

Gender Distribution of ABO and Rhesus Blood Groups among Medical Students of a Public Medical School in Lahore, Pakistan

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ABSTRACT

Introduction: The identity of blood is unchangeable. More than 400 blood grouping antigens have been reported so far but the ABO and Rh is recognized as the major ones with clinical significance. **Objective:** To determine the frequency and gender distribution of ABO and Rh blood groups in medical students from a public medical school in Lahore, Pakistan. **Design:** Cross sectional study. **Method:** Blood group and Rh factor determination was carried out by Shaikh Khalifa Bin Zayed Al Nahyan Medical & Dental College Blood Donor Society, under the auspices of the department of Hematology & Blood bank, Shaikh Zayed Medical Complex. It was done by the antigen-antibody agglutination test and included all 481 medical students studying in the medical school. **Results:** The cumulative percentages of ABO and Rh blood groups among voluntary male and female medical student were : B +ve 33.7%, O +ve 30.4 %, A +ve 19.8%, AB +ve 7.9%, B -ve 4.2 %, O -ve 1.9%, AB -ve 1.2% and A -ve 1.0% while that for Rhesus -ve and Rhesus +ve blood groups was 8.3% and 91.7% respectively. B+ve (33.7%), the most prevalent blood group in both gender was 35.2% in males and 32.2% in females. O+ve (30.4%) was the second most prevalent one and was 32.2% in males and 28.6% in females. **Conclusion:** Blood groups in medical students follow the same frequency and distribution as of the general population of Punjab, predominantly B +ve and O +ve. Frequency distribution helps to inform blood banks about the proportional need for each blood group and also guides blood donor societies to collect proportionate samples of different blood groups following this population distribution.

Key Words: Blood groups, ABO blood group, Rh blood group, Blood donors.

INTRODUCTION

Utilization of blood is a regular necessity in a health care system. Need of blood is an essential and unavoidable requisite in the medical and surgical departments. There should be a constant, reliable and cost-free source of blood in the blood bank, that is tested and safe for the recipients. There is also the hassle and expense in

arranging such donations by non-local patient's relatives so there should be an organized way to an easily accessible source of blood. This precluded the medical students as a fore most choice.

Identification of blood groups' distribution in various populations in context to blood banking is crucial but little being done in our population.¹ Medical students being a part of the hospitals can play an important role in blood bank reserves of blood in emergencies as well as whenever needed. Medical students are quite motivated with a very

positive attitude towards blood donation² and this can prove to be a time efficient and relatively safer way of collecting blood in blood banks. The use of extensive history from donors and advanced serological and nucleic acid testing (NAT) assays has greatly reduced infection from several transfusion transmitted pathogens.³ Quality and safety standards of the blood bank are mandatory to reduce risk of transfusion infections.⁴ A huge number of blood donors are lost due to extensive screening and standard protocols and procedures of blood donations in blood banks, necessitating the establishment of a healthy blood donor pool or source.⁵ Gender-wise distribution of ABO blood groups

Students and young population is a big pool of healthy, voluntary blood donors and committed to further donation after further screening and serological tests as appropriated by the blood bank.⁶ Determination of frequencies of ABO blood groups for blood banking, organ transplant and genetic studies is important and has already been established.⁷

Medical students make a pool of healthy voluntary blood donors in our country. They usually practice blood donation with an interval of eight weeks between donations at least, as per standard practice and guidelines.⁸

Shaikh Khalifa Bin Zayed Al Nahyan Medical and Dental College is a public sector medical teaching institute affiliated with Shaikh Zayed Hospital Lahore. It has an influx rate of hundred students per year. Data was collected from a pool of 481 medical students studying in all 5 years of medical college.

METHODS

A total of 481 medical students from Shaikh Khalifa Bin Zayed Medical & Dental College affiliated with University of Health Sciences, Lahore, Pakistan participated in this study voluntarily. The subjects included both male and females with no age restrictions. Inclusion criteria included MBBS Students who agreed to donate blood in the future. Participants were given a donor questionnaire which also gave the blood bank the authority to use the data and an agreement to use

their donations as deemed appropriate by the Blood Bank. The questionnaire also included information regarding any present or past medical condition and past history relevant to blood donation. A 1.0-2.0 ml sample of blood was drawn from the antecubital vein of each subject in a disposable syringe, and transferred immediately to a tube containing ethylene diamine tetra acetic acid (EDTA). 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 Du test was done. Blood was collected under WHO guidelines and screened accordingly for HIV, HBV, HCV and Syphilis. Subjects whose blood samples completely satisfied the screening criteria for HIV, HBV, HCV and Syphilis, according to WHO were included and a databank of these volunteer students was developed. Data was entered and analyzed using SPSS version 20.0.

RESULTS

Out of the total 481 subjects, 236(49.1%) were males and 245(50.9%) were females as shown in Table 1. The distribution of ABO and Rhesus blood groups in both genders are shown in Table 2. In a descending order, ABO and Rhesus blood groups in the total sample are; B +ve 33.7%, O +ve 30.4%, A +ve 19.8%, AB +ve 7.9%, B -ve 4.2%, O -ve 1.9%, AB -ve 1.2% and A -ve 1.0%. Total cumulative percentage of Rhesus -ve and Rhesus +ve blood groups was 8.3% and 91.7%, respectively.

Results exhibits, B +ve was the predominant blood group with a combined percentage of 33.7% and A -ve was the least common blood group with a total percentage of 1% comprising of only 5 subjects in the total sample and only present in male medical students.

B+ve (33.7%), the most prevalent blood group in both gender was 35.2% in males and 32.2% in females. O+ve (30.4%) was the second most prevalent one and was 32.2% in males and 28.6% in females. A+ve (19.8%) was 3rd most prevalent in males 19.1% and females 20.4%. AB +ve blood group was 10.6% in females as compared

to 5.1% among male students. B -ves in males and females were almost equal, 4.1%.

Table 1: Gender-wise distribution of subjects.

Gender	Frequency	Percent
Male	236	49.1
Female	245	50.9
Total	481	100.0

Table 2: Gender-wise distribution and frequency of ABO and Rhesus blood groups.

Blood groups	Male	Female	Total
A+ve	45 (19.1%)	50 (20.4%)	95 (19.8%)
A-ve	5 (2.1%)	0	5 (1.0%)
B+ve	83 (35.2%)	79 (32.2%)	162 (33.7%)
B-ve	10 (4.2%)	10 (4.1%)	20 (4.2%)
AB+ve	12 (5.1%)	26 (10.6%)	38 (7.9%)
AB-ve	2 (0.8%)	4 (1.6%)	6 (1.2%)
O+ve	76 (32.2%)	70 (28.6%)	146 (30.4%)
O-ve	3 (1.3%)	6 (2.4%)	9 (1.9%)
Total	236 (49.1%)	245 (50.9%)	481 (100%)

DISCUSSION

This study not only created awareness among the health professional students about healthy blood donation but it also lead to the formation of databank of healthy, voluntary blood donor students at SKZMDC. Blood banking is the backbone of medical interventions in health system. Provision of safe blood to all in need of transfusion is one of the objectives of public health.

This survey was conducted for the first time in our institute and the distribution of blood groups were found to be very useful for identifying voluntary blood donors with different blood groups, especially the rare ones. A lot of research evidence is available on healthy, potential, voluntary blood donors to enhance and improve blood banking and transfusion facilities^{9,10}.

Studies on blood grouping in medical students or young voluntary blood donors are scarce, though enough literature on blood groups distribution in the general population globally and in Pakistan is available. In our study, we found the

same prevalence of B+ve blood group (33.7%) as in a study on most prevalent blood groups in a Pakistan's major district. Least common blood group according to our study was A-ve but in this study it was AB-ve¹¹.

A study conducted to determine the frequency of various ABO and Rh (D) blood groups among voluntary blood donors in Rawalpindi/ Islamabad area of Pakistan showed the same results; B +ve being the most common blood group in voluntary blood donors¹². Another study in District Dir Lower Khyber Pakhtunkhwa Pakistan, showed A +ve as the predominant blood group of the population¹³. However, a study conducted regarding distribution of ABO and RH blood group alleles in different populations of southern Punjab, Pakistan showed no significant difference between ABO or Rh allele variation¹⁴. Another study conducted at Punjab Institute of Cardiology, Lahore, Pakistan showed the same dominance of B +ve in our population¹⁵. There is a need for blood groups mapping of our population and identify ethnic and regional differences in blood groups' distribution among Pakistani population and voluntary blood donors¹⁶.

Our study showed that 49.1% were males and 50.9% were females, while in another study 55.6% of donors were male and other 44.4% were female¹⁷. A study conducted on medical students in Nepal showed that the most prevalent blood group was A +ve and O +ve as compared to B +ve in our medical students. The least common blood group was AB -ve in Nepal which was the same as in our medical student population¹⁸. Our sample showed blood groups B +ve 33.7%, O +ve 30.4 %, A +ve 19.8%, AB +ve 7.9%, B -ve 4.2 %, O -ve 1.9%, AB -ve 1.2% and A -ve 1.0% in a descending order of frequency. Female medical students formed 46.67 % of Nepalese Medical students whereas in our college 50.9% were females. The common finding in all studies included current research is the predominance of Rh +ve antigen on the blood groups.

A study conducted in Puducherry, India revealed that there was a positive attitude of medical students towards blood donation and a 100 % voluntary rate can be achieved through education regarding blood donation of these medical

students¹⁹. Our study aims to bring this fact forward and initiate such education system so as to make sure that educated personnel such as medical students play a vital role in the future of blood banking.

Another study conducted in medical and non-medical students in Nepal showed that medical students donated much less than the non-medical students²⁰, while in our study 96.2% participated in the survey voluntarily. Blood centers are able to recruit and process large numbers of blood donations to meet the demand for antigen-matched blood but we need to avail all options in an under resourced health system, as ours, to meet our blood banking needs²¹. A study conducted on blood donations in developing countries showed that certain themes like misinformation about blood donation, fear of blood donation, willingness to donate only for family and friends contributed significantly towards this blood donation attitude²². To improve this we need to educate the masses and utilize all potential blood donors at our disposal.

Our study indicates that 96.2% medical students volunteered to participate in this drive and agreed to donate blood in the future for the benefit of the patients. The predominant blood group was B +ve and females were the predominant donors. The blood groups follow the same frequency pattern as in the general population. This could be a very important source for the blood bank which needs blood for transfusion in emergency as well as in elective procedures. By organizing blood donation drives in all the medical colleges in Pakistan, blood banking can be improved to an immense level in terms of efficiency and resources. Also, a huge cohort can be gathered to improve knowledge regarding voluntary blood donation in medical students and also genotypes of such donors.

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