against the diseases which are associated with different blood groups as there is definite genetic association, like group O (non-secretory) has higher incidence of duodenal ulcer[23,24,25] while group A carries increased incidence of gastric carcinoma[26]. Likewise group B is found to be associated with ovarian carcinoma[27].

Table 2: Comparison of Present Study with Indian Studies (in percentage)

	A	B	AB	O	Rh +ve	Rh –ve
Present Study	23.88	33.34	8.06	34.72	91.17	8.83
Bangalore[12]	23.85	29.95	6.37	39.82	94.2	5.79
Chittoor[13]	18.95	25.79	7.89	47.37	90.6	8.42
Vellore[14]	18.85	32.69	5.27	38.75	94.5	5.47
Shimoga-Malnad[15]	24.27	29.43	7.13	39.17	94.93	5.07
Davanagere[16]	26.15	29.85	7.24	36.76	94.8	5.52
Eastern Ahmedabad[17]	23.3	35.5	8.8	32.5	94.2	5.8
Punjab[18]	21.9	37.6	9.3	9.3	97.3	2.7

Table 3: Comparison with studies outside India

	A	B	AB	O	Rh	Rh –
Pakistan[19]	23.85	38	10	10	89.1	10.9
Nepal[20]	34	29	4	33	96.7	3.33
Britain[21]	41.7	8.6	3	46.7	83	17
USA[22]	41	9	4	46	85	5
Niger Delta[8]	23.8	20.7	2.8	52.7	93.9	62.12

Thus present study concludes that blood group 0 is the commonest among the donor's followed by B, A and AB respectively. Rh +ve are more than Rh negative. The data generated in present study and similar studies in each region will be useful for health planners for drafting national transfusion policies and also serves to enable insight into possibilities of future burden of disease and make efforts to face further health challenges.

References

[1] Land Steirier K. Zur Kenntnis der antifermentativen, lytischen and agglutinierenden wirkungen des

Blutserums under lymphe. Zentralblatt Bakteriologic. 1900; 27: 357–62.
[2] Von decastella A, Sturli A. Ureber die iso agglutinine in serum gesunder and Kranaker Menschen" Mfiner Med WSchr. 1902; 49: 1090–5.
[3] Boyd WC (1958) Genetics and the races of man. Boston. Little Brown 335-342.
[4] Lasky LC, Lane TA, Miller JP, Lindgren B, Patterson HA, et al. (2002) In utero or ex utero cord blood collection: which is better? Transfusion 42: 1261-1267.
[5] Wall DA, Noffsinger JM, Mueckl KA, Alonso JM 3rd, Regan DM, et al. (1997) Feasibility of an obstetrician-based cord blood collection network for unrelated donor umbilical cord blood banking. J Matern Fetal Med 6: 320-323.
[6] Dhot PS, Nair V, Swarup D, Sirohi D, Ganguli P (2003) Cord blood stem cell banking and transplantation. Indian J Pediatr 70: 989-992.
[7] Khurshid B, Naz M, Hassan M, Mabood S F. Frequency of ABO and Rh (D) blood groups in district Swabi, NWFP, Pakistan. J Sci Tech University, Peshawar. 1992; 16: 5-6.
[8] Enosolease M E,Bazuaye G N. Distribution of ABO and Rh-D blood groups in the Benin area of Niger-Delta:Implication for regional blood transfusion.Asian J Transf Sci. 2008; 2(1):3-5
[9] Mollison PL (1979) Blood transfusion in clinical medicine. (6thedn), Blackwell Scientific Publication: Oxford, UK 239-666.
[10] Hein HO, Suadicani P, Gyntelberg F (2005) The Lewis blood group--a new genetic marker of obesity. Int J Obes (Lond) 29: 540-542.
[11] Lo YM, Hjelm NM, Fidler C, Sargent IL, Murphy MF, et al. (1998) Prenatal diagnosis of fetal RhD status by molecular analysis of maternal plasma. N Engl J Med 339: 1734-1738.
[12] Periyavan A, Sangeetha S K, Marimuthu P, Manjunath B K, Seema. Distribution of ABO and Rhesus-D groups in and around Bangalore. Asian J Transfus Sci. 2010; 4 (1): 41.
[13] Reddy K S N, Sudha G. and Rh (D) blood groups among the desuri Reddis of Chittoor District, Andhra Pradesh. Anthropologist. 2009; 11 (3): 237-238.
[14] Das P K, Nair S C, Harris V K, Rose D, Mammen J J, Bose Y N, Sudarsanam A. Distribution of ABO and Rh-D blood groups among blood donors in a tertiary care centre in South India. Trop Doct. 2001; 31 (1): 47–8.
[15] Girish C J, Chandrashekhar T N, Ramesh Babu K, Kantikar S M. ABO and Rhesus blood group distribution among Malnad region blood Donors Research and Reviews in Biomedicine and Biotechnology [RRBB]. 2011; 2 (3): 25-30.
[16] Mallikarjuna S. Prevalence of ABO and Rhesus blood group among blood donors. Indian Journal of Public Health, Research and Development. 2011.
[17] Wadhwa M K, Patel S M, Kothari D C, Pandey M, Patel D D. Distribution of ABO and Rhesus-D groups in Gujarat, India: a hospital based study. Indan J Ped Oncol.1998; 19 (4): 137–141.
[18] Sidhu S.Distribution of the ABO Blood Groups and Rh(D) Factor Among the Scheduled Caste Population of Punjab.Anthropologist. 2003;5: 203-204.
[19] Hammed A, Hussain W, Ahmed J, Rabbi F, Qureshi J A. Prevalence of Phenotypes and Genes of ABO and Rhesus (Rh) Blood Groups in Faisalabad, Pakistan. Pak J Biol Sci. 2002; 5: 722–724.
[20] Pramanik T, Pramanik S. Distribution of ABO and Rh blood groups in Nepalese medical students: a report. East Mediterr Health J. 2000 Jan; 6 (1): 156-8.
[21] Frances TF: Blood groups (ABO groups). In: Common Laboratory and Diagnostic Tests. Philadelphia: Lippincott. 2002, 3rd Edition: 19–5.
[22] Mollison P L, Engelfriet C P, Conteras M. The Rh blood Group system. In Blood Transfusion in Clinical Medicine, 9th Edition. Oxford: Black well Scientific Publication.1993; 2008–9.
[23] Weiner A.S, Blood group and disease. *Am J Hum Genet* 1970; 22: 476-83.
[24] Vogal F. ABO blood groups and diseases. *Am J Hum Genet* 1970; 22: 464-75.
[25] Woolf B. On estimating the relation between blood group and disease. *Am Hum Genet* 1955; 19: 251-53.
[26] Aird I, Bentall H H, Roberts J A. (1953). A relationship between cancer of stomach and the ABO blood groups. Br Med J. 2011 Apr; 1 (4814): 799–801.
[27] Gates M A, Wolpin B M, Cramer D W, Hankinson S E, Tworoger S S. ABO blood group and incidence of epithelial ovarian cancer. Int J Cancer. 2010; 128 (2): 482–6.