EUROPEAN ACADEMIC RESEARCH
Vol. III, Issue 3/ June 2015

Impact Factor: 3.4546 (UIF)
DRJI Value: 5.9 (B+)

ISSN 2286-4822
www.euacademic.org

Prevalence of ABO and Rhesus Blood Groups in various blood donors in Kashmir

Dr. IRFAN ALI
MD, Lecturer
Department of Medicine, Government Medical College
Srinagar, Jammu and Kashmir, India
Dr. SHAGUFTA PARVEEN
MD, Lecturer
Department of Pharmacology, Government Medical College
Srinagar, Jammu and Kashmir, India
Prof. SHOWKAT AHMAD KADLA
DM, Professor and Head Department of Gastroenterology
Government Medical College
Srinagar, Jammu and Kashmir, India
Dr. NISAR AHMAD SHAH
DM, Assistant Professor
Department of Medicine and Gastroenterology
Government Medical College
Srinagar, Jammu and Kashmir, India

Abstract:

Background: *The ABO blood group system was the first human blood group system to be discovered by Landsteiner in 1900. The second type of blood group is the rhesus system. There are only two Rh phenotype such as Rh positive and Rh negative, depending on whether Rh antigen is present on the red cell or not. The frequency of ABO and Rh phenotypes in different populations has been extensively studied. The present study was done to assess the prevalence of blood groups in various blood donors in Kashmiri population, a part of Northern India and to compare our results with other studies conducted in other parts of India and elsewhere in the world.*

Material and Methods*: The study group consisted of various blood donors from the records of thirteen years (01-01-2000 to 31-12-2012) from blood bank of 800 bedded hospital. A total of fifty one*

thousand six hundred and sixty one blood groups were determined. ABO and Rhesus blood groups were estimated by DiaCion ABO/D+ reverse grouping for patients.

Results: *The frequency of ABO and Rhesus phenotypes was calculated. From our results it was found that the most frequently occurring blood group was blood group 'O' (35.71%) and the least occurring blood group was AB (6.8%). Majority (91.06%) of the study population was Rhesus positive. The prevalence of co-existing ABO/Rhesus phenotypes was calculated from which it was found that the more frequently group was O +ve (32.16%) followed by B+ve (30.5%) and A+ve (22.09) and the least found group was AB+ve (6.27%). Donors with Rhesus negative groups comprised only 8.93% of total in which, O negative, B negative, A negative and AB negative occurred at frequencies of 3.55%, 2.79%, 2.02%, 0.54% respectively.*

Conclusion: *Commonest blood group in our community is blood group O, followed by B, A and then AB respectively. 91.06% of our population is Rhesus positive.*

Key words: Blood Donor, Commonest Group, Prevalence, Kashmir.

Introduction:-

ABO blood groups were discovered in 1900 by Landsteiner and Rhesus in 1940. 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. The ABO blood group system is the only system in which antibodies are consistently and predictably present in the serum of normal individuals whose red cells lack the antigens[1-3]. Apart from differences amongst species, differences between the individuals of the same species have also been demonstrated. During the World wars, it was discovered for the first time that the frequency of ABO and Rhesus blood groups was different in persons native to different parts of the world. Attempts have

been made to classify the racial groups of mankind according to the incidence of known blood groups[4].

The second type of blood group is the rhesus system. There are only two Rh phenotype such as Rh positive and Rh negative, depending on whether Rh antigen is present on the red cell or not. Rh system emerged as second most important blood group system due to hemolytic disease of newborn and its importance in RhD negative individuals in subsequent transfusions once they develop Rh antibodies[3].

Determination of ABO blood groups is done by detecting A and B antigens. In addition, known red cells are used to detect anti-A and anti-B in the serum, by a process called 'reverse' grouping. ABO and Rh gene phenotypes vary widely across races and geographical boundaries [5-7] despite the fact that the antigens involved are stable throughout life.

The frequency of ABO and Rh phenotypes in different populations has been extensively studied. Different blood groups have been shown to be particularly associated with different diseases as well [8,9].

TABLE 1: Blood types with their genotypes and their constituent agglutinogens and agglutinins.

GENOTYPE	BLOOD TYPE	AGGLUTINOGENS	AGGLUTININS
OO	O	-	Anti-A and Anti- B
OA/AA	A	A	Anti-B
OB/BB	B	B	Anti-A
AB	AB	A and B	-

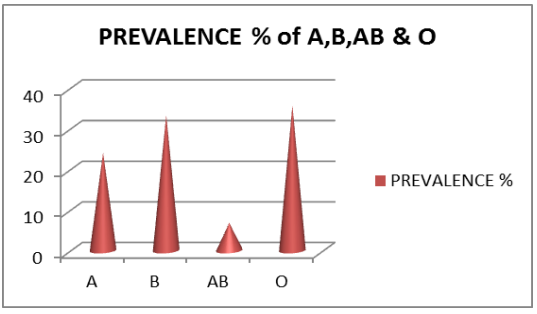


Figure 1.

ABO and Rhesus blood groups exhibit extensive polymorphism in different populations and the frequency at which each of the blood group exists shows considerable variations in different populations. This study has been done to know the frequency of various blood groups in Kashmiri population and to compare the same with the results from other parts of the world as well as within our own country.

Material and Methods:

The study group included 51,661 individuals of SMHS Hospital during past thirteen years. The blood was drawn by the Phlebotomist by standard procedure of vene-puncture and used for determination of ABO & Rh blood groups by gel technology. The frequency of phenotypes 'A', 'B', 'AB' and 'O', Rhesus positive and Rhesus negative were calculated. Blood was collected from both camps as well as from voluntary blood donors, donating blood in SMHS Hospital. The records were scrutinized for native population. The results were compared with other studies available from India and abroad.

Results:

Each sample of donors and recepients was labelled according to its phenotype as per ABO system and Rhesus positive or negative status was recorded. The prevalence of the phenotypes A, B, AB & O was calculated on donors blood and the results are presented in Table 1 (fig.1 & fig.2)

TABLE 2: Prevalence of phenotypes of ABO & Rh alleles

PHENOTYPE	NO. OF DONORS	PREVALENCE %
A	12,459	24.10
B	17,223	33.33
AB	3,523	6.80
O	18,456	35.70
RHESUS		
RHESUS POSITIVE	47047	91.06
RHESUS NEGATIVE	4614	8.93

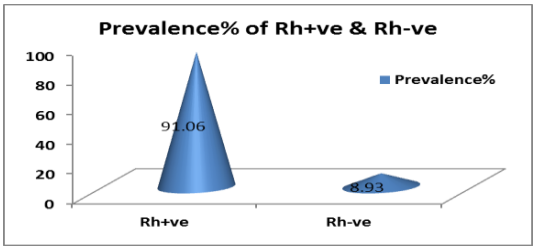


Figure 2.

TABLE 3: Prevalence of ABO/RHESUS Phenotypes

PHENOTYPE	NUMBER	PREVALENCE%
A+	11412	22.09
A-	1047	2.02
O+	16618	32.16
O-	1838	3.55
B+	15777	30.53
B-	1446	2.79
AB+	3240	6.27
AB-	283	0.54

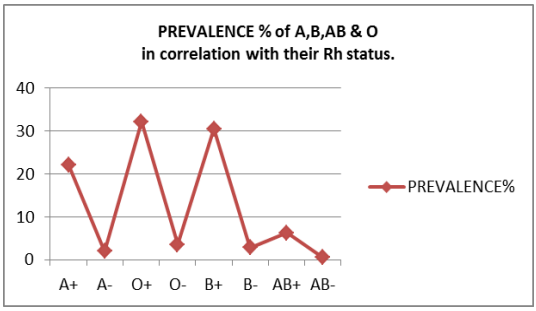


Figure 3.

The prevalence of the ABO phenotypes linked to the rhesus phenotype in our study group was O+ where almost 32.16% had this phenotype. This was followed by B+ve in 30.53%, A+ 22.09% and AB+ 6.27%. The lowest prevalence was that of AB-ve which was found to be 0.54% (Table 3, fig.3)

Discussion:

Research on ABO group system has been of immense interest due to its medical importance in different diseases. ABO blood group system is not only important in blood transfusions, cardiovascular diseases, organ transplantation, erythroblastosis in neonates but also one of the strongest predictions of national suicide rate and a genetic marker of obesity[10,11]. A significant deficit of group O has suggested that there may be susceptibility to develop osteoarthrosis in normal hip-joint and spinal osteochondrosis[12, 13]. The genetic history of a person can be known by studying the blood groups[14]

This study has determined the distribution frequency of ABO and Rhesus blood groups in the native population of voluntary blood donors at one of the biggest hospital of the state. India is a country with a lot diversities based on race, religion and creed. Hence diversity has been observed in the distribution of blood groups in population within the country[15]. Study from south India[16] showed that blood group 'O' was commonest (38.75%) followed by group B (32.69%), group A (18.85%) and AB (9.90%) with percentage of Rh +ve being 95.73% and Rh-ve being 4.27%. These resuts were comparable to the results of our study. Results from Jaunpur[17] also showed the group O as most frequently occurring group with the incidence 30.40%, but it was followed by group A (23.50%) and the group B was the least occurring among all with the incidence of 2.004% only while as studies from Maharashtra[18] have shown that blood group B to be commonest with the frequency of 33.06% followed by group O(31.04), groupA (27.02) and finally group AB(8.33) [table.4]

Another study conducted by Subhashini A.B[19] in 2007 regarding prevalence of ABO & Rhesus groups in Pondicherrry had shown that the commonest ABO blood group was group A, with a prevalence of 39.50% followed by blood group

'O'(34.00%). This is in contrast to our study, though Kashmir also falls in northern India.

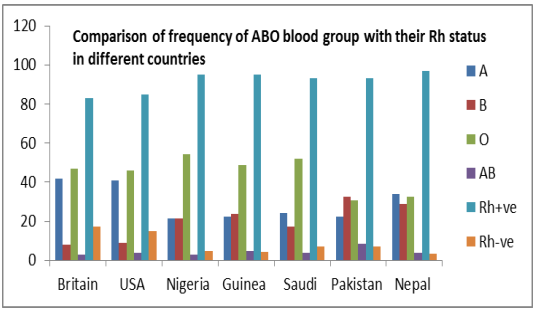
Comparing our results with those seen in other countries, Guinae and Nepal have a pattern that resembles ours while other contries like Soudi Arabia, Nigeria, Britain and USA though had the O as the commonest group but next in frequency in decending order are the group A, group B and then AB respectvelly[21].(Table.5, fig.4)

Table 4.Comparison of Frequency percentage of ABO and Rhesus blood group different areas of India

Population	**A**	**B**	**O**	**AB**	**Rh+ve**	**Rh-ve**
South India [16]	18.85	32.69	38.75	9.90	94.45	5.55
Urban area in Maharashtra [18]	27.02	33.06	31.04	8.33	95.73	4.27
Jaunpur [17]	23.50	2.004	30.40	4.00	97.00	3.00
Pondicherry [19]	39.50	20.50	34.00	6.50	93.50	6.50
Present study	24.10	33.33	35.70	6.80	91.06	8.93

Table. 5 Comparison of Frequency percentage of ABO and Rhesus blood group in different countries of the world[20]

Population	A	B	O	AB	Rh+ve	Rh-ve
Britain	42.00	8.00	47.00	3.00	83.00	17.00
USA	41.00	900	46.00	4.00	85.00	15.00
Nigeria	21.60	21.40	54.20	2.80	95.20	4.80
Guinea	22.50	23.70	48.90	4.70	95.90	4.10
Saudi Arabia	24.00	17.00	52.00	4.00	93.00	7.00
Pakistan	22.40	32.40	30.50	8.40	93.00	7.00
Nepal	34.00	29.00	32.50	4.00	96.70	3.30



Bibliography:

1. Amin-ud-Din M et al. Serological study among the municipal employees of Tehran, Iran. Distribution of ABO and Rh blood groups. Haematology, 2004, 7(4):502–4.
2. Sigmon JM. Basic principles of the ABO and Rh blood group systems for hemapheresis practitioners. Journal of clinical apheresis, 1992, 7(3):158–62.
3. 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.
4. Boyd WC (1958) Genetics and the races of man. Boston. Little Brown 335-342.
5. 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.
6. 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.
7. Dhot PS, Nair V, Swarup D, Sirohi D, Ganguli P (2003) Cord blood stem cell banking and transplantation. Indian J Pediatr 70: 989-992.

8. AIRD I, BENTALL HH, ROBERTS JA (1953) A relationship between cancer of stomach and the ABO blood groups. Br Med J 1: 799-801.
9. Mollison PL, Engelfriet CP, Conteras M (1993) Immunology of red cells. In Blood Transfusion in Clinical Medicine. (9thedn), Oxford, Blackwell 87-88.
10. Mollison PL (1979) Blood transfusion in clinical medicine. (6thedn), Blackwell Scientific Publication: Oxford, UK 239-666.
11. Hein HO, Suadicani P, Gyntelberg F (2005) The Lewis blood group--a new genetic marker of obesity. Int J Obes (Lond) 29: 540-542.
12. Lourie JA (1983) Is there an association between ABO blood groups and primary osteoarthrosis of the hip? Ann Hum Biol 10: 381-383.
13. Ritsner MS, Shmidt IR, Shekhner IA, Gurkov IaV, Stankov IA (1979) Analysis of the distribution of ABO system blood groups among patients with spinal osteochondrosis syndromes. Zh Nevropatol Psikhiatr Im S S Korsakova 79: 409-413.
14. Sokolov R (1993) Why We Eat What We Eat: How Columbus Changed the Way the World Eats, New York, Simon & Schuster 1-50.
15. Tulika Chandra and Ashish Gupta. Prevalence of ABO and Rhesus Blood Groups in Northern India. J Blood Disorders Transf 2011; 3 (5):132-5.
16. Das PK, Nair SC, Harris VK , Rose D, Mammen J, Bose YN and et al. A Distribution of ABO and Rh–D blood groups among blood donor in atertiary care centre in South India. Trop Doct 2001; 31:47–8.
17. Rai V, Patel R.P. & Kumar P.: Study of ABO and Rh (D) blood groups inScheduled Caste of Jaunpur District. Anthropologist, 2009; 11(2): 151-152.
18. Warghat N.E., Sharma N.R., Baig M.M.: ABO and Rh Blood Group distribution among Kunbis (Maratha)

population of Amravati District, Maharashtra-India; Asiatic J. Biotech Res. 2011; 2 (04) 479-483.

19. Subhashini A.B.: Distribution of ABO and Rh (D) blood groups among Irulas, a tribal population of Pondicherry, India. Anthropologist, 2007; 9(2): 163-164.
20. Purushottam A. Giri, Sankalp Yadav , Gaurav Singh Parhar , Deepak B. Phalke. Frequency of ABO and Rhesus B.Groups: A Study from a Rural Tertiary Care Teaching Hospital in India. Int J Biol Med Res. 2011; 2(4): 988 -990