

# Prevalence of ABO and Rh Blood Groups among Medical Students of a Teaching Institution

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## ABSTRACT

### BACKGROUND

ABO blood group system was defined based on the presence of blood group antigens present on the cell membrane of erythrocytes. Though human beings possess the same blood group system, the prevalence of blood group system varies markedly across races, ethnic groups etc. This study aimed to look at the prevalence of ABO and Rh blood group among the medical students.

### METHODS

An observational study was conducted to look for the ABO and Rh blood grouping among 1128 undergraduate medical students after getting their informed consent. Blood grouping and Rh typing was done by slide agglutination test using antisera (anti A, anti B and anti D sera) by keeping a control. Blood was mixed with saline to form a red cell suspension, to which antisera were added and checked for agglutination. Red cells-saline mixture acted as a control, which helped to confirm the presence or absence of agglutination. Data was tabulated as frequencies and percentages for categorical data.

### RESULTS

Among the study population, there were 835 (74%) females and 293 (26%) were males. The order of prevalence about the frequency of blood group types were O, B, A and AB respectively. Maximum prevalence was noted with O blood group with 39.5% and the least with AB blood group (6.3%).

### CONCLUSIONS

The most common blood group among this study population is O, followed by B, A and AB. 94% of the group was Rh positive, while the rest of the population was Rh negative.

### KEYWORDS

Prevalence, ABO Blood Group, Rh Typing

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BACKGROUND

ABO blood group system was discovered by Landsteiner in the year 1901. This was based on the presence of blood group antigens present on the cell membrane of erythrocytes. Around 700 blood group antigens were explained, based on which 30 blood group systems were described.<sup>1,2</sup> These antigens were found as either glycoproteins or glycopospholipids on the cell membrane. H antigen, an immediate precursor of A and B antigen is formed by adding fucose to the glycolipid or glycoprotein backbone. Further addition of N-acetyl galactosamine and galactose resulted in the production of A and B antigen respectively.<sup>3,4</sup> Later in 1941, Landsteiner and Wiener described the Rh blood group system. Based on the presence of A and B antigens on the surface of RBC, A, B, AB and O blood groups were defined. ABO blood group is classified under major blood group system as it is strongly antigenic which forms the basis of transfusion reactions in case of mismatched blood transfusion.<sup>5</sup> Among the several Rh antigens, D antigen is the most significant one which is highly immunogenic. Rh incompatibility can cause severe haemolytic reactions.<sup>6</sup> Though all human beings possess the same blood group system, the prevalence of blood group system varies markedly across races, ethnic groups etc. It is important to have knowledge about the blood group among the population especially medical students.<sup>7</sup> This study aimed to look at the prevalence of ABO and Rh blood group type among the medical students of Kerala, South India.

METHODS

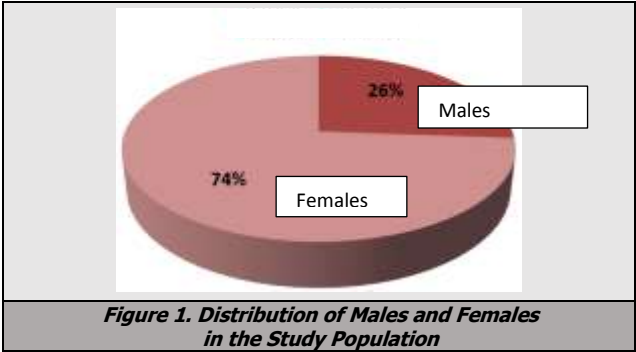
An observational study was conducted among 1128 undergraduate medical students after getting their informed consent. Blood grouping and Rh typing was done by slide agglutination test using antisera (anti A, anti B and anti D sera) by keeping a control. Blood was mixed with saline to form a red cell suspension, to which antisera were added, mixed using three different toothpicks and checked for agglutination. Appropriate care was taken not to mix the "test mixtures" and "control mixtures".

Data were tabulated as frequencies and percentages for categorical data.

RESULTS

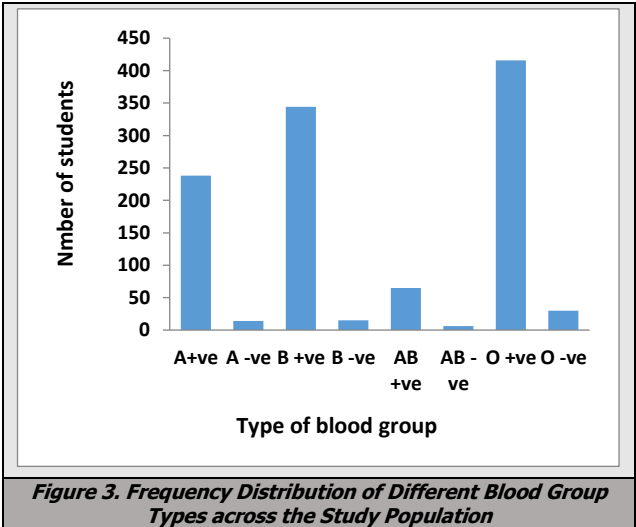
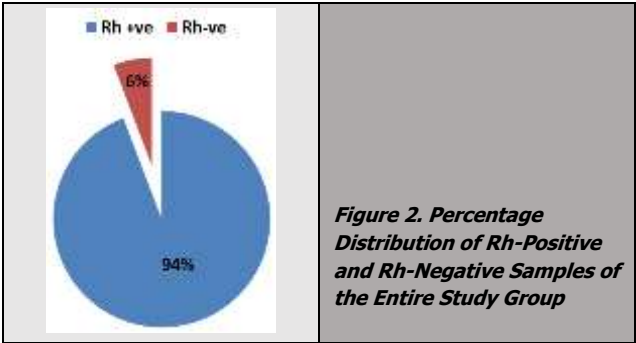
1128 medical students in the age group 18-25 years were participated in the study. Among the study population, there were 835 (74%) females and 293 (26%) were males and is represented in the figure 1. The order of prevalence about the frequency of blood group types were O, B, A and AB respectively. Maximum prevalence was noted with O blood group with 39.5% and the least among AB blood group (6.3%). The frequency and percentage of prevalence of different blood group in the study population is given in the

table 1. Among the 1128 students, 1063 (94%) students were Rh positive, whereas only 65 (6%) students were Rh negative and is given the figure 2. Considering Rh blood group system, 238, 344 and 65 students were A positive, B positive and AB positive respectively. Maximum prevalence was noted for O positive blood group, which included 416 students. Among the Rh negatives, only 6 students (9.2%) among the entire study group was AB negative. Maximum number of Rh negatives was noted for O blood group, that is 46% of the entire Rh negative population belonged to O negative group. The frequency distribution of different blood group types across the study population is given in the figure 3.



Blood Group	Frequency	Percentage
A	252	22.3
B	359	31.8
AB	71	6.3
O	446	39.5

Table 1. Frequency and Percentage of Distribution of Blood Group across the Study Population



## DISCUSSION

The present study aimed to look for the prevalence of ABO and Rh blood group system among medical students. ABO and Rh blood group systems are of importance in blood transfusion, organ donation as well as predicting certain diseases like cardiovascular diseases, erythroblastosis fetalis etc.<sup>8</sup> This study showed that maximum prevalence of blood group was noted for O followed by B. The order of prevalence of blood group types were O, B, A and AB respectively. This is similar to other studies done in population of Southern and Eastern India by Girish et al,<sup>9</sup> Mallikarjuna et al,<sup>10</sup> Nag et al,<sup>11</sup> Periyavan et al,<sup>12</sup> where they noticed an increased prevalence of O blood group followed by B. The studies done by Chandra et al,<sup>13</sup> Kaur et al,<sup>14</sup> Patel Piyush et al<sup>15</sup> and Giri et al<sup>16</sup> among Northern, Western and central Indian population noted a maximum prevalence of blood group B followed by O, A and AB. Studies done in several other countries like Saudi Arabia,<sup>17</sup> USA,<sup>18</sup> Britain,<sup>19</sup> and Australia<sup>20</sup> showed a maximum prevalence of blood group O. According to the study done by Rahman et al,<sup>21</sup> the commonest blood group among Pakistan population was B, whereas in Nepal the maximum prevalence was noted for A blood group.<sup>22</sup> The present study showed that 94% of the students were Rh positive, whereas only 6% students were Rh negative. Studies done by Yousef et al,<sup>23</sup> Giri et al<sup>16</sup> and Warghat et al<sup>24</sup> showed prevalence similar to those of present study. But an increased prevalence of Rh negative blood group is noted among the studies done in other countries USA and UK which showed a prevalence of about 15-17%.

## CONCLUSIONS

The most common blood group seen in this study population is O, followed by B, A and AB. 94% of the group was Rh positive, while the rest of the population was Rh negative. Thus, medical students must be aware of, their own blood group to get involved in voluntary blood donation which can save many lives and to understand the importance of the same in predicting diseases.

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