

Prevalence of ABO and Rhesus Blood Group among Students of Mata Gujri College

**Dr Manjusha Pouranik, Dr Sangeeta Sarkhel, Mrs Rajni Gupta, Dr Mahima Tripathi
Mata Gujri Mahila Mahavidyalaya Jabalpur (M.P.)**

Background

India is a large country with a wide variety of racial, religious, and cultural backgrounds. The geographic distribution of blood types among the people within a nation has shown the same variability. The two most significant blood types in humans are Rh and ABO. Goals: Between January 2021 and December 2022, a retrospective study was carried out to compare and ascertain the distribution of the Rh and ABO blood groups.

Materials and Methods

The Zoology Department of Mata Gujri Mahila Mahavidyalaya Jabalpur conducted a retrospective study spanning one year. Information regarding the blood types of the students was gathered from the department's wellness club. Results: 585 students in all studied from January 21 to December 22. Blood group 'A' accounted for 196 (23.5%), 'B' for 246 (28.5%), 'AB' for 58 (17%), and 'O' for 71% of the total numbers. In both Rh D positive and Rh D negative people, blood group "O" was the most common, followed by blood group "B." Blood type "AB" was the rarest.

Conclusion

Our population has a relatively low "AB" blood group and a much higher "O" blood group. In order for students and society as a whole to be able to donate blood to blood banks and transfusion programs that may improve patient care, it is imperative that blood group distribution be studied.

Keywords: ABO blood group, Rh (D) factor

Introduction

Approximately 400 erythrocyte antigens have been discovered to date. They were divided into 30 blood group systems by the International Society of Blood Transfusion, of which the ABO and Rh systems are crucial for transfusion purposes [1].

Karl Landsteiner's 1900 discovery of the A, B, and O blood groups was a significant development in the history of blood transfusion. The fourth kind, AB, was discovered in 1902 by Adriano Sturli and Alfred Von DE Castello. Landsteiner and Weiner made the discovery of the later Rh group in 1941 [2].

Blood types are predetermined by genetics. Mendelian fashion inherits the great majority. On chromosomes 9 and 1, respectively, are the genes for ABO and Rh (D) [3]. ABO and Rh group occurrence vary significantly among racial and ethnic groupings, across geographic boundaries, and occasionally within the same region [4].

In addition to being crucial for efficient management of the blood bank inventory, understanding the Rh and ABO blood group systems is also helpful for forensic investigations, population genetic studies, and the study of population migration trends [1].

Additionally, blood types have been linked to a number of illnesses, including cancer, diabetes, urinary tract infections, Rh incompatibility, duodenal ulcers, and cardiovascular disorders [5].

Materials

and

Methods

A year-end retrospective analysis was conducted at our department of zoology. The pupils belonged to the 20–25 year old age range.

By puncturing using a lancet, blood samples were obtained. Following validation, commercially available antisera against A, B, and D were utilized for agglutination reactions. On a proforma that was expressly designed, data was entered and examined.

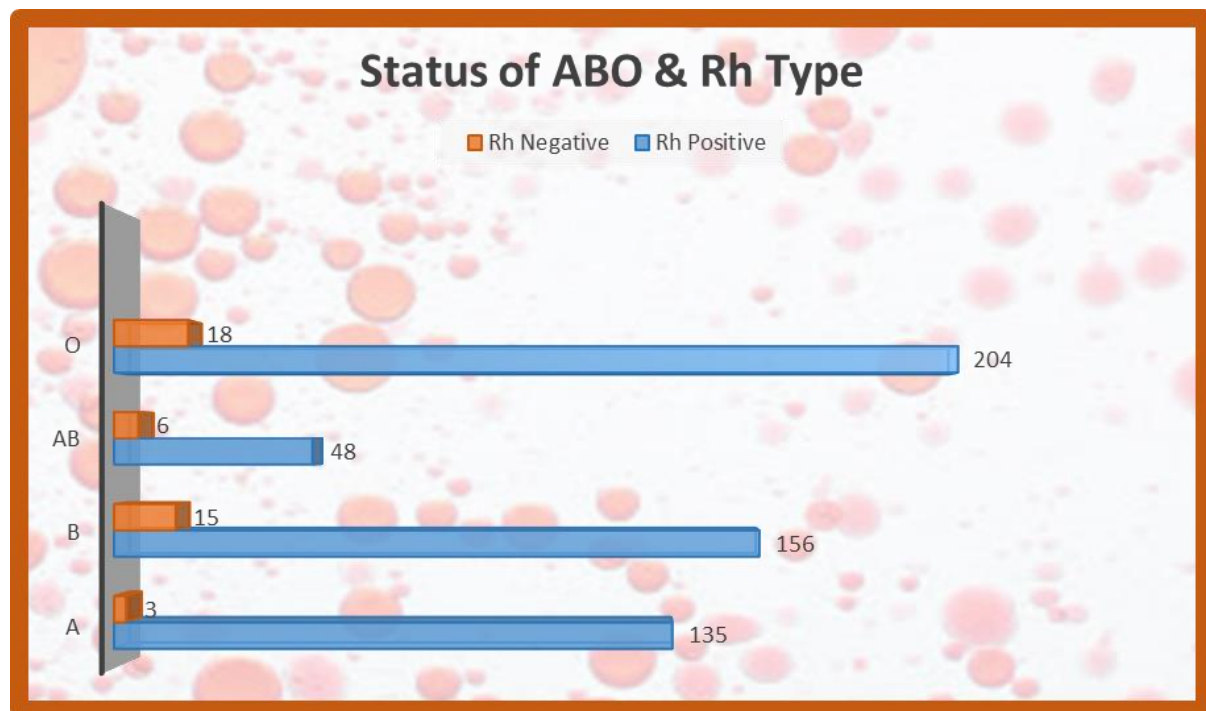
Observations and Results

The total donors studied from January 2021 to December 2022 were 585. Out of these 585 subjects 204 (68%) were O positive and 18 (3%) were O negative with highest frequency. The lowest with AB positive 48(16%) and A negative(0.5%)The frequency of ABO and Rh blood groups in the studied population is shown in Table 1.

Table 1: Frequency Distribution of ABO and Rh blood groups in the current study

ABO Blood group	Rh Positive	Percentage (%)	Rh Negative	Percentage (%)	Total	Total Percentage (%)
A	135	23%	3	0.5%	138	23.5%
B	156	26%	15	2.5%	171	28.5%
AB	48	16%	6	1%	54	17%
O	204	68%	18	3%	222	71%
Total	543	133%	42	7%	585	140%

The distribution of blood groups was: blood group ‘A’ 138 (23.5%), ‘B’ 171 (28.5%), ‘AB’ 54 (17%) and ‘O’ 222 (71%).



In both Rh D positive and Rh D negative person’s blood group ‘O’ was the commonest followed by blood group ‘B’. Blood group ‘AB’ is the least common. We compared our data with various studies conducted both inside and outside India as can be seen in Table 2.

Table 2: Comparative study on frequency of ABO and Rh phenotypes at different geographical areas

Within India	A	B	AB	O	Rh Positive	Rh Negative
Current Study in South India	20%	35.8%	7.3%	36.9%	96.28%	3.72%
Bangalore	23.85%	29.95%	6.37%	39.82%	94.2%	5.8%
Chittoor	18.95%	25.79%	7.89%	47.37%	90.6%	8.42%
Vellore	21.86%	32.69%	6.7%	38.75%	94.5%	5.5%
North India	21.7%	39.8%	9.33%	29.1%	95.71%	4.29%
West India	21.94%	39.4%	7.86%	30.79%	95.05%	4.95%
Central India	24.15%	35.25%	9.10%	31.5%	95.43%	4.57%
East India	23.9%	33.6%	7.7%	34.8%	94.7%	5.3%
OUTSIDE INDIA						
USA	41%	9%	4%	46%	85%	15%
Britain	41.7%	8.6%	3%	46.7%	83%	17%
Australia	38%	10%	3%	49%	NA	NA
Pakistan	22.4%	32.4%	8.4%	30.5%	93%	7%
Nepal	34%	29%	4%	33%	96.7%	3.33%

Discussion

The blood group distribution in India is highly diverse. Understanding the frequency of blood groups is crucial for assessing a young adult's state. Knowing your own blood type is crucial since it may facilitate voluntary donation. According to our research, a significant portion of women in the menstrual age group are underweight and anemic. Since the majority of the pupils exhibit low body weight, poor concentration, and anemia, they have also been deemed ineligible to donate blood [6]. O > B > A > AB was the predominant ABO blood group in the current study's total sample, which was consistent with other studies done in South India (Bangalore, Chittoor, and Vellore) [9,10,11]. India's blood type distribution by geography demonstrates. Studies conducted internationally in the USA [12], UK [13], Australia [14], and Pakistan [15] revealed that the 'O' blood group is the most common. The "A" blood group was discovered to be somewhat more common than the "O" blood group only in Nepal, which is connected to Western India [16].

In terms of the Rhesus system, 92.28% of participants in our study were Rh positive, compared to just 7.72% who were Rh negative. These numbers are consistent with those from other research projects conducted throughout India. The majority of groupings are Rh positive. Comparatively, research conducted in the United States and Great Britain revealed a greater percentage of Rh negative group prevalence than equivalent frequencies of Rh group prevalence discovered in Nepal.12–13–16.

Conclusion

Understanding blood types is crucial for transfusion services, which improve the health of patients. Reducing rates of morbidity and death will be made easier with access to a sufficient and safe blood supply. Our research has important implications for Mata Gujri College's creation of a basic blood group database. It helps to enable insight into potential future burden of blood type associated disorders in addition to providing scientific data.

Funding: Nil, **Conflict of interest:** None initiated.

References

1. A Patel Piyush, P Patel Sangeetha, V Shah Jigesh, V Oza Haren. Frequency and Distribution of Blood Groups in Blood Donors in Western Ahmedabad – A Hospital Based Study. *Natl J Med Res.* (2012); 2(2): 202-206.
2. SK.Mishra, Naresh Bajaj, Prabhakar Singh, Keshav Singh, Pallavi Indurkar. Frequency & distribution of ABO and RH (Factor) blood groups among medical students of Central India, Rewa, Madhya Pradesh. *IJPCBS.* 2014; 4(4) : 980-984.
3. Himanshu shekhar, Ashmeet Kaur, Pooja Jadeja, Parihar, P. M. & Ketan K Mangukiya. Frequency and distribution of ABO blood group and RH (D) factor in Southern Rajasthan. *I.J.S.N.* 2014; 5 (3) : 494-497.
4. Gadwalkar Srikant R, Sunil Kumar N, Ravidhar. Distribution of Blood Groups in and around Bellary, Karnataka. *Indian Journal of Clinical Practice.*2013; 24 (3) : 247 – 250.
5. 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 Transfus Sci.* 2008 Jan;2(1):3-5. doi: 10.4103/0973-6247.39502. [PubMed]
6. Garg P, Upadhyay S, Chufal SS, Hasan Y, Tayal I. Prevalance of ABO and Rhesus Blood Groups in Blood Donors: A Study from a Tertiary Care Teaching Hospital of Kumaon Region of Uttarakhand. *J Clin Diagn Res.* 2014 Dec;8(12):FC16-9. doi: 10.7860/JCDR/2014/9794.5355. Epub 2014 Dec [PubMed]
7. Mallikarjuna S. Prevalence of ABO and Rhesus blood group among blood donors. *Indian Journal of Public Health, Research and Development.* 2011.
8. Giri P A, Yadav S, Parhar G S, Phalke D B. Frequency of ABO and Rhesus Blood Groups: A Study from a Rural Tertiary Care Teaching Hospital in India. *Int J Biol Med Res.* 2011; 2 (4): 988–990.
9. Periyavan S, Sangeetha SK, Marimuthu P, Manjunath BK, Seema DM. Distribution of ABO and Rhesus-D blood groups in and around Bangalore. *Asian J Transfus Sci.* 2010 Jan;4(1):41. doi: 10.4103/0973-6247.59391. [PubMed]
10. Reddy K S N, Sudha G and Rh (D) blood groups among the Desuri Reddis of Chittoor District, Andhra Pradesh. *Anthropologist.* 2009; 11 (3): 237-238. [PubMed]
11. groups among blood donors in a tertiary care centre in South India. *Trop Doct.* 2001 Jan;31(1):47-8. [PubMed]
12. Mollison P L, Engelfriet C P, Conteras M. The Rh blood Group system. In *Blood Transfusion in Clinical Medicine*, 9th Edition. Oxford: Black well Scientific Publication.1993; 2008–9.
13. Frances TF: Blood groups (ABO groups). In: *Common Laboratory and Diagnostic Tests.* Philadelphia: Lippincott. 2002, 3rd Edition: 19–5.
14. Australian Red Cross society. All about blood. URL: ww.donateblood.com.au/all-aboutblood/blood-types.
15. Hammed A, Hussain W, Ahmed J, Rabbi F, Quersh J A. Prevalence of Phenotypes and Genes of ABO and Rhesus (Rh) blood groups in Faisalabad, Pakistan. *Pak J Biol Sci.* 2002,; 5(6):722- 724.
16. Pramanik T, Pramanik S. Distribution of ABO and Rh blood groups in Nepalese medical students: a report. *East Mediterr Health J.* 2000 Jan;6(1):156-[PubMed]