ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 12, Issue, 05, pp.11576-11579, May, 2020

DOI: https://doi.org/10.24941/ijcr.38674.05.2020

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

A COMPARISON OF PREVALENCE OF ABO AND RHESUS BLOOD GROUPS AT TWO PLACES IN NORTH INDIA & ONE PLACE IN NORTHEAST INDIA

***Chaudhary Veena**

Assistant Professor, Department of Physiology, World College of Medical Sciences & Research and Hospital, Jhajjar, Haryana, India, Pin-124103

ARTICLE INFO

Article History:
Received 18th February, 2020
Received in revised form
24th March, 2020
Accepted 28th April, 2020
Published online 30th May, 2020

Key Words: (A+) A Positive blood group, (B+) B Positive blood group, (AB+) AB Positive blood group, (O+) O Positive blood group, (A-) A Negative blood group, (B-) B Negative blood group, (AB-) AB Negative blood group, (O-) O Negative blood group, (RH)-Rockland Hospital, (WCMSRH)-World College of Medical Sciences & Research and Hospital, (JMCH)-Jorhat Medical College & Hospital.

ABSTRACT

In this study, the aim was to find out the prevalence of ABO & Rhesus blood groups in a group of persons at two places in North India & one place in Northeast India. In this study, the results showed that the prevalence of different blood groups among one group of 2140 patients evaluated at RH & WCMSRH in North India was approximately: B 35%, O 32%, A 23% & AB 10%. The results also showed that the prevalence of different blood groups among one group of 205 students evaluated at JMCH in Northeast India was approximately: O 35.5%, B 28%, A 27.5% & AB 9%. Thus, it is concluded that in the present studies at RH & WCMSRH in North India, B gene was most common, while in JMCH study in Northeast India, O gene occurred most frequently. The blood group A was 3rd most common blood group & the blood group AB was infrequent in all the 3 studies in India. The Rh negatives were about 07% in North India & about 04% in Northeast India.

Citation: ***Chaudhary Veena.*** **2020.**"A comparison of prevalence of ABO and Rhesus blood groups at two places in North India & one place in Northeast India", *International Journal of Current Research*, 12, (05), 11576-11579.

INTRODUCTION

Karl Landsteiner has been credited for the discovery of ABO blood group system in 1900. His extensive research on serology based on simple but strong scientific reasoning led to identification of major blood groups such as O, A, and B types, compatibility testing, and subsequent transfusion practices [Landsteiner, 1900]. Landsteiner discovered that human blood contain iso-agglutinins capable of agglutinating other human red blood cells [Landsteiner, 1900]. He was awarded the Nobel Prize for medicine in 1930 [Owen, 2000]. It was not until 1940 when Landsteiner and Weiner discovered the Rh factor that transfusion medicine involved less risk. Immunogenicity of the Rh factor along with A, B antigens made it mandatory for pre-transfusion testing [Lefrère, 2010; Gundrajukuppam, 2016]. 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 [Gundrajukuppam, 2016].

****Corresponding author: Chaudhary Veena,***
Department of Physiology, World College of Medical Sciences & Research and Hospital, Jhajjar, Haryana, India, Pin-124103.

A person with Rhesus antigen is referred to as Rhesus positive while individuals lacking the antigen are Rhesus negative. About 85 % of all white people are Rh positive and 15 % are Rh negative. In American blacks, the percentage of Rh positives is about 95 %, whereas in African blacks, it is virtually 100 % (Vaz Mario *et al*., 2013). Data from the low-to middle income countries are limited.

AIMS AND OBJECTIVES

To find out the prevalence of ABO & Rhesus blood groups in a group of persons at two places in North India & one place in Northeast India.

MATERIALS AND METHODS

Study Setting and Period of Study: The study was conducted at 3 different places in India as follows:

- Department of Pathology, Rockland Hospital in Delhi, North India during the period from 01 January 2012 to 07 August 2014,
- Department of Pathology, World College of Medical Sciences & Research and Hospital in Jhajjar, Haryana,

North India, during the period from 18 July 2018 to 31 January 2020 and
- Department of Physiology, Jorhat Medical College & Hospital in Jorhat, Assam, Northeast India during the period from 01 June 2015 to 30 June 2018.

Study Design: The study was a Hospital Based Study, conducted at 3 different hospitals in India.

Sample Size: For the present study, blood groups of a total of 2345 persons were evaluated as follows:

- Blood groups of 1240 patients were recorded and studied at Rockland Hospital in Delhi, North India, during the period from 01 January 2012 to 07 August 2014,
- Blood groups of 900 patients were recorded and studied at World College of Medical Sciences & Research and Hospital in Jhajjar, Haryana, North India, during the period from 18 July 2018 to 31 January 2020 and
- Blood groups of 205 MBBS students were recorded and studied at Jorhat Medical College & Hospital in Jorhat, Assam, Northeast India, during the period from 01 June 2015 to 30 June 2018.

Sampling Design:

- The study was done as Random Sampling of the patients that attended various clinical departments at Rockland Hospital in Delhi, North India, during the period from 01 January 2012 to 07 August 2014.
- The study was done as Random Sampling of the patients that attended various clinical departments at World College of Medical Sciences & Research and Hospital in Jhajjar, Haryana, North India, during the period from 18 July 2018 to 31 January 2020 and
- The study was done as Random Sampling of the MBBS students that studied at Jorhat Medical College & Hospital in Jorhat, Assam, Northeast India, during the period from 01 June 2015 to 30 June 2018.

Study Variables: ABO & Rhesus Blood Groups of Persons

Inclusion Criteria/ Selection Criteria

Participants in the study eligible for inclusion were:

- Patients of either sex of all age groups who attended Rockland Hospital in Delhi, North India.
- Patients of either sex of all age groups who attended World College of Medical Sciences & Research and Hospital in Jhajjar, Haryana, North India.
- MBBS students of either sex of all age groups that studied at Jorhat Medical College & Hospital, in Jorhat, Assam, Northeast India.

Neonates & children were included after obtaining proper informed written consent from their parent/guardian. Adult subjects were included after obtaining proper informed written consent from them.

Study Characteristics: In this study, the blood groups of 2345 persons were evaluated. The demographic information, history, physical examination, and type of blood group in the subject's questionnaire were recorded. In this study, blood group was recorded after collecting blood samples from subjects, under all aseptic procedures. Subjects that satisfied the inclusion criteria were selected and the subjects who did not meet the inclusion criteria were excluded.

Data Collection Methods and Tools: Subject's history information was collected in questionnaires and blood groups data were collected and reported, and then statistical analysis of data was performed using SPSS software. Calculations of P values were done using Quick Calcs-Graphpad Software.

Statistical Methods and Statistical Interpretation: Chi-square test was used to calculate Two-tailed P values in our study. When presenting P values, it was helpful to use the asterisk rating system as well as quoting the P value:

P < 0.05* , it is **statistically significant**,
P < 0.01 ** , it is **very statistically significant,
P < 0.001*, it is **extremely statistically significant**.

RESULTS AND OBSERVATIONS

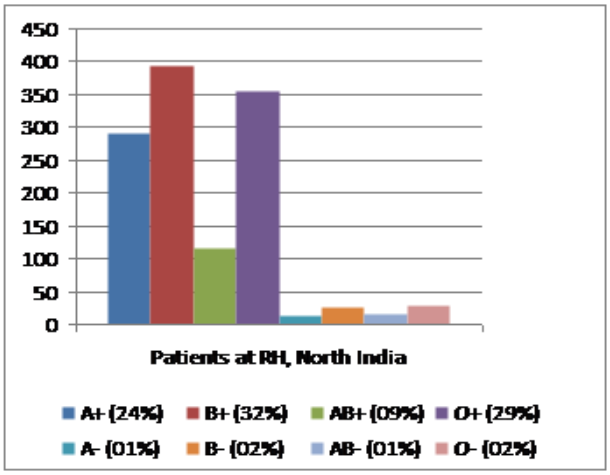

Figure 1. Bar Diagram showing prevalence of ABO & Rhesus blood groups in 1240 patients at RH in Delhi, North India.

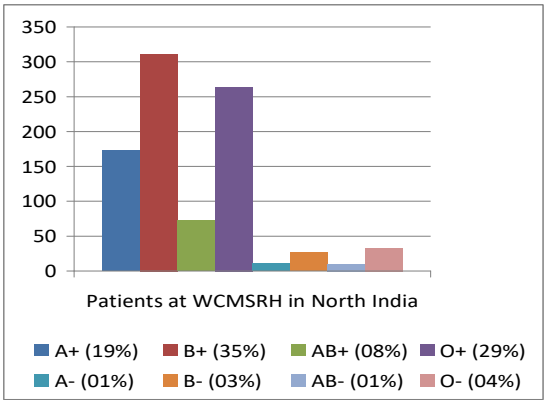

Figure 2. Bar Diagram showing prevalence of ABO & Rhesus blood goups in 900 patients at WCMSRH, in Haryana, North India

Table 1. Table showing prevalence of ABO & Rhesus Blood Groups in a group of 2140 patients in North India (RH & WCMSRH studies) & 205 students in Northeast India (JMCH study)

Population sampled	A+	A-	B+	B-	AB+	AB-	O+	O-	Rh+	Rh-	Total	P value
Patients at RH	291	013	394	025	116	016	356	029	1157	083	1240	<0.0001
Patients% at RH	24%	01%	32%	02%	09%	01%	29%	02%	94%	06%	100%	---------
WCMSRH Patients	173	011	311	026	072	010	264	033	820	080	900	<0.0001
WCMSRH Patients%	19%	01%	35%	03%	08%	01%	29%	04%	91%	09%	100%	---------
NorthIndia Patients	464	024	705	051	188	026	620	062	1977	163	2140	<0.0001
NorthIndia Patients%	22%	01%	33%	02%	09%	01%	29%	03%	93%	07%	100%	---------
JMCH Students	56	01	56	02	16	02	69	03	197	08	205	<0.0001
JMCH Students%	27%	0.5%	27%	01%	08%	01%	34%	1.5%	96%	04%	100%	---------

In this study, it is evident that the prevalence of different blood groups among one group of 2140 patients evaluated at RH & WCMSRH in North India was approximately: B 35% (B+ 33% & B- 02%), O 32% (O+ 29% & O- 03%), A 23% (A+ 22% & A- 01%) & AB 10% (AB+ 09% & AB- 01%). Thus, in this study, it is evident that the most common ABO blood group among one group of patients in North India was B, followed by O, further followed by A and AB. Overall, the Rh negatives were about 07% among the patients in North India. The blood group AB & Rh negatives (A-, B-, AB- & O-) were infrequent in both RH & WCMSRH studies in North India. The two-tailed P value was less than 0.0001***, in the Chi-square test in both the studies. By conventional criteria, this difference was considered to be extremely statistically significant.

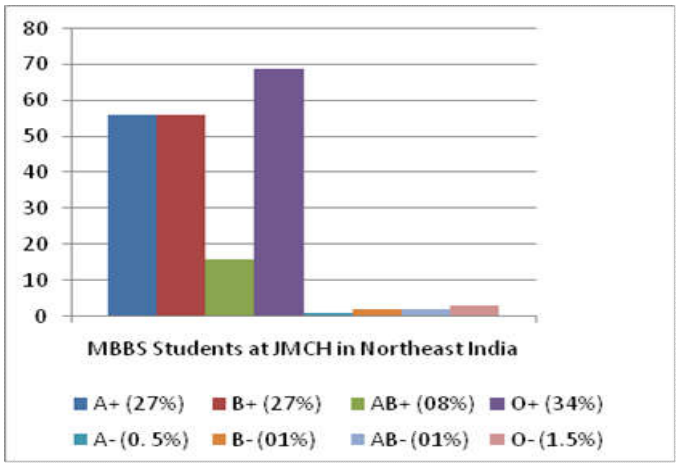

Figure 3. Bar Diagram showing prevalence of ABO & Rhesus blood groups in 205 MBBS Students at JMCH in Jorhat, Assam, Northeast India

In this study, it is evident that the prevalence of different blood groups among one group of 205 students evaluated at JMCH in Northeast India was approximately: O 35.5% (O+ 34% & O- 1.5%), B 28% (B+ 27% & B- 01%), A 27.5% (A+ 27% & A- 0.5%) & AB 9% (AB+ 08% & AB- 01%). Thus the most common ABO blood group among the MBBS Students at JMCH, in Assam (Northeast India) was O, followed by B & A, and further followed by AB. The Rh negatives were about 04% among the students at JMCH, in Northeast India. The blood group AB & Rh negatives (A-, B-, AB- & O-) were infrequent in JMCH study. The two-tailed P value was less than 0.0001***, in the Chi-square test. By conventional criteria, this difference was considered to be extremely statistically significant.

DISCUSSION

Following studies support our observations:

- The commonest ABO blood group was group B in Northern India with Rh negativity at only 4.29%. The frequency of various blood groups in North India was as follows: group B (34.84%) followed by group O (29.75%), group A (21.50%) and group AB (13.91%) (Chandra, 2012).

- In our study, the results showed that the prevalence of different blood groups among one group of 2140 patients in North India was approximately: B 35%, O 32%, A 23% & AB 10%. The Rh negatives were about 07% in North India. Thus in our study, the commonest ABO blood group was group B in North India with Rh negativity at only 07%.

- In American blacks, the percentage of Rh positives is about 95% (Vaz Mario *et al*., 2013).

- In JMCH study (Northeast India), the Rh negatives were about 04%, which is similar to the percentage of Rh negatives of about 5% in American blacks.

Following studies partly support our observations:

- The prevalence of different blood groups among one group of persons studied was approximately: O 47%, A 41%, B 9 % and AB 3 %. It is obvious from these percentages that the O and A genes occur frequently, whereas the B gene is infrequent (Vaz Mario *et al*., 2013).

- In our study, the most common blood group among the MBBS Students at JMCH, in Assam (Northeast India) was O (35.5%), followed by B (28%) & A (27.5%) and further followed by AB (9%). It is obvious from these percentages that the O, B and A genes occurred frequently, whereas the AB blood group was infrequent.

- About 85% of all white people are Rh positive and 15% are Rh negative. In American blacks, the percentage of Rh positives is about 95%, whereas in African blacks, it is virtually 100 % (Vaz Mario *et al*., 2013).

- Approximately 85% of Caucasians express RhD antigen (Rh positive), whereas 99% of persons from Africa or Asia are Rh positive (Kliegman RM, et al. 2020).

- In our study, the Rh negatives were about 07% in North India, which is intermediate between the percentage of Rh negatives of about 05% in American blacks and 15% in white people.

SUMMARY

In this study, the aim was to find out the prevalence of ABO & Rhesus blood groups in a group of persons at two places in North India & one place in Northeast India. For the present study, blood groups of a total of 2345 persons (1240 patients in RH, 900 patients in WCMSRH & 205 students in JMCH) were evaluated. Participants that satisfied the inclusion criteria were selected and the participants who did not meet the inclusion criteria were excluded. Subject's history information was collected in questionnaires and Blood Groups Data were collected and reported, and then statistical analysis of data was performed using SPSS software. Calculations of P values were done using QuickCalcs-Graphpad Software. The Chi-square test was used to analyze the collected data.

In this study, the results showed that the prevalence of different blood groups among one group of 2140 patients in North India (at RH & WCMSRH) was approximately: B 35%, O 32%, A 23% & AB 10%. The Rh negatives were about 07% in North India. By conventional criteria, this difference was considered to be extremely statistically significant. In an another study, the results showed that the prevalence of different blood groups among the 205 MBBS Students in JMCH, in Assam (Northeast India) was approximately as follows: O 35.5%%, B 28%, A 27.5% & AB 9%. In JMCH study (Northeast India), the Rh negatives were about 04%. By conventional criteria, this difference was considered to be extremely statistically significant.

CONCLUSION

It is concluded that in the present studies at RH & WCMSRH in North India, B gene was most common, followed by O gene & further followed by A gene. In JMCH study in Assam (Northeast India), O gene occurred most frequently, closely followed by both B & A genes. The blood group A was 3rd most common blood group & the blood group AB was infrequent in all the 3 studies in India. The Rh negatives were about 07% in North India & about 04% in Northeast India.

REFERENCES

Chandra T, Gupta A. 2012. Prevalence of ABO and Rhesus Blood Groups in Northern India. J Blood Disorders Transf 3:132. doi:10.4172/2155- 9864.100013

Gundrajukuppam DK, Vijaya SB, Rajendran A, Sarella JD. 2016. 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.,* 10(5):EC07–10.

Kliegman RM, et al. 2020. Haemolytic disease of the fetus and newborn. Nelson Textbook of Paediatrics 21st edition: 967-970.

Landsteiner, Karl. 1900. "Zur Kenntnis der antifermentativen, lytischen und agglutinierenden Wirkungen des Blutserums und der Lymphe". Centralblatt f.Bakteriologie, Parasitenkunde u. Infektionskrankheiten. 27: 357-362.

Lefrère J, Berche P. 2010. Landsteiner discovers the blood groups. *Transfus Clin Biol*. 17(1):1–8.

Owen R. 2000. Karl Landsteiner and the first human marker locus. Genetics. 155:995–8.

"Racial and ethnic distribution of ABO blood types". Bloodbook.com. Archived from *the original* on 4 March 2010. Retrieved 1 August 2010.

Vaz Mario, Kurpad A., Raj T. 2013. Guyton and Hall Textbook of Medical Physiology. A South Asian Edition. 12th Edition: 156-157.

****