

THE PREVALENCE OF ABO BLOOD AND RHD POSITIVE AND RHD NEGATIVE AMONG THE STUDENTS OF PESHAWAR, PAKISTAN

Saifullah Bacha¹, Murad Ali², Izaz Ullah³, Fawad Ahmad Noor⁴

ABSTRACT

OBJECTIVES

This study aims to find the prevalence of ABO blood Group and Rh D among the Students of Peshawar, Pakistan.

METHODOLOGY

It was a cross-sectional study conducted at the private paramedical institute of Peshawar over six months. Three hundred and fifty (350) students from different paramedical institutes participated. This study was conducted to determine blood groups in the paramedical institute. The blood of each student was collected by venipuncture techniques. Lancet was used for blood taking. Blood groupings were performed using commercially available Anti-sera A, B, and D as reagents for blood grouping.

RESULTS

Blood group A was prevalent (31.7%), followed by blood group B (31.1%), O (28.3%), and AB (8.9%). The Rh D distribution also varies among the four ABO blood group types. The total percentage of Rh D positive was (86.3%), and the Rh D negative was (13.7%).

CONCLUSION

This study concluded that blood group A was the most common among the other blood groups: B, O and AB.

KEYWORDS: ABO, Blood Group, Phenotype, Rh Factor

How to cite this article:

Bacha S, Ali M, Ullah I, Noor FA. The Prevalence of ABO Blood and RhD Positive and RhD Negative among the Students of Peshawar, Pakistan. J Wazir Muhammad Inst Paramed Tech. 2022;2(2): 19-22

Correspondence

¹Saifullah Bacha, Lab Technician, Shahab Clinical Laboratory, Barikot, District Swat

☎: +92-349-4429293

✉: saif1188bacha@gmail.com

²Lab Technician, Amreek Clinical Laboratory, Saidu Sharif Swat

³Lab Technician, Shifa Clinical Laboratory, District Dir Khall

⁴Clinical Technician, Pathology Department, Hayatabad Medical Complex, Peshawar

INTRODUCTION

Karl Land Steiner was the first person who discovered the blood groups and noted the erythrocyte agglutination properties of individuals from the serum of others.¹ In 1901 around 20 different types of blood grouping systems were discovered. However, ABO and RH blood grouping systems were essential in blood

transfusion and organ transplantation.² The fourth type of ABO was discovered by Adrian Sturli and Alfred von de Castello in 1902.³ Blood groups A, B, AB, and O are the main types of blood groups. A, B, and AB are antigens on the surface of red cells reacting with opposite antibodies. Blood groups A and B have surface antigens A and B, respectively. AB Blood group has both A and B antigens with no antibodies acting as universal acceptors. At the same time, the O Blood group has no surface antigen acting as a universal donor.⁴ Blood groups antigens may be essential in genetic research, blood transfusion, organ donation, anthropology, and human ancestral relation. ABO and Rh blood groups are the most suitable antigens, as their incompatibility with the Rh group leads to hemolysis and hemolytic disease in newborns.⁵ The blood system of ABO blood is the only one in which erythrocytes are present

consistently and predictably in sera from healthy individuals that contain antigens.⁶ Among them, the most critical systems are ABO and Rhesus. In the Rh system, blood groups are classified as Rh negative and Rh positive, depending on the presence of the Rh antigen D on the surface of red blood cells. Rh-positive blood drop has agglutination, while Rh-negative has no agglutination.⁷ RH blood grouping systems are helpful in the prevention of erythroblastosis, especially in fetalis. When the fetus is Rh positive, and the mother is Rh negative, Rh incompatibility causes significant problems in some pregnancies.^{8,9} Allogeic immunity reduces the incidence of hemolytic disease in infants by more than 90%. Necessary for up to 1% of all pregnant women with antibodies.¹⁰ With the help of this study, the frequency of blood groups is estimated and will be used to assist in the preparation of records for the institutional blood bank, helping in disease awareness among them. For blood transfusion, the youth needs to know their blood group in emergency conditions.¹¹ Frequency distributions of ABO and Rh blood groups from various populations of the world and Pakistan have been reported. However, no such types of study have been conducted for district Peshawar, especially from paramedical students. In the present study, we first report ABO and Rh blood group polymorphisms from the paramedical students, which will be helpful in case of emergency and blood transfusion.

METHODOLOGY

A Retrospective cross-sectional study was applied to determine blood groups among paramedical students of Peshawar. Three hundred and fifty (350) paramedical students from different institutes participated in this study. The study duration was six months. Each participant was recruited through a convenient sampling technique, and informed consent was taken. Each student's blood was collected by venipuncture techniques and the finger prick method. After collecting blood, we draw the blood into an EDTA tube and mix it well. Then we take a clean tile/slide and put three drops of blood. A drop of each Anti-sera A, B, and D was added and mixed correctly. The agglutination was observed, and noted the result. ABO blood grouping is based on the principle of an agglutination reaction.

RESULTS

Table 1: The Distribution of Participants in the ABO Blood Grouping

Blood Group	f (%)
A Positive	99 (28%)
B Positive	93 (27%)
O Positive	81 (23%)
AB positive	29 (08%)
O Negative	18 (05%)
B Negative	16 (05%)
A Negative	12 (03%)
AB Negative	02 (01%)

Table 2: Gender-Wise ABO Blood Groups among Students

Blood Groups	Males (n 315)	Females (n 35)	Total (n 350)
A	99 (31.4%)	12 (34.3%)	111 (31.7%)
B	101 (32.1%)	08 (22.8%)	109 (31.1%)
AB	28 (8.9%)	03 (8.6%)	31 (8.9%)
O	87 (27.6%)	12 (34.3%)	99 (28.3%)

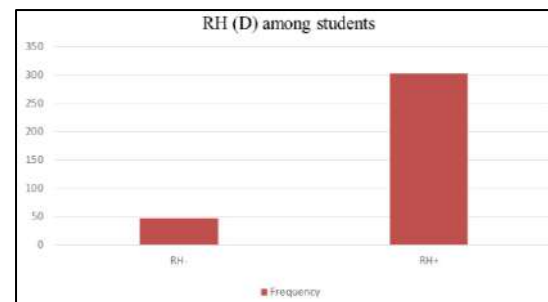


Figure 1: RH(D) among Students

DISCUSSION

The distribution of blood group ABO changes from one individual to another. Other studies conducted in Libya blood group A (30.17%) and AB (8.96%) were found to be the most prevalent. In contrast, O (37.44%) and B (23.43%) were the least.¹² In Ethiopia, the study showed the percentages of blood group O (41.20%), A (34.96%), AB (3.34%) and B (20.48%), respectively.¹³ The study reported that in Nigeria, frequencies of the blood group were AB<B<A<O (3.66%), 20.64%, (22.77%) and 52.93%.¹⁴ In rural southwestern Uganda, the distribution of blood groups A, B, AB, and O were (24.6%), (20.7%), (4.5%) and (50.3%) respectively.¹⁵ These studies support our results. In our current study, the distribution of the ABO blood group among the male and female participants was per the other study conducted in District Dir, upper Pakistan, which is less similar to our current study. The percentage population of males A, B, AB and O were (16.6%), (15.4%), (6.3%) and (9.8%) and the female ratio of A, B, AB and O (15.5%), (14.4%),

(6.1%) and (15.9%).¹⁶ In Our study, the Rh – D distribution of the ABO blood group based on antigen were A positive, B positive, AB positive and O positive (28.3), (26.6), (8.3) and (23.1) while the distribution of A negative, B negative, AB negative and O negative were (3.4), (4.6), (0.6) and (5.1) respectively. In another study conducted at Gomal Medical College, Pakistan, the frequency of A positive (25.60%) was higher than the other blood groups. This study compared with our study, we concluded that blood group A, O positive and AB negative were similar.¹⁷ The Rh-D distribution also varies among the four ABO blood group types. The total percentage of Rh-D positive was (86.3%), and the Rh-D negative was (13.7%). In Saudi Riyadh, the incidence of Rh D positive and negative were (84.8%) and (15.2%) respectively.¹⁸ These studies are similar to our study. Blood grouping is the most crucial test and is helpful in emergency conditions. They were helping with disease awareness among them. It provides primary data for future research in this field and is also valuable for clinicians and various blood donor associations.

LIMITATIONS

There should be multiple factors that affect patients satisfaction, but this study was not recorded. The sample size was small because we could not generalize it to other populations. In this study, the data is specific to Peshawar. It may be extended to other cities of the country to draw more holistic results.

CONCLUSIONS

This study concluded that most students have no idea about their blood group. We found that blood group A was the most common group among the other blood groups: B, O and AB. The total percentage of Rh D positive was (86.3%).

CONFLICT OF INTEREST: None

FUNDING SOURCES: None

REFERENCES

- Jabin F, Waheed U, Ahmed S, Arshad M, Arshad A, Zaheer HA. Red blood cell phenotyping of blood donors in Islamabad, Pakistan. *Global Journal of Transfusion Medicine*. 2018 Jan 1;3 (1):26.
- Sabir A, Iftikhar A, Ijaz MU, Hussain G, Rasul A, Iqbal RK, Sajid F, Anwar H. Retrospective study of frequency of ABO and Rhesus blood group among population of Safdarabad and Faisalabad cities of Pakistan. *BMC Research Notes*. 2021 Dec; 14 (1):1-5.
- Apecu RO, Mulogo EM, Bagenda F, Byamungu A. ABO and Rhesus (D) blood group distribution among blood donors in rural south western Uganda: a retrospective study. *BMC research notes*. 2016 Dec;9(1):1-4.
- John S. Prevalence of ABO and Rhesus blood groups in blood donors: a study from a tertiary care centre in South Kerala. *Int J Contemp Med Res*. 2017;4(11):2314-6.
- Girma N, Petros Y. Frequency of ABO, Rh Blood Group Alleles Among Oromo, Amhara and Wolayita Ethnic Group Students in Robe Secondary, Preparatory and Zeybela Primary School, Bale, Ethiopia. *Ethiopia. IJGG*. 2017 Jun 1;5(2):19-26..
- Canizalez-Román A, Campos-Romero A, Castro-Sánchez JA, López-Martínez MA, Andrade-Muñoz FJ, Cruz-Zamudio CK, Ortíz-Espinoza TG, León-Sicairos N, Gaudrón Llanos AM, Velázquez-Román J, Flores-Villaseñor H. Blood groups distribution and gene diversity of the ABO and Rh (D) loci in the Mexican population. *BioMed research international*. 2018 Apr 23; 2018.
- Ahmed M, Memon A, Iqbal K. Distribution pattern of ABO and Rhesus blood groups among different ethnic population of Karachi. *J Pak Med Assoc*. 2019 Oct 1; 69(10):1474.
- Shams S, Afridi SG, Waddod A, Iqbal M, Munir M, Shams U, Khan M, Yousaf S. Frequency Distribution of ABO, Rh Blood Groups among the.
- Chanko KP. Frequency of ABO blood group and Rh (D) negative mothers among pregnant women attending at antenatal Care Clinic of Sodo Health Center, SNNPR, Ethiopia. *Am J Clin Exp Med*. 2020; 8:10-4.
- Paridar M, Shoushtari MM, Kiani B, Nori B, Shahjahani M, Khosravi A, Far MJ. Distribution of ABO blood groups and Rhesus factor in a Large Scale Study of different cities and ethnicities in

- Khuzestan province, Iran. Egyptian Journal of Medical Human Genetics. 2016 Jan 1; 17(1):105-9.
11. Mohamud MH, Aweis AD, Adam AS, Mohamed FA, Fidow SQ, Mohamed LM. Distribution and Frequency of ABO and Rhesus (D) Blood Groups in Somalia: A Retrospective Study on Students of Jazeera University, Mogadishu-Somalia. BioMed Research International. 2022 Jan 30; 2022.
 12. Saad KA. Distribution of ABO blood groups and resus factor (RH) in Albiyda/Libya. JMDSR. 2016;3:28-31.
 13. Golassa L, Tsegaye A, Erko B, Mamo H. High rhesus (Rh D) negative frequency and ethnic-group based ABO blood group distribution in Ethiopia. BMC research notes. 2017 Dec; 10(1):1-5.
 14. Anifowoshe AT, Owolodun OA, Akinseye KM, Iyiola OA, Oyeyemi BF. Gene frequencies of ABO and Rh blood groups in Nigeria: A review. Egyptian Journal of Medical human genetics. 2017; 18(3):205 10.
 15. Apecu RO, Mulogo EM, Bagenda F, Byamungu A. ABO and Rhesus (D) blood group distribution among blood donors in rural south western Uganda: a retrospective study. BMC research notes. 2016 Dec; 9(1):1-4.
 16. Shah H, Haram U, Naz F, Haseeb A, Ullah R, Jan A, Shah S. Distribution of Abo and Rhesus Blood Groups in general population of district Dir Upper. Pak J Physiol. 2016 Dec 31;1212(44):37-9.
 17. Amin S, Ahmad J, Khan MS, Khan A, Khan RH, Umar M, Rehan M, Ullah S, Ullah B, Sanai M, Zia A. Frequency of ABO, Rh and ABO-Rh blood groups in students of Gomal Medical College, DI Khan, Pakistan. Gomal Journal of Medical Sciences. 2020; 18(1):306.
 18. Elsayid M, Al Qahtani FS, Al Qarni AM, Almajed F, Al Saqri F, Qureshi S. Determination of the frequency of the most immunogenic Rhesus antigens among Saudi donors in King Abdulaziz Medical City–Riyadh. Journal of Natural Science, Biology, and Medicine. 2017 Jan;8(1):56.

CONTRIBUTORS

1. **Saifullah Bacha** – Concept & Design; Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval
2. **Murad Ali** – Data Acquisition; Data Analysis/Interpretation
3. **Izaz Ullah** – Data Analysis/Interpretation
4. **Fawad Ahmad Noor** - Supervision



LICENSE: JWMIPT publishes its articles under a Creative Commons Attribution Non-Commercial Share-Alike license (CC-BY-NC-SA 4.0).
 COPYRIGHTS: Authors retain the rights without any restrictions to freely download, print, share and disseminate the article for any lawful purpose. It includes scholarly networks such as Research Gate, Google Scholar, LinkedIn, Academia.edu, Twitter, and other academic or professional networking sites.