

## Frequency Distribution of ABO and Rh Blood Groups among Blood Donors in Smt. Sarswati Karad Blood Bank, Latur

Prashant Chege<sup>1</sup>, Shubhangi Khule<sup>2</sup>, Meena Sonawane<sup>3</sup>, Pooja Holambe<sup>4</sup>

<sup>1</sup>Department Of Pathology, Maharashtra, Institute of Medical Sciences & Research, Medical College and Yashwantrao Chavan Rural Hospital, Latur -413512, Maharashtra, India.

<sup>2</sup>Department Of Pathology, Maharashtra, Institute of Medical Sciences & Research, Medical College and Yashwantrao Chavan Rural Hospital, Latur -413512, Maharashtra, India.

<sup>3</sup>Department Of Pathology, Maharashtra, Institute of Medical Sciences & Research, Medical College and Yashwantrao Chavan Rural Hospital, Latur -413512, Maharashtra, India.

<sup>4</sup>Department Of Pathology, Maharashtra, Institute of Medical Sciences & Research, Medical College and Yashwantrao Chavan Rural Hospital, Latur -413512, Maharashtra, India.

Received Date: 22/01/2023

Acceptance Date: 10/03/2023

### Abstract

**Background:** The information of the distribution of ABO and Rh blood groups is very essential. It helps in the management of blood banks properly, including smaller local transfusion services or regional or national transfusion service. The ABO and Rh blood group system, both are most important for blood transfusion purposes. This study is conducted to determine the frequency of ABO and Rh blood groups in Smt. Sarswati Karad Blood Bank, Latur. Blood Bank attached to MIMSR Medical College and Y.C.R. Hospital, Latur (Maharashtra), India. **Aim and Objective:** To study the frequency distribution of ABO and Rh blood groups among blood donors in Smt. Sarswati Karad Blood Bank, Latur. **Material And Methods:** The distribution of ABO and Rh blood groups was studied among 3909 blood donors screened at Smt. Sarswati Karad Blood Bank, Latur, over a period of 3 years (January 2019 to December 2021). Records of blood groupings of blood donors (both in-house & camps) were examined. All entries were double-checked by each author. Data on the frequency distribution of ABO and Rh blood groups were reported in simple percentages. **Results:** The blood group phenotype B predominates in distribution with the highest frequency (37.6%) followed by O (29.4%) and A (23.7%). The least common blood group was AB group (9.3%). The prevalence of Rh negative group was found in 160 (4.1%) donors. **Conclusion:** This study concludes that the frequency of blood group B Rhesus Positive is highest followed by O and A. The least common blood group was AB.

**Keywords:** Blood group, Donors, Transfusion.

**Corresponding Author:** Dr. Shubhangi Khule, Assistant Professor, Department of Pathology, Maharashtra, Institute of Medical Sciences & Research, Medical College and Yashwantrao Chavan Rural Hospital, Latur- 413512, Maharashtra, India.

**Email:** [shubhangikp194@gmail.com](mailto:shubhangikp194@gmail.com)

### Introduction

The discovery of the ABO blood groups system was done by Karl Landsteiner. The ABO blood group system, the most clinically important blood group system because antibodies against A or B or both antigens are naturally present in the serum of persons whose red cells express blood group B, A, or O. It was followed by the discovery of Rh D antigen [1]. Today there are total 29 human blood groups systems (including the ABO and Rhesus system) that are approved by the International Society of Blood Transfusion (ISBT). There are over 600

different blood group antigens have been discovered, but many of these are very rare or are mainly found in certain ethnic groups [2]. The ABO incompatible transfusions are potentially fatal. Molecular basis of ABO blood group system was found in 1900 [3]. Blood classification into groups is depend on the presence or absence of inherited antigen on the surface of RBCs. Some of these antigens are also found on the surface of other types of cells and body secretions like saliva, sweat, semen, serum, tears, urine etc. It helps in forensic investigations [4]. The ABO blood groups depend on a single gene that is located on long arm of the ninth chromosome. With 3 alleles: i, IA, and IB. IA and IB alleles are dominant over i, expressing a special dominance relationship (co-dominance), which means that type A and type B parents can have an AB-type child and O-type child if they are both heterozygous (IBi, Iai) [5]. Rhesus(Rh) system is the second most significant blood group system.; the most significant Rhesus antigen is the Rhesus D antigen as D Antigen is the most immunogenic of the five main Rhesus antigens [2]. The blood group antigens are of clinical importance in blood transfusion, organ transplantation, autoimmune haemolytic anemia and feto-maternal blood group incompatibility [6].

### Materials And Methods

The frequency distribution of ABO and Rh blood groups was done among 3909 blood donors screened at Smt. Sarswati Karad Blood Bank, Latur over a period of 3 years (January 2019 to December 2021). Record registers of blood groupings of blood donors were examined. Repeat entry was strictly avoided. All entries were checked by each author. Blood group of all donors were identified by forward grouping and reverse grouping using tube technique and gel cards. Data of frequency of ABO and Rh blood groups were reported in simple percentages.

### Results

The results of the analysis of the ABO and Rh blood groups of the present study have been summarized in the Table 1 and 2, respectively. Our results revealed the most common blood group to be group B [1471 (37.6%)], followed by group O [1147 (29.4%)], and group A [927 (23.7%)]. The least common blood group was AB group [364(9.3%)]. The prevalence of Rh-D negative group was found in 160(4.1%) donors.

**Table 1. Distribution of ABO blood groups among blood donors**

Blood Group	n	Percentage
A	927	23.7
B	1471	37.6
AB	364	9.3
O	1147	29.4
Total	3909	100

**Table 2: Distribution of Rh blood group among blood donors.**

Blood Group	n	Percentage
Rh Positive	3749	95.9
Rh Negative	160	4.1
Total	3909	100

### Discussion

Frequency distribution of the ABO and Rh blood groups among blood donors is very important. It varies from race to race as well as among different regions. This study deals

with frequency distribution of A, B, O and Rh blood groups among blood donors in Smt. Sarswati Karad Blood Bank, Latur. It was observed in the present study that there was preponderance of group B, closely followed by group O. These results were in accordance with the study conducted in other regions of Maharashtra[7], in U.P. [8], Punjab [9] showed preponderance of group B followed by group O. Studies conducted at Vellore, south India[10] & by Khan MN et al in Jammu and Kashmir [11] to screen the distribution of ABO and Rh-D blood groups among blood donors revealed preponderance of group O followed by group B. This may be attributed to the different ethnic origin. The frequency of ABO\*B allele is higher (0.233) among Indian population as compared to ABO\*A allele (0.186) which is in comparison to our study [7]. These findings correlate with the studies conducted among Kaniyas in Mysore, Karnataka [12] and among HIV seropositive patients at an ICTC centre in Bangalore [13]. Our study is not in comparison with the study conducted among vokkaligas of Mysore which showed a preponderance of group A than group B [14]. The incidence of Rh-D negative group was identical to previously published data from North India. Rh (D) positive frequency (95.9%) in this study was similar to some neighboring Arabian countries, example, Saudi Arabia (91.22%), [15] Arians (91.7%),[16] and Iran (88.7%) [17]. Compared with racial groups, it is similar to African blacks (94%) [18], but with a marked differences from those of Caucasians (85%), including Europeans and their descents.

### Conclusion

The present study is the study that documents the frequencies of ABO, subgroup ABO and Rh (D) blood groups among blood donor in Smt. Sarswati Karad Blood Bank, Latur. This could have a significant at blood banks in Latur, where certain blood groups are needed more than others in emergency conditions. In addition, this study will help in research to find the reasons of increasing of certain blood group to another by linking it to genetics.

### Conflict of Interest - Nil

### Sources of Support - Nil

### References

1. Garratty G, Dzik W, Issitt PD, Lublin DM, Reid ME, Zelinski T. Terminology for blood group antigens and genes – historical origins and guideline in the new millennium. *Transfusion* 2000; 40:477-89.
2. Oluwadare I, Shonekan S, *African Journal of Biotechnology* 2008;Vol. 7 (11), pp. 1641-1643.
3. Rai V. And Kumar P. Genetic Analysis of ABO and Rh Blood Groups in Backward Caste Population of Uttar Pradesh, India/ *Not Sci Biol*, 2011, 3(3):07-14
4. Hartmann G. *Group Antigens in Human Organs*. Copenhagen: Ejnar Munksgaard; 1941:87-92
5. Yazer M, Olsson M, Palcic M. The cis-AB blood group phenotype: fundamental lessons in glycobiology. *Transfus Med Rev*.2006; 20(3):207–217.
6. Hanania .SS, Hassami.S, Irshaid NM. Allele Frequency and Molecular Genotypes of ABO Blood group system in Jordanian Population. *J. Med.Sci*,2007; 7(1):51-58
7. Warghat NE, Sharma NR, Baig MM. ABO and Rh Blood Group frequency distribution among Kunbis Maratha of Amravati District, Maharashtra-India. *Asiatic J. Biotech Res*. 2011; 2(04)479-483
8. Rai V, Patel Ram, Kumar. P. Study of ABO and Rh (D) Blood Groups in Scheduled Caste of Jaunpur District. *Anthropologist* 2009.11(2): 151-152
9. Sharda Sidhu. Distribution of the ABO Blood Groups and Rh(D) Factor Among the Scheduled Caste Population of Punjab. *Anthropologist* 2003;5(3): 203-204

10. Das PK et al. Distribution of ABO and Rh blood groups among blood donors in a tertiary care centre in South India. *TropDoct.* 2001 Jan; 31(1):47-8.
11. Khan MN, Khaliq I, Bakhsh A, Akhtar MS, Amin-ud- Din M. Frequency Distribution of ABO and Rh D blood groups in the population of Poonch District, Jammu and Kashmir. *East Mediterr Health J.* 2009;15(3):717-21.
12. Devi OR, Gangadhar MR. ABO and Rh (D) Blood Groups Among the Kaniyas of Karnataka. *Anthropologist* 2006.8(2): 145-146
13. Banu A, Ahmed SM, Shastri S. Distribution Of ABO And Rh Blood Groups In HIV Seropositives At An Integrated Counseling And Testing Centre In Karnataka, India *SAARC J Tuber Lung Dis HIV/AIDS* 2011;8(2):42-45
14. Jai Prabhakar SC, Gangadhar MR. Study of ABO and Rh (D) Blood Groups among GangadikaraVokkaligas of Mysore, Karnataka. *Anthropologist*, 2009.11(1): 63-64
15. Al-Himadi AR, Umar M. ABO blood group distribution among Saudi citizens related to their regional or original tribal location. *Kuwait J.Sci.Eng.*2002.29(1)75-81.
16. Ali N, Anwar M, Bhatti FA, Nadeem M, Nadeem A, Ali AM. Frequency of ABO and Rh blood groups in major ethnic groups and casts of Pakistan. *Pak J Med Sci Q.* 2005;21(1):26–29.
17. Boskabady MH, Shademan A, Ghamami G, Mazloom R. Distribution of blood groups among population of Mashhad (North East of Iran). *Pak J Med Sci Q.* 2005;21(2):194–198.
18. Enosolease ME, Bazuaye GN. Distribution of ABO and Rh-D blood groups in the Benin area of Niger-Delta: implication for regional blood transfusion. *Asian J Trans Sci.* 2008;2(1):3–5.