



**DISTRIBUTION OF DIFFERENT BLOOD GROUPS AMONG BLOOD DONATIONS OF
A BLOOD BANK LOCATED IN TERTIARY CARE HOSPITAL OF MANDI DISTRICT
OF HIMACHAL PRADESH**

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ABSTRACT

Background: The knowledge of ABO and Rhesus (Rh) blood group are of prime significance for blood transfusions in management of anemias or acute hemorrhages due to trauma, organ transplantations, family studies and forensic investigations. This knowledge is further of great asset to blood bank inventory. **Aims & Objectives:** To assess prevalence of different blood groups in blood donations for a year in a tertiary care health institution. **Methods:** Cross-sectional study using hospital records of blood bank regarding distribution of ABO blood groups among all blood donations from 1st January 2021 to 31st December 2021. **Results:** There were 3324 blood donations in blood bank under our study during one year w.e.f 1st January 2021 to 31st December 2021. Amongst them B+ive blood group had maximum prevalence of 30.02% followed by A+ive blood group which was 26.05%. O+ive blood group was present among 24.09% of all donations and AB+ive donors were 13.57%. Prevalence of A-ive, B-ive, O-ive and AB-ive blood group donations was 1.81%, 2.19%, 1.50% and 0.75% respectively. Among negative blood groups B-ive had maximum prevalence and AB-ive had the least prevalence. **Conclusions:** Knowledge about distribution of blood groups in given population is of great attribute during emergency. This knowledge is backbone of blood bank directory, which will further fulfill need regarding availability of different blood groups as per distribution.

KEYWORDS: ABO blood groups, Rhesus (Rh) blood group, blood donations, negative blood groups.

INTRODUCTION

It took long journey for evolution of safe practices along with knowledge about safety measures regarding blood transfusion. Practice of venesection was being carried out even during of Hippocrates around 430 BC.^[1] William Harvey contributed a great milestone by discovering the mechanism of blood circulation in 1628 which proved a turning point in history of blood transfusion.^[2] Further a keen observation by Karl Landsteiner at the University of Vienna in 1900 was a magnificent step where he discovered that some blood transfusions were successful while others proved fatal. Landsteiner discovered the ABO blood group system where he mixed red cells and serum of each of his staff. It was further illustrated by him that the serum of few people agglutinated the red cells of others. In his experiments he was further successful to establish 3 type blood group system where blood group typing were A, B

and C. Later on C blood group was further renamed as O because in German word Ohne which meant without or Zero which meant null in English. After one year 4th blood group which was less prevalent was discovered and named as AB. Later on he received Nobel Prize in physiology and medicine for his work in 1930.^[3]

International Society of Blood Transfusion has recently recognized 33 blood group systems. Apart from ABO and Rhesus system, many other types of antigens have been noticed on the red cell membranes which are of great significance w.r.t blood transfusion.^[4] Despite the long list of several other blood groups discovered so far, the knowledge and distribution of ABO and Rh-D blood group are of utmost importance^[4] for effective management of blood bank inventory.^[5] This system is also useful in different genetic studies, relation to certain diseases, different migration patterns of population as

well as helps in resolving certain medicolegal issues, basically paternity dispute.^[6] Many findings suggest that public education regarding blood donation, regular prompts of donors to donate when there is a shortage and friendly attitude of staff have the potential to motivate donors and eliminate barriers to blood donation.^[7]

Study of blood grouping is not only generating a simple database but also create a great social awareness about self-blood grouping and safe blood transfusion among the population of a country.^[8] India is a vast country with lot of diversity in race, religion and creed. The same diversity has been observed in geographical distribution of blood groups in population within country. Every transfusion center should have a record of frequency of blood group system in their population. The study of distribution of blood group is very important for blood

banks and transfusion services that could contribute to the patient's health care.^[9]

MATERIAL AND METHIODS

Study area: Analysis of blood donations of a blood bank of tertiary care hospital located at Zonal Hospital Mandi in Himachal Pradesh, India.

Study design: cross-sectional analytical study.

Study Period: 1st January 2021 to 31st December 2021.

Sampling Technique: Analysis of all blood donations for a year was done. All blood donations of the year were included in study. ABO blood groupings of all blood donations were done.

Study Tools: Data was collected from blood bank records.

Statistical Analysis: Data collected was analyzed with the help of Statistical Methods.

RESULTS

Table 1: Distribution of different blood groups among total blood donations for one year, w.e.f 1st January 2021 to 31st December 2021.

Total blood donations w.e.f 1 st January to 31 st December 2021(N= 3324)			
S. No	Type of Blood Group	n	%
1.	A +ive	866	26.05
2.	A -ive	60	1.81
3.	B +ive	998	30.02
4.	B -ive	73	2.19
5.	O +ive	801	24.09
6.	O -ive	50	1.50
7.	AB +ive	451	13.57
8.	AB -ive	25	0.75

Table 1./Fig. 1 depicts that there were 3324 blood donations in blood bank under our study during one year w.e.f 1st January 2021 to 31st December 2021. Amongst them B+ive blood group had maximum prevalence of 30.02% followed by A+ive blood group which was 26.05%. O+ive blood group was present among 24.09% of all donations and AB+ive donors were 13.57%.

Prevalence of A-ive, B-ive, O-ive and AB-ive blood group donations was 1.81%, 2.19%, 1.50% and 0.75% respectively. Among negative blood groups B+ive had maximum prevalence and AB-ive had the least prevalence. In our study prevalence of Rh+ive blood groups was 93.75% and Rh-ive blood group was 6.25%.

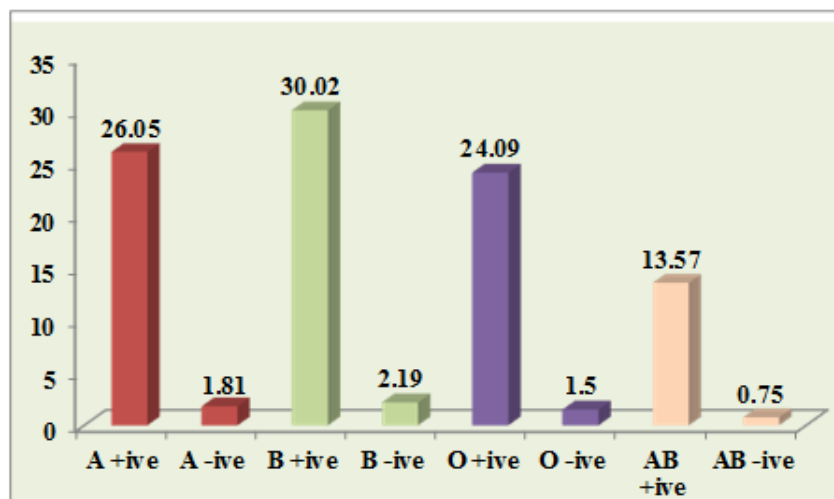


Fig. 1: % distribution of of different blood groups among total blood donations of one year, w.e.f 1st January 2021 to 31st December 2021.

DISCUSSION

We did a study about a blood bank of a tertiary care hospital for one year regarding stats of distribution of different blood groups. In our studies we found that B+ive blood group had maximum prevalence of 30.02% followed by A+ive blood group which was 26.05%. O+ive blood group was present among 24.09% of all donations and AB+ive donors were 13.57%. In our study prevalence of A-ive, B-ive, O-ive and AB-ive blood group donations was 1.81%, 2.19%, 1.50% and 0.75% respectively. At national level a systematic review was done by K. Patidar *et al.* which was based on literature search from January 2001 to December 2018 on ABO and Rh (D) distribution in all states of India. They divided India into five regions according to geographical area. Same blood group individuals from all the states were added and a national data was compiled. Out of total 112 studies from 23 states of India a total of 1 429 996 donors were selected and data was analyzed. Overall distribution of the A, B, O and AB blood groups in India was 23.16%, 34.10%, 34.56% and 8.18%, respectively. Rh(D)-positive and Rh(D)-negative population are 94.13% and 5.87%, respectively.^[5] In our study prevalence of Rh+ive blood groups was 93.75% and Rh-ive blood group was 6.25%, which quite resembles with our study.

A similar study was done by E. Shahverdi *et al.* regarding distribution of blood groups in Iranian population. In their study results for ABO blood grouping were 1268 (36.49%) typed as group O followed by 1115 (32.09%) as group A, 823 (23.68%) as group B, and 269 (7.74%) as group AB.^[10] This distribution is quite different from distribution of blood groups in Indian population and population under our study. Suresh B *et al.* in their study included 49,110 donor samples in a tertiary care teaching hospital blood bank of south India which were tested during their study period for ABO grouping and Rh-D typing. The frequency of O, B, A, AB and Bombay blood groups were 41.7%, 32.2%, 20%, 6.1% and 0.03% respectively. Rh (D) positive and negative blood groups were seen in 92.8% and 7.2% respectively. In their study O blood group has maximum prevalence whereas in our study B+ive blood group has maximum frequency whereas Bombay blood groups were not included in our study.^[11] A retrospective study was done by Kumar S *et al.* where most common blood group found was B 31.68%, in our study it is 30.02% and least common being AB 11.70% in our study it is 13.5%. The prevalence of Rhesus positive and negative distribution in the present studied population was found as 93.51% and 6.49%, respectively.^[6] This is very much similar to our study.

A study was undertaken by Agrawal *et al.* with an objective to provide data on the ABO and Rh(D) blood group distribution and gene frequency across India. A total of 10,000 healthy blood donors donating in blood banks situated in five different geographical regions of the country (North, South, East and Center) were

included in the study. ABO and Rh (D) grouping was performed on all these samples. Data on the frequency of ABO and Rh(D) blood groups was reported in simple numbers and percentages. The study showed that O was the most common blood group (37.12%) in the country closely followed by B at 32.26%, followed by A at 22.88% while AB was the least prevalent group at 7.74%. 94.61% of the donor population was Rh positive and the rest were Rh negative.^[12] In our study B is most common blood group. A similar retrospective study was done by C. Bhavani *et al.* for one year at blood bank in of a medical college in south India where data pertaining to the blood groups of donors was collected from the Blood Bank donor register from for 1 year and found O blood group was significantly high in their population and comparatively low AB blood group.^[13]

In a study data of 40732 blood donors were retrospectively collected and analyzed by A. Raja *et al.* regarding ABO and Rh blood groups from May-2011 to April-2016 and reported in simple numbers and percentage. Blood group of the blood donors was determined by forward and reverse methods with the help of commercially available standard monoclonal antisera by test tube and column agglutination techniques in required cases. The most common blood group among donors was B (34.43%) followed by O (32.26%), A (24.35%), while the least prevalent blood group was AB (8.94%). Rh positivity among donors was (95.12%) & Rh Negative donor was (4.87%). The most common blood group in donors was B positive and least common was AB negative.^[14] The prevalence of most common and least common blood groups correlates with our study.

CONCLUSION

There is great diversity in distributions of blood groups globally as well as nationally henceforth knowledge about distribution of blood groups in given population is of great attribute during emergency. This knowledge is backbone of blood bank directory, which will further fulfill need regarding availability of different blood groups as per distribution. This will not only reduces transfusion related reactions but also help to combat them.

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