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Gender Distribution of Abo and Rh Blood Groups among Medical Students of Jlnmch Bhagalpur Bihar

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ABSTRACTS: Background: Blood is frequently transfused in medical practice. At present 33 Blood group systems representing over 300 identified red cell antigens listed by the International society of blood transfusion 1. the most important are A, B and D antigens determining the ABO and Rh blood groups. Both blood groups are inherited in Mendelian fashion and are important from transfusion point of view &medicolegal dispute . The objective of this study was to find out prevalence of ABO and Rh blood groups among medical students of JLNMCH Bhagalpur Bihar . **Methods**: It was a cross-sectional study conducted in the department of Physiology, JLNMCH Bhagalpur Bihar from 10Feb 2020to 18Feb 2020. The students of MBBS from first year to third year, aged 18–24 years were included in the study. Conventional glass slide method was used to determine the ABO and Rh blood groups. Results were tabulated as frequency and percentage. **Results**: A total of 309 students were included in the study. Out of 309 students, 196 (63.43%) were males and 113 (36.57%) were females.Out of the males 179 (91.32%), and out of females 102 (90.26%) were Rh positive. The prevalence of Rh negative group in male subjects was 8.68%, and in female subjects it was 9.74%. The frequencies of A, B,O and AB blood groups in Rh positive male subjects were 20.40%,(40) 35.20%(69), 26.53%(52) and 9.18 %(18) respectively, and among females Rh positive subjects 19.60%(20), 39.21%(40), 32.35%(33) and 8.82%(9) respectively. In Rh negative male subjects the frequencies of A, B, O and AB blood groups were 1.53%(3), 3.57%(7), 3.06%(6) and .51%(1) respectively, and among female Rh negative subjects 1.76%(2), 4.42%,(5) 2.65%(3) and 0.88%(1) respectively. **Conclusion**: The most prevalent blood group was B+ and no association was seen between gender and blood groups either ABO or Rh (p>0.05).

I. INTRODUCTION

Blood, the major fluid flowing through human bodies has always been a source of intrigue and fascination for people.since Harveys Postulates . Most importantly it is transfused to support life of patients in need. ABO is the main blood grouping system in humans. It is characterized by the presence or absence of two main genes, A and B1. The major blood groups found in ABO system are A, B, AB and O. A and B antigens are found on the surface of red blood cells which constitute the major cell line in blood 2. These antigens are complex oligosaccharides and they differ because of the difference in their terminal sugars3. Almost 3000 antigens have been found on erythrocytes all of which are inherited by Mendelian trait4. Rhesus (Rh) system is the second system of blood grouping. Rh blood grouping is of great importance in transfusion 5. It has only two Rh phenotypes namely Rh positive (Rh+) and Rh negative (Rh-) depending on the presence or absence of Rh antigen on the surface of red blood cells 6.. Apart from ABO and Rh systems of blood groups, other important antigens out of 300 known antigens are Duffy, Diego,Kidd, Lutheran ,Bombayantigen etc7. The blood groups are inherited. ABO blood types are controlled by a single gene located on chromosome 9 having three alleles. Inheritance of Rh blood grouping is based on the presence of either R or r alleles 8. All human races share the same blood grouping systems with significant differences in frequencies of different types. There is need to understand the prevalence and frequency of these blood groups among different populations and races. A marked variation has been observed in the incidence of ABO and Rh blood groups among

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world population indicating racial differences as well as genetic and ethnic diversity of human population. The objective of this study was to make the gender based comparison of frequency of ABO and Rh blood groups among the medical students of JLNMCH Bhagalpur Bihar

II. MATERIAL AND METHODS

This cross-sectional analytical study was conducted in the Department of Physiology JLNMCH Bhagalpur Bihar from 10feb 2020 to 18Feb 2020 . Sample size was calculated using WHO sample size calculator. We included 309 students of from first year to third year of age18–24 years. An informed written consent was taken. Conventional glass slide method was used to determine the ABO blood groups in the Physiology laboratory during the practical. A sterile lancet was used to prick the finger. A drop each of anti-sera A, anti-sera B and anti-sera D were placed on the glass slides. A drop of blood from individual student was mixed with anti-sera separately with the help of common pins.Blood groups were determined after observing agglutination with the naked eye. The agglutination in individual glass slides was confirmed after observing under the compound light microscope.Data were analyzed using SPSS-25. Frequency and percentage were calculated for categorical variables. Association of blood groups with gender was calculated using Chi Square test. Alpha error was kept ≤0.05.

III. RESULTS

This study included 309 medical students out of which 196 (63.43%) were males and 113 (36.57%) were females. Their mean age was 20.01±1.19 years.

Blood Group		Frequency	Percentage
ABO	A	69	22.33
	B	121	39.15
	AB	29	09.38
	O	90	29.12
Rh	Positive	283	91.58
	Negative	26	8.42

Table-1 shows frequency distribution of ABO and Rh blood groups in all participants.

Table-2 shows association of gender with ABO blood grouping, and Table-3 shows the association of gender with Rh grouping. Table-4 shows association of the gender with ABO and Rh blood grouping combined.

Table-2: Frequency of ABO blood groups in males and females [n (%)]

Gender	ABO Grouping A	B	AB	O
Male	21.93	38.77	09.69	29.59
Female	22.99	39.81	8.84	28.31

Table-3: Frequency of Rh blood groups in males and females [n (%)]

Gender	Rh Grouping Positive	Negative
Male	179(91.32%)	17(8.67%)
Female	102(90.26%)	11(9.73%)

Table-4: Frequency of ABO and Rh blood groups combined in males and females [n (%)]

Blood groups	Male	Female
A Positive	40 (20.40%)	24(21.23%)
A Negative	3 (1.53%)	2(1.76%)
B Positive	69 (35.20%)	40(35.39%)
B Negative	7 (3.57%)	5(4.42%)
AB Positive	18 (9.18%)	9(7.96%)
AB Negative	1 (0.51%)	1(0.88%)
O Positive	52 (26.53%)	29(25.66%)
O Negative	6 (3.06%)	3(2.65%)

IV. DISCUSSION

This study will not only create awareness among the health professional students about healthy blood donation but will also lead to the formation of databank of healthy, voluntary blood donor students at JLNMCH Bhagalpur Bihar . Blood banking is the backbone of medical interventions in health system. Provision of safe blood to all in need of transfusion is one of the objectives of public health. This survey was conducted for the first time in our institute and the distribution of blood groups were found to be very useful for identifying voluntary blood donors with different blood groups, especially the rare ones. A lot of research evidence is available on healthy,

potential, voluntary blood donors to enhance and improve blood banking and transfusion facilities.**9,10,11,12,13,14,15,16** Studies on blood grouping in medical students or young voluntary blood donors are scarce, though enough literature on blood groups distribution in the general population globally and in India is available.

The most prevalent blood group was found to be B+ irrespective of gender. Also, no gender based association was found with blood groups either ABO or Rh ($p>0.05$).In our study the frequency distribution of blood group B was highest with percentage frequency of 39.15%, followed by blood group O, 29.12; blood group A, 22.33% and the least percentage frequency was ofblood group AB 9.38%. Our study also confirmed that percentage frequency of Rh+ is the highest (91.58%) as compared to Rh- (8.42%). These results are quite similar to those found in a study by NSCB med college MP **17.**In our study, frequency comparison of different ABO blood groups between males and females showed the highest frequency percentage of B in males and females, 38.77% and 39.81% respectively. It was followed by blood group O, 29.56% in males and 28.31% in females; blood group A, 21.93% in males and 22.99% in females and the least frequency percentage was shown by blood group AB, 9.69% in males and 8.84% in females. So our study showed that the most prevalent ABO blood group in both males and females was B and no gender based association of ABO blood grouping system could be established ($p=0.17$). This study also compared frequency of Rh blood groups on the basis of gender. Again there was no gender based association. In males frequency percentage of Rh+ was 91.32% and in females 90.26%. The frequency percentage of Rh- was more in Females (9.73%) as compared to males 8.67%. However overall frequency of Rh+ was almost equal in both the genders ($p=0.88$).Our study also compared both ABO and Rh blood groups in male and female medical students . The highest frequency percentage in both males and females was of blood group B+ (35.20%) in males and 35.30% in females, showing a little higher percentage in females compared to males. The least frequency percentage was of A-, 1.08% in males and 1.22% in females. However no significant difference could be established in the distribution of ABO and Rh blood groups among male and female medical students ($p=0.25$).Taking into consideration that the medical students and medical health professionals deal directly with the emergencies requiring urgent blood donations,awareness regarding their own blood groups is helpful. A study conducted in Puducherry, India revealed that there was a positive attitude of medical students towards blood donation and a 100 % voluntary rate can be achieved through education regarding blood donation of these medical studentsOur study aims to bring this fact forward and initiate such education system so as to make sure that educated personnel such as medical students play a vital role in the future of blood banking.. Blood groups are of vital importance in various aspects especially blood transfusion, genetic research, human evolution and forensic investigations8, inheritance patterns, paternity, finger printing and as predictor of national suicide rates.12–14 ABO blood grouping is clinically most significant because of the potential ability of this system's antibodies to cause haemolytic transfusion reactions and haemolytic disease of the foetus and newborn.15 We tried to find out any gender difference in the distribution of ABO and Rh blood groups. However no significant correlation could be found among both genders. These results are in accordance with the previous studies by Odokuma et al19 and Ajay kr saluja et al17.

V. LIMITATIONS

The data was collected from only one institution. Data from other institutions can further strengthen the results
of this study.

VI. CONCLUSION

No statistically significant association was found between gender and ABO and Rh blood groups. The most prevalent blood group was B+ which is in accordance with the overall trend of ABO frequencies in different regions of India .

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