

Distribution of ABO and Rh Blood Groups Among medical students in Telangana.¹Harish Kumar B., ²Akshay Berad¹Assistant Professor ,Dept. of Physiology, Mamata Medical college. Khammam, Telangana.²Assistant Professor, Dept. of Physiology, Chalmeda Anandrao Institute of Medical Sciences, Karimnagar, Telangana, India.**Correspondence Author:** Dr Akshay Berad, Assistant Professor, Physiology, Chalmeda Anandrao institute of medical sciences, Bommakal, Karimnagar 505001, Telangana.**Conflicts of Interest:** Nil**Abstract**

An important milestone in the history of blood transfusion was the discovery of the ABO blood groups by Karl Landsteiner, followed by discovery of Rh (D) antigen. Landsteiner's achievements lead to several discoveries in the field of immunohaematology. The ABO blood group is useful in selecting the appropriately matched blood group during blood transfusion, organ transplantation, finding out association of blood groups and diseases etc. ABO blood group system classifies blood groups of people into four different types namely A, B, O and AB. The need for the study of frequency distribution of blood group is multipurpose. This study was done to know the frequency distribution of blood groups among medical students. This study was conducted on 200 medical students in the Department of Physiology at medical college in Telangana state. The blood samples were collected by finger prick method. ABO blood grouping and Rhesus factors (Rh) typing determined by glass slide method. Out of total 200 medical students who volunteered, 92 were males and 108 females. . In our study, the most frequently occurring blood group was O (39%) followed by B group (34%), A group (21%) and AB group(6%) . 188(94%) students were Rh positive whereas only 12 (6%) were Rh negative. This study may enable us to contact individuals belonging to a particular

blood group at times of medical emergencies when blood transfusion is required.

Keywords: ABO, Rh-D, Blood group system**Introduction**

ABO and Rhesus (Rh) blood group systems till today remain clinically most important in spite of being identification of around twenty nine blood group systems, enumerated by International Society of Blood Transfusion. In 1900, Karl Landsteiner detected the human ABO blood group.[1] The Rh blood group system was discovered during 1939–1940 by Landsteiner, Weiner, Levine and Stetson, clarifying the basis of many unpredicted transfusion reactions. In 1945, Coombs, Mourant and Race described the use of antihuman globulin (Coombs test) for incomplete antibodies.[2] Later, these two systems have substantiated to be the most important in transfusion medicine. Today, the requirement for blood group frequency and prevalence studies is multiuse, besides their importance in relative to blood transfusion and organ transplantation. Human red blood cells contain on their surface a series of glycoproteins and glycolipids, which constitute blood group antigens. Development of these antigens are genetically controlled and they appear early in fetal life and remain unchanged till death [3]. The major ABO blood group system is divided into four blood types on the basis of presence or

absence of A and B surface antigens. The blood groups are A, B, O and AB. The frequency of four main ABO blood groups varies in the population throughout the world. ABO blood group system derives its importance from the fact that A and B are strongly antigenic and anti A and anti B naturally occurring antibodies present in the serum of persons lacking the corresponding antigen and these antibodies are capable of producing intravascular hemolysis in case of incompatible transfusion [4]. Rh antigens are highly immunogenic and till now 49 Rh antigens are identified. D antigen is most significant and D negative individuals produce anti-D if they encounter the D antigen through transfusion or pregnancy and causes hemolytic transfusion reaction, or hemolytic disease of fetus and newborn. For this reason, the Rh status is routinely determined in blood donors, transfusion recipients, and in mothers-to-be [5]. Acquiring knowledge on distribution of ABO blood groups at local and regional levels will not only be helpful in the effective management of blood banks but also in safe blood transfusion services [6]. Hence, the present study was planned with the aim of determining the distribution of ABO and Rh blood groups in healthy young adults in college. This study may enable us to contact individuals belonging to a particular blood group at times of medical emergencies when blood transfusion is required.

Materials and Methods

Study was conducted on first year MBBS medical students in the Department of Physiology at Medical College in Telangana State . Total of 200 medical students, 92 males and 108 females, samples were collected by finger prick method under aseptic precautions. The ABO blood grouping and Rhesus factors (Rh) typing determined by glass slide method, which is based on antigen antibody agglutination. Commercially available standard anti sera A, anti sera B and anti sera D were used for the study.

RBCs suspended in isotonic saline were treated with anti-A, anti-B and anti-D anti sera on separate glass slides, marked as A, B and D and mixed with separate applicator sticks. The mixture observed for agglutination, both macroscopically and micro scopically and compared with the control. The blood group was determined based on agglutination with the corresponding anti sera. If agglutination was present in the blood drop A , then it belongs to A blood group, agglutination in blood drop B, B group, agglutination in both A and B blood drops, AB group and if no agglutination in both A and B drops, then O group. Similarly, agglutination in blood drop D was considered as Rh Positive and no agglutination Rh negative. The data was expressed as percentages.

Results

Table : Frequency distribution of different blood groups among medical students

Blood groups	Males N=92	Females N=108	Total N=200
A	21 (22.82%)	21 (19.44%)	42 (21%)
B	31 (33.69%)	37 (34.25%)	68 (34%)
O	33 (35.86%)	45 (41.66%)	78 (39%)
AB	07 (7.60%)	05 (4.62%)	12 (06%)
Rh positive	85 (92.39%)	103 (95.37%)	188 (94%)
Rh negative	07 (7.60%)	05 (4.62%)	12(06%)

Out of total 200 medical students who volunteered, 92 were males and 108 females. The results are illustrated in Table . In our study, the most frequently occurring blood group was O (39%) followed by B group (34%), A group (21%) and AB group(6%) . 188(94%) students were Rh positive whereas only 12 (6%) were Rh negative. 92.39% males were Rh positive , 7.6% males Rh negative . 95.37% females were Rh positive and 4.62% females were Rh negative.

Discussion

Blood grouping is an important parameter for social, professional and medical needs. In the present study, the frequency of blood group O was the highest (39%) and

the least frequency was that of blood group AB (6 %). Several studies within the Telangana state [7] and rest of India [8-12] and other countries [13-15] have reported variations in the blood group distribution in diverse populations. This study helped in analyzing the distribution of blood groups among college students who comprise a heterogeneous population within this region

Conclusion

The study confirms that blood group O was the commonest of the ABO blood group system among the medical students studied and AB blood group was the least. Rhesus positive was commoner than Rhesus negative. Knowledge of blood group distribution is important for clinical studies, for reliable geographical information, blood bank management and for forensic studies in the population. . Such a study would create awareness about self-blood grouping and also enable one to prepare a database of the available blood groups which can be utilized during medical emergencies for safe blood transfusion.

References

[1]. Garratty G, Dzik W, Issitt PD, et al. Terminology for blood group antigens and genes-historical origins and guidelines in the new millennium. *Transfusion* 2000;40(4):477-89.

[2]. Hillyer CD. Blood banking and transfusion medicine—history, industry, and discipline. In: Shaz BH (ed) *Transfusion medicine and hemostasis*. Amsterdam: Elsevier, 2013;p 3-9.

[3]. Firkin F, Chesterman C, Penington D, Rush B. Blood groups; blood transfusion; acquired immune deficiency syndrome. In : de Gruchy's clinical hematology in medical practice. 5th ed, New Delhi, Oxford University Press; 1989. p. 475-96.

[4]. Harmening MD, Firestone D. The ABO blood group system. In: Harmening MN, editor. *Modern Blood*

Banking and Transfusion Practices.5th ed. USA: FA Davis Company, Philadelphia, USA. 2005. p. 108-32.

[5]. Bethesda DL. Blood Groups and Red Cell Antigens. In: *The Rh blood group*. USA: National Center for Biotechnology Information; 2005. p.1-6. (Retrieved on 23 April 2013 from <http://www.ncbi.nlm.nih.gov/books/NBK2269/pdf/ch07Rh.pdf>).

[6]. Patel Piyush, Patel Sangeeta, Shah Jigesh and Oza Haren. Frequency and Distribution of blood groups in donors in Western Ahmedabad-A Hospital based study. *National Journal of Medical Research* 2(2), 2012, 202-206.

[7]. Sudhir Kumar Vujhini, Pandu Ranga Rao Sangapati, Mahesh Kandukuri. Frequency and Distribution of Blood Groups in Blood Donors of Tertiary Care Hospital in Rangareddy District of Telangana State, India. *Medical Science*, 2014, 10(40), 95-98.

[8]. N. Mohan Rao, Bhavana Grandhi, Vissa Shanthi, Syam Sundar Rao Byna, Swathi Sreesailam & B. Krishna Murthy. Study of Blood Groups in Blood Donors in Narayana Medical College & Hospital, Nellore (AP), India, *International Journal of Current Medical And Applied Sciences*, vol.6. Issue 2, 2015, 110-113.

[9]. Dr. Krishna M C, Dr.Sharadha.M S, Dr Raman M Hulinaykar, Dr.Harish S G. Frequency and Distribution of ABO and Rhesus (D) Blood Groups In And Around Tumkur, Karnataka, Study From Tertiary Care Teaching Hospital, *International Journal of Healthcare Sciences*, Vol. 2, Issue 1, 2014, 135-139.

[10]. Purandare VR and Prasad NB. Distribution of ABO Blood Groups in Healthy Young Adults in Pune City, *International Journal of Basic and Applied Medical Sciences* ISSN: 2277-2103, Vol. 2 (3), 2012, 74-78.

[11]. Katingpou Panmei1, Premjit Yumnam, Gaikhuanglung Ngaomei. Frequency Distribution of ABO

and Rh Blood Groups among Students of Maram Tribe of Don Bosco College, Maram, Manipur. *Int. J. Pure App. Biosci.* 2 (4): 2014, 61-66.

[12]. Sidhu S. Distribution of the ABO Blood Groups and Rh Factor Among the Scheduled Caste Population of Punjab. *Anthropologist.*5, 2003, 203–204.

[13]. Olubayode Bamidele, Dennis S. Arokoyo and Abiola O. Akinbola. Distribution of ABO and rhesus blood groups among medical students in Bowen University, Iwo, Nigeria, *Annals of Biological Research*, 4 (11): 2013, 1-6.

[14]. Rayhana Sultana, Zaida Rahman, Asadul Mazid Helali, Rabeya Yousuf, Shyamoli Mustafa, Abdus Salam, Mainul Haque. Study of ABO and RH-D Blood Groups Among the Common People of Capital City of Bangladesh, *International Journal of Pharmacy and Pharmaceutical Sciences*, Vol 5, 2013, Issue 3, 814-816

[15]. Hamed A, Hussain W, Ahmed J, Rabbi F, Qureshi J A. Prevalence of Phenotypes and Genes of ABO and Rhesus (Rh) Blood Groups in Faisalabad, Pakistan. *Pak J Biol Sci*, 5, 2002, 722–724.