

Retrospective study on prevalence of negative ABO blood group antigens in a tertiary care hospital, North-east India.

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Abstract:

Aim: To study the prevalence of Rh negative ABO blood group antigens in a tertiary care hospital, North-east India.

Objective: To find out the prevalence of Rh negative ABO blood groups in a tertiary care hospital.

To identify the commonest type of Rh negative ABO blood group.

Methods and Materials: it is a retrospective study over last 5 years (2013 to 2018 February) done at blood bank of Tripura Medical College among voluntary blood donors.

Result: Total of 10000 cases over last 5 years (2013 to 2018, February) are studied and Rh negative ABO blood group cases are 329(3.29%) and O blood group shares the maximum (1.31 %) of Rh negative type.

Conclusion: The frequency of Rhesus (D) negative ABO blood group antigens is very low. The blood bank services need to develop innovative strategies targeting donors who are more likely to boost blood stocks in the region in reducing mismatched blood transfusion, maternal mortality rate and haemolytic disease in newborn, by assuring safe and sufficient blood supply when needed.

Keyword: ABO blood group, Rhesus blood group.

Date of Submission: 28-01-2019

Date of acceptance: 11-02-2019

I. Introduction

Distribution of Rhesus negative ABO blood group in a population is low and knowledge regarding its distribution is critical in managing a transfusion service in areas such as haemolytic disease in newborn, paternity testing as well as Rh negative individuals with subsequent blood transfusion. Karl Landsteiner's discovered ABO blood group system in 1900, but transfusion reactions were still prevalent. It was in 1940 when Landsteiner and Weiner discovered the Rh factor. After that to prevent mismatched transfusion Rh factor along with A, B antigens detection became mandatory for pre-transfusion testing^[1]. Currently there are more than 50 antigens in the Rh blood group system but the principal Rh antigens of medical interest are D, C, E, c and e^[2]. Rhesus positive person carries Rhesus antigen while Rhesus negative individuals are lacking the antigen. When a Rhesus negative person is exposed to Rhesus positive blood, antibodies will be produced, which cause potentially fatal haemolytic reactions. There is a lack of published data in Tripura describing the distribution of Rh negative blood group among blood donors. This study aims to determine the distribution of Rhesus negative ABO blood groups among blood donors in a tertiary care hospital in Tripura, Northeast India.

II. Methods And Materials

A retrospective study is done at blood bank of Tripura Medical College, Tripura, over a period of last 5 years (2013 to 2018, February). The data based on blood group of donors of either sex are studied. The donors with more than one entry are included once for the study. ABO and Rh grouping is done by agglutination test using anti-A, anti-B, anti-D sera and Gel technique.

Gel cards are used in the **Gel method**. The cards have microtubules filled with a dextran acrylamide gel containing anti-IgG. The gel acts as a filter for agglutinates. Patient serum and reagent red cells are added to the microtubules. The card is incubated at 37° C for 15 minutes and then centrifuged for 10 minutes. Washing and check cells are not required. If no agglutinates are present, the red cells form a pellet at the bottom of the gel, indicating that no clinically significant antibodies were detected. Agglutination indicates an antibody was detected. If large agglutinates are present, the red cells form a layer at the top of the gel. Small agglutinates are dispersed throughout the bottom of the gel. Gel technique have been found to be more sensitive than

conventional serological techniques, particularly for the detection and identification of clinically significant antibodies, provide greater reliability of results and enhance standardisation and control of laboratory procedures.

A total of 10000 donors are studied for their blood groups and the percentage of Rh negative ABO blood group is calculated.

III. Result

Total **10000** donors are studied from 2013 to 2018 February and only **329** donors are found to be Rh negative.

Table 1: Year wise distribution of total number of Rh negative ABO blood groups among total donors.

Year	A group Rh negative	B group Rh negative	O group Rh negative	AB group Rh negative	Donors
2013	15	22	34	07	2276
2014	12	18	14	03	1568
2015	10	13	23	02	1650
2016	17	21	26	07	2340
2017	15	25	29	05	2034
2018	02	04	05	00	132
Total	71	103	131	24	10000

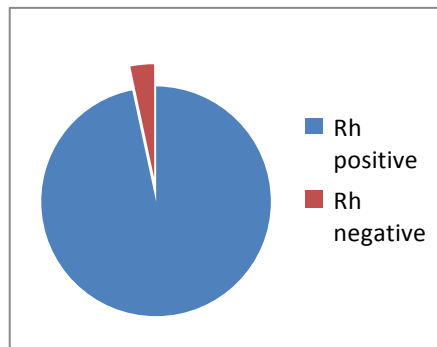
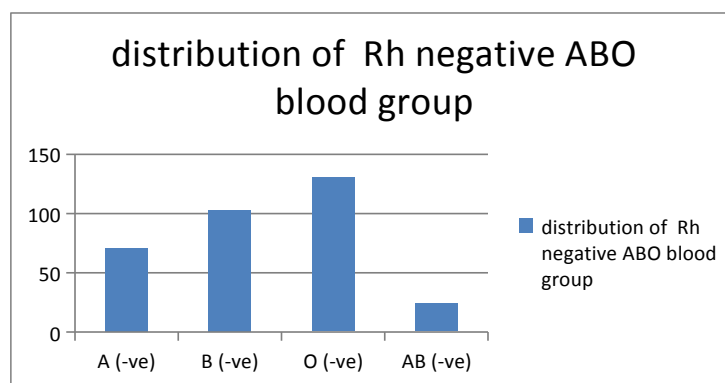


Table 2: Percentage wise distribution of different type of Rh negative ABO blood groups.

	Frequency
A group Rh negative	0.71%
B group Rh negative	1.03%
O group Rh negative	1.31%
AB group Rh negative	0.24%
Total	3.29%



The frequency of Rh negative ABO blood group is **3.29%** and O group of blood is sharing most of Rh negative type i.e. **1.31%**. second most common is B group Rh negative type(**1.03%**) followed by A group Rh negative type(**0.71%**) and lastly AB group Rh negative type(**0.24%**).

IV. Discussion

Rh status in ABO blood group determination is most important in clinical settings in order to ensure patient safety. Rh factor determination is crucial because of its marked immunogenicity. As individuals who do not produce the D antigen will produce anti-D if they encounter the D antigen on transfused red blood cells.

This causes haemolytic transfusion reaction or, in the case of newborn red blood cells, haemolytic disease of the newborn [3]. That's why determination of the Rh status in clinical settings and for research purposes is most important. Individuals who are Rhesus negative in our study are only **3.29%** in contrast to other studies, which showed a range between **2** and **8%**.

Population	Rh negative
Kashmir ^[4]	4.08%
Maharashtra ^[5]	2.55%
Bangalore ^[6]	5.86%
Nigeria ^[7]	5.70%
Pakistan ^[8]	8.60%
India ^[9]	5.87%

As well, this study shows the highest occurrence of O group Rh negative i.e. **1.31%**. followed by B group Rh negative type(**1.03%**) , A group Rh negative type(**0.71%**) and lastly AB group Rh negative type(**0.24%**) which corresponds with the study done by Kaur,Harjot et al^[10].

V. Conclusion

Blood bank and transfusion service is an important part in clinical setting in any region. The importance of this study lies here only. Knowing the status of blood group especially Rh negative blood group is mostly helpful in case of calamities and future disease burden for health care providers to face it with appropriate knowledge. Besides these it also helps in reducing mismatched blood transfusion and maternal mortality rate by assuring safe and sufficient blood supply when needed. Haemolytic disease of newborn can be preventable hence provides the knowledge of forensic study in population with its reliable geographical information.

References

- [1]. Lefrère J, Berche P. Landsteiner discovers the blood groups. *Transfus Clin Biol.* 2010;17(1):1–8.
- [2]. Gundrajukuppam DK, Vijaya SB, Rajendran A, Sarella JD. Prevalence of principal Rh blood group antigens in blood donors at the blood bank of a Tertiary Care Hospital in Southern India. *J Clin Diagn Res.* 2016;10(5):EC07–10.
- [3]. Bodmer W. Genetic characterization of human populations: from ABO to a genetic map of the British people. *Genetics.* 2015;199(2):267–79.
- [4]. Lato J, Masoodi NA, Bhat NA, Khan GQ, Kadla SA. The ABO and Rh blood groups in Kashmiri population. *Indian J for the Practicing Doctor.* 2005;3(2) 2006-5-2006-6.
- [5]. Chavhan, Aravind Allelic Frequency of ABO And Rh D Blood Group Among The Banjara Caste Population of Akola District, Maharashtra, India. 2011. Available from Nature Precedings <http://dx.doi.org/10.1038/npre.2011.5771.1> .
- [6]. 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;4:41.
- [7]. Falusi AG, Ademowo OG, Latunji CA, Okeke AC, Olatunji PO, Onyekwere TO, et al. Distribution of ABO and RH genes in Nigeria. *Afr J Med Med Sci.* 2000;29:23–6.
- [8]. Anees M, Jawad A, Hashmi I. Distribution of ABO and rh blood group alleles in Mandi Bahauddin district of Punjab, Pakistan *Proc. Pakistan Acad Sci.* 2007;44:289–94.
- [9]. Amit Agrawal, Aseem Kumar Tiwari, Nidhi Mehta, Prasun Bhattacharya, Ravi Wankhede, Sunita Tulsiani, Susheela Kamath; *Asian J Transfus Sci.* 2014 Jul-Dec; 8(2): 121–125. doi: 10.4103/0973-6247.137452.
- [10]. Kaur, Harjot; Khanna, Ashish; Manjari, Mridu; Khanna, Menka. **Asian Journal of Transfusion Science; Ahmedabad** Vol. 7, Iss. 2, (Jul/Dec 2013): 159-159.

Dr. Pallab kanti kar. “Retrospective study on prevalence of negative ABO blood group antigens in a tertiary care hospital, North-east India.” *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no.2, 2019, pp 24-26.