FREQUENCY OF PRE-HYPTERTENSION AMONG VARIOUS BLOOD GROUPS

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ABSTRACT
Objectives: To determine the frequency of pre-hypertension among various blood groups of medical students.

Material and Methods: This cross-sectional study was conducted at Aziz Fatima Medical and Dental College Faisalabad, Pakistan. A hundred medical students aged 18 to 25 were enrolled from first year to final year MBBS by convenience sampling technique. Blood pressure was measured by auscultatory method and blood groups were determined by conventional slide method. Data was analyzed by SPSS version 25. Basic characteristics of the studied population are presented as mean and standard deviation (age, height, weight, and blood pressure). Categorical variables like prehypertension are analyzed as dichotomous variables and are expressed as frequencies and percentages. Proportions were compared using the Chi-square test. p≤0.05 was taken as statistically significant.

Results: The study revealed that blood group B was the most common blood group followed by O blood group. While AB blood group is the least common blood group in our study.

Of the total population pre-hypertension was found in 56(55.4%). Prehypertension was most frequently found in subjects with blood group A (71.4%) whereas least commonly found in subjects having blood group B.

Conclusion: Blood group B was the most common blood group of our studied population. Prehypertension is commonly found in subjects with blood group A.

Keywords: Blood group antigens, Pre-Hypertension


INTRODUCTION

Hypertension, which is also known as the “silent killer”, is a modifiable risk factor and a challenging health problem globally. ¹ Prevalence of pre-hypertension is an emerging disease that is increasing at an alarming rate among youngsters. ² It is estimated that the number of mortalities due to prehypertension in developing countries is rising to 15% i.e. 44 million people by the year 2020. ³ Prehypertension accounts for 45 to 55% of the morbidity in youngsters of the Indo sub-continent. ⁴ Association of blood groups regarding paternity issues and medicolegal issues is already been well documented. These days the interest of medical researchers is increasing to explore its association with different diseases. The association of various diseases with blood group antigens is well documented including certain infections and carcinomas while certain diseases are still questionable regarding blood groups. ⁵

Essential hypertension is more prevalent in adults than in children. Diagnosis of raised blood pressure in the early years of life can be a forecast of hypertension in adults. ⁶ Various studies in the past have been conducted to find the correlation of “ABO” and “Rhesus” blood groups with hypertension showing conflicting results. ⁶

Future research is required concerning the linkage between these parameters, which might help screen the young population at risk of pre-hypertension and take primary preventive actions to reduce the burden of diabetes and its complications in the community.

Hence current study is designed and planned to find out the frequency of pre-hypertension and ABO blood groups among medical students and to find out the association between both study parameters.

Prehypertension is usually asymptomatic and remains undiagnosed in young adults. Although some
of them sometimes experience excruciating headaches and visual blurriness they do not take it enough seriously to seek medical assistance, considering themselves as healthy individuals. Ultimately when they get medical advice due to the gradual deterioration of their symptoms it gets very late and the subject gets full-blown disease. Thereby warning us to be alert and follow proper precautions to curb outcomes such as CVD. 3 According to JNC 8 guidelines starting antihypertensive drugs at specific Blood Pressure values helps to obtain better health results. 8 High-risk younger populations should be screened earlier for pre-hypertension than other populations and should advised to be adopt preventive measures to reduce the incidence of hypertension and its serious sequences and outcomes. We designed this study to determine the frequency of pre-hypertension among various blood groups of medical students.

MATERIALS AND METHODS

This study was conducted at Aziz Fatima Medical and Dental College Faisalabad, Punjab, Pakistan from July to December 2020. It was a cross-sectional study. The sample size was calculated by keeping a confidence interval of 95 while the margin of error was 0.05, power was 0.8. While using the mean difference of systolic blood pressure among normotensive and hypertensive and standard deviation. It comes out to be 88 while keeping 20% dropouts (18 students). Out of a total of 106 subjects, 6 were not willing to participate. A hundred medical students aged 18 to 25 years were enrolled from 1st year to the final year of MBBS by convenience sampling technique. Ethical approval was taken from the institutional ethical committee (Ref. No: IEC/918-20). Hundred male and female students of 18 to 25 years of age were enrolled from 1st year to the final year of MBBS by convenience sampling technique. Students of first-year to second-year MBBS were approached during their physiology practical classes, whereas students of third-year to final year were approached during ward rotation at Aziz Fatimah Hospital Faisalabad. All relevant information including age, race, medical history, and family history of hypertension was recorded on structured proforma. Medical students with a history of cardiovascular diseases, and diabetes mellitus were excluded. Before enrolling, informed consent was taken from subjects, and were assured of confidentiality.

The conventional slide method was used to determine blood groups. Three glass slides were labelled as ‘A’, ‘B’, and ‘D’. Blood drops were obtained by figure prickling following aseptic measures, and were placed on each slide. Drops of anti-A, anti-B, and anti-D sera were added to respective slides and mixed with blood using toothpicks. Blood groups were determined by observing agglutination reactions.

A Mercury sphygmomanometer was used to estimate blood pressure by auscultatory method making the subject sit and relax for 5 minutes.9 Three readings were recorded and their average value was used for data analysis. According to JNC 7 criteria, blood pressure <120/80 mmHg and 121-139/81-90 mmHg was taken as normal and prehypertension respectively.10

STATISTICAL ANALYSIS

SPSS 25 was used to analyse the data. Descriptive of the studied population was presented as mean and standard deviation (age, height, weight, and blood pressure). Categorical variables like prehypertension are analyzed as dichotomous variables (yes/no) and are expressed as frequencies and percentages. Proportions were compared using the Chi-square test. p≤0.05 was taken as statistically significant. Means of blood pressure were compared among prehypertensive and normotensive were compared by independent T-test.

RESULTS

The study is comprised of 100 male and female medical students (50 in each group). Description of the study population is described in Table 1. The mean ± SD of study participants was 21.6±1.82. The current study reveals that the commonest blood group was B followed by blood group O in the current study population while the least frequent blood group was AB in our study (Figure 1). Eighty-three (83.2%) of the population was Rh positive and only 17 (15.8%) were Rh negative. Of the total population pre-hypertension was found in 5655.4%). On the other hand, 44 (43.6%) of the population were normotensive. Prehypertension was significantly found in subjects with blood groups A (71.4%) followed by subjects having blood groups AB and O (Table 2). Subjects with prehypertension have the highest systolic (122.2 vs. 112.9) and diastolic blood pressure (88.89 vs. 74.0) compared to normotensives. However, a statistically significant difference was found in terms of diastolic pressure (p-value 0.006) (table 3).

DISCUSSION

Prehypertension is an alarming sign if detected early in life, which depicts the risk of hypertension later on in life. The seventh report of the Joint National Committee (JNC-7) proposed separate cataloging for prehypertension, separating it from established hypertension. 10 ABO blood group system is based on the inheritance of the presence and absence of antibodies and antigenic substances. ABO Blood group system is gaining attention these days for researchers as it is found to be associated with various diseases. 11 Active research has now been carried out to explore the association of various diseases with different blood groups showing that certain diseases are found to be associated with particular blood groups. 12 It is found that there is diverse distribution of blood groups globally reflecting the particular ethnicity and genetic

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Frequency Of Pre-Hypertension Among Various Blood Groups

Table 1: Descriptive Statistics of study population (n = 100)

<table>
<thead>
<tr>
<th>Age</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>21.61</td>
<td>1.82</td>
</tr>
<tr>
<td>Weight</td>
<td>67.33</td>
<td>12.92</td>
</tr>
<tr>
<td>Height</td>
<td>2.74</td>
<td>0.32</td>
</tr>
<tr>
<td>BMI</td>
<td>24.66</td>
<td>4.48</td>
</tr>
<tr>
<td>BPS</td>
<td>118.51</td>
<td>10.48</td>
</tr>
<tr>
<td>BPD</td>
<td>82.34</td>
<td>11.56</td>
</tr>
</tbody>
</table>

Table 2: Frequencies and percentages of normotensive and prehypertensive among ABO blood groups.

<table>
<thead>
<tr>
<th>ABO blood groups (n= 100)</th>
<th>Frequency of blood groups</th>
<th>Normotensive 100-120 / 60-80 mmHg (n=44) N (%)</th>
<th>Pre-hypertensive 121-140 / 81-90 mmHg (n=56) N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>21</td>
<td>6(28.6)</td>
<td>15(71.4)</td>
</tr>
<tr>
<td>B</td>
<td>32</td>
<td>17(53.1)</td>
<td>15(46.9)</td>
</tr>
<tr>
<td>AB</td>
<td>20</td>
<td>9(45.0)</td>
<td>11(55.0)</td>
</tr>
<tr>
<td>O</td>
<td>27</td>
<td>12(44.4)</td>
<td>15(55.6)</td>
</tr>
</tbody>
</table>

p-value = 0.037

p-value is determined by the Chi-Square test
p-value ≤ 0.05 = significant

Table 3: Comparison of Blood Pressure among Prehypertension and Normotensive subjects

<table>
<thead>
<tr>
<th></th>
<th>Systolic blood pressure Mean ± SD</th>
<th>Diastolic blood pressure Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre hypertension (n=56)</td>
<td>122.91±10.79</td>
<td>88.87±10.51</td>
</tr>
<tr>
<td>Normotensive (n=44)</td>
<td>112.90±6.82</td>
<td>74.02±6.33</td>
</tr>
</tbody>
</table>

p-value = 0.39
p-value = 0.006

p-value is determined by T-test, p-value ≤ 0.05 is taken as significant

Fig 1: Blood group distribution among the study population (n= 100)

In the current study, prehypertension was most frequently found in individuals having blood group A. Our results are justified by the Sushil et al study conducted in Nepal, which also reported the occurrence of hypertension in individuals with blood group A. Another study conducted in Ghana reported hypertension in blood group AB followed by blood group A.

We have found a significant difference in diastolic blood pressure in the pre-hypertensive and normotensive groups. These results are similar to a study conducted in Faisalabad by Altaf B.

The strength of the study was its standardized protocol like the questionnaire and estimation of blood pressure and blood group.

This is a single-centred study is a limitation as results cannot be generalized to the whole population.

CONCLUSION

Blood group B was the most common blood group of our studied population. Prehypertension is commonly found in subjects with blood group A.

REFERENCES

Frequency Of Pre-Hypertension Among Various Blood Groups

CONFLICT OF INTEREST: Authors declare no conflict of interest

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AUTHOR’S CONTRIBUTION
Following authors have made substantial contributions to the manuscript as under

Moiez M: Conception, write up and over all supervision
Zahid H: Data collection, literature search
Ashfaq R: Statistical analysis and bibliography
Zareen S: Literature search
Altaf B: Data collection
Rasheed Z: Data collection

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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