Original Article

Estimation of Mean Scores of Blood Pressure and Knowledge of Health Risks Associated with High Blood Pressure among Medical Students of Rawalpindi Medical University

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Abstract

Background: Hypertension is a problem faced by many people in our society. This study examines the mean blood pressure scores, and knowledge of health risks associated with hypertension among 1st-year medical students at Rawalpindi Medical University.

Objectives: The objectives of this study are to measure the mean blood pressure scores and assess the risk factors associated with high blood pressure.

Materials and Methods: The descriptive cross-sectional survey was conducted from April to June 2024 at Rawalpindi Medical University, Rawalpindi, Pakistan. A total of 70 medical students responded to this survey. Data was analyzed using IBM SPSS Statistics version 27. Inferential statistics were used, and the threshold for statistical significance was set at a p-value less than 0.05.

Results: More than half of the population whose data is obtained are females. Approximately 3/4 of the people had their blood pressure checked by professionals. 53% had normal blood pressure, 22% had low blood pressure and remaining hadn't checked theirs. Only less than 1% out of total population were on blood pressure medications and rest were not.

Conclusion: The study demonstrated that blood pressure scores were mostly normal among the students. Moreover, students had moderate knowledge regarding health risks associated with high blood pressure.

Keywords: Blood Pressure, Systolic Blood Pressure, Diastolic Blood Pressure, Sphygmomanometer

Introduction

The forces exerted by blood on the walls of arteries are termed blood pressure. Its normal value is 120/80mmHg (Systolic/Diastolic). Systolic pressure is the maximum blood pressure during ventricular contraction, whereas diastolic pressure is the minimum pressure recorded just before the next contraction. Blood pressure is measured using a sphygmomanometer.[1]

Hypertension is the term used for the condition in which blood pressure in arteries is persistently elevated, with systolic pressure being 140 mmHg or higher, and diastolic pressure being 90 mmHg or higher. Hypertension can result from various factors, including increasing age, obesity, smoking, excess caffeine intake, stress, and a sedentary lifestyle. Symptoms include blurred vision, headaches, dizziness, fatigue, chest pain, and irregular heartbeat. Sometimes, high blood pressure can be asymptomatic, hence referred to as a "silent killer."[2]

Hypertension is linked with a 71% increase in the risk of heart failure. An increase of 20 mmHg in systolic pressure leads to a 20% whereas a 10 mmHg increase in diastolic pressure correlates with a 12% increase in heart failure risk.[1] Excessive sodium intake, especially among urban youth who consume large amounts of fast food, often leads to the onset of prehypertension or hypertension, raising health risks like obesity and myocardial infarction (MI).[2] Hypertension contributes to a wide range of diseases, yet its connection to specific sexes is often overlooked, particularly in females. Female-specific risk factors include reproductive conditions, gynecological issues, and menopause. Since hypertension can begin to develop at a young age, it is essential to address it in females.[3] In some rural areas, curry leaves are considered beneficial for individuals at risk of hypertension. These leaves, rich in potassium and low in salt, are of great interest for their potential health benefits. Statistical analysis among Indian patients has shown that curry leaves may help lower blood pressure.[4]

NSAIDS may antagonize the blood pressure-lowering effect of antihypertensive medication and elevate blood pressure by prostaglandin inhibition, sodium retention, and vasoconstriction. There is a small elevation in systolic blood pressure and no effect on diastolic blood pressure.[5]

With age, the systolic blood pressure tends to rise with hypertension, not the diastolic blood pressure. This may be caused due to structural changes in arteries and large artery stiffness. A risk factor associated with the development of CVD is increased systolic and decreased diastolic blood pressure, leading to an increase in pulse pressure.[6] There is a close relationship between anxiety and autonomic blood pressure. Prolonged state of anxiety eventually leads to increased blood pressure over an extended period.[7]

Obesity in children is associated with high blood pressure. Obesity prevention programs, specifically those involving both diet and physical activity among children, seem to be more effective.[8]

Caffeine supplementation affects the cardiovascular system, causing a significant

increase in systolic and diastolic blood pressure in adults > 18 years.[9]

Hypertension affects cognitive health across all ages, notably impairing children's brain development. In the young population, it can lead to decreased attention span, reduced memory capacity, and impaired problem-solving skills. Addressing hypertension in children is crucial to prevent lifelong cognitive deficits and related learning disabilities.[10] Lifestyle modification is crucial to a population-wide strategy for lowering BP and CVD risk by 30-33% regardless of genetic predisposition.[11]

Cardiovascular disease (CVD) is primarily caused by elevated BP, with a right-sided shift in population distribution being a key factor with a strong causal relationship supported by clinical trials and observational studies. Preventing age-related BP increases and intensively treating it could reduce this population burden of BP-related CVD.[12]

There is an important link between high blood pressure and screen time among children and adolescents. An increase in screen time increases the odds of hypertension by 8%. The research showed a 1.9 mmHg increase in systolic blood pressure but no significant increase in diastolic blood pressure. The screentime in hypertensive children and adolescents was 0.79 hours (47.4 minutes) higher than the normotensive subjects.[13] Recent research highlights the significance of biomarkers in hypertension management. Notably, enhanced aerobic fitness and vascular function play a crucial role in lowering blood pressure. Conversely, reduced oxidative stress, inflammation, and glycolipid toxicity contribute to promoting hypertension. Engaging in regular physical activity reduces blood pressure.[14] Hypertension, a global health crisis, affects over a billion people worldwide. Despite its prevalence and severe health consequences, awareness and control remain low, underscoring the need for improved management strategies.[15]

In this study, we also addressed the knowledge of the population regarding different health factors such as hypertension, old age, obesity, and intake of alcohol, which greatly affects the rate of blood pressure in individuals. The objectives of this study are to measure the mean scores of blood pressure and assess the risk factors associated with high blood pressure.

Materials and Methods

A descriptive cross-sectional 17-item online questionnaire was circulated to first-year medical students after ethical review board approval at Rawalpindi Medical University (RMU) in Rawalpindi, Pakistan, by using Google Forms. The questionnaire included consent from subjects. Participation of students was voluntary. Research duration was 2 months, April-May 2024. Closed-ended questions were used to collect the data. Age and gender of students were correlated to mean scores of blood pressure measured by professionals who had obtained standard medical training on measurement of blood pressure via the Korotkoff method. BP measurements were recorded manually. The data was entered in an Excel sheet. Knowledge regarding risk factors like age, smoking, stress, diabetes, obesity, caffeine,

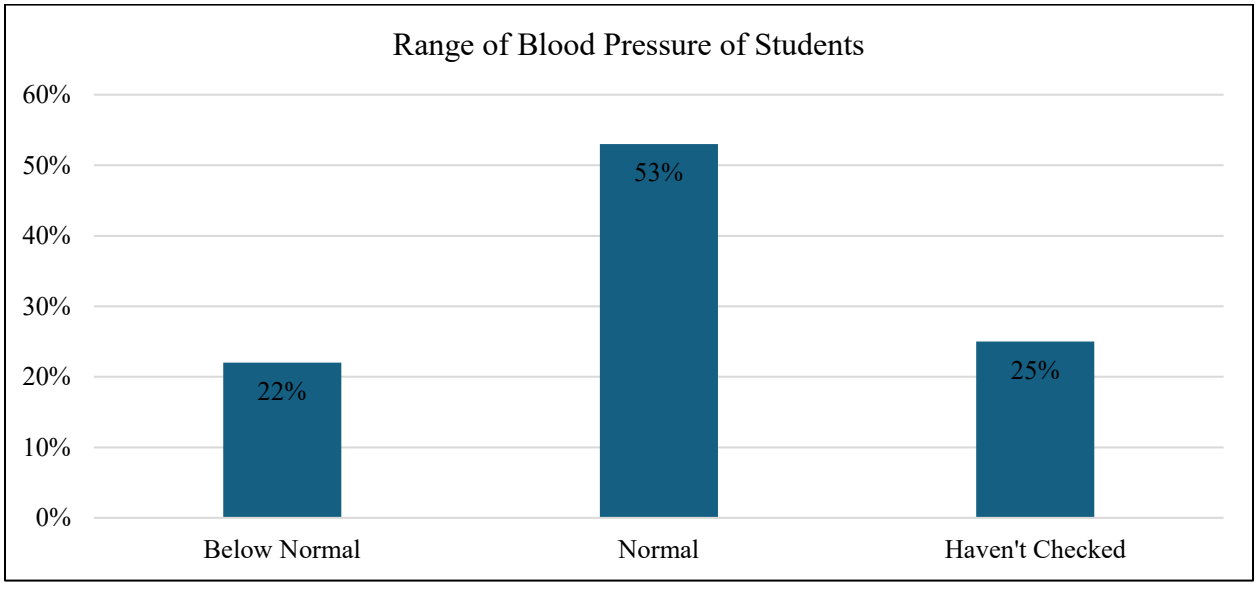
and alcohol intake was assessed via a Google Form. The questionnaire obtained data on family history (whether a family member had been diagnosed by a physician as a hypertensive patient) as well as medical history (whether the subject had been prescribed antihypertensives by a physician). Students were asked to rule out the health complications from a checklist in a Google form in accordance with their pre-existing knowledge. They were also directed to select relevant symptoms from a provided list in order to assess awareness among subjects.

Participation of students was voluntary. Non-cooperative students were excluded. A total of 70 students participated out of a class strength of 366. Blood pressure of male and female students of the age group 17-20 was checked using a sphygmomanometer at two specific times, once early morning and once in the afternoon. Statistical analysis was completed using SPSS 27. Categorical data was computed as frequencies, percentages, and pie charts.

Results

Normal blood pressure level was set at 120/80 (systolic/diastolic). Any change in BP measurements taken over time due to environmental factors was recorded as a fluctuation from the set reference value. In an age group of 17-20 comprising 65% females and 35% males, 73% of students got their blood pressure checked by a professional. 22% of students had blood pressure below normal, 53% of students were observed with normal blood pressure, and 25 % of students didn't get their blood pressures checked. Only 24% of students were reported to have a history of blood pressure fluctuations. Less than 1% of students took medicine for blood pressure issues.

Figure 1 *Percentage of Participants Who Have Had Their BPs Checked by Professionals.*



Note. Data presented as percentage.

Table 1 *Response of Participants Regarding Blood Pressure Related Questions.*

Variables	Frequency (Percentage) n=36
Has the student had their blood pressure checked by a professional?	
Yes	36 (75.0%)
No	12 (25.0%)
Have you taken any medication for blood pressure issues?	48 (100%)
Headache and vomiting; symptoms of hypertension?	
Yes	36 (75.0%)
No	12 (25.0%)
Lifestyle influence on hypertension	
Yes	36 (75.0%)
No	12 (25.0%)
Medications influence on hypertension	
Yes	24 (50.0%)
No	12 (25.0%)

Note. Data presented as frequency (percentage).

Discussion

This study aimed to estimate the mean scores of blood pressure (BP) and knowledge associated with the risks of high BP among 1st-year MBBS students at Rawalpindi Medical University. The findings provide crucial insights into the current understanding and awareness levels of high BP risks and how these correlate with actual BP readings.

Our analysis revealed that the mean BP scores among participants were in accordance with the range recommended by health guidelines. Additionally, the mean knowledge scores regarding the risks associated with high BP were moderate, indicating a gap in students' awareness regarding some factors and understanding of hypertension and its implications. In an age

group of 17-20 comprising 65% females and 35% males, 73% of students got their blood pressure checked by a professional. 22% of students had blood pressure below normal, 53% of students were observed with normal blood pressure, and 25 % of students didn't get their blood pressure checked. Only 24% of students were reported to have a history of

blood pressure fluctuations. Less than 1% of students took medicine for blood pressure issues.

Our findings are in line with those of similar studies, which have reported that a significant proportion of participants could not identify key risk factors for high BP, such as obesity, poor diet, and lack of physical activity.[18] This suggests a persistent global challenge in raising awareness and understanding of hypertension.

The results of this study highlight several implications for public health policy and practice. First, there is a clear need for enhanced educational campaigns that focus on the risks of high BP and the importance of regular monitoring. Health education programs should be tailored to address specific knowledge gaps and be delivered through various channels to reach a broader audience.

Second, the high mean BP scores emphasize the urgency of implementing screening programs to identify individuals at risk of hypertension early. Such programs could be integrated into routine health check-ups and community health initiatives to ensure wider reach and impact.

Despite the valuable insights provided, this study has several limitations. The cross-sectional design limits the ability to establish causal relationships between knowledge levels and BP readings. Additionally, the self-reported nature of the knowledge assessment may introduce response bias. Future research should consider longitudinal studies to track changes in BP and knowledge over time and explore the effectiveness of different educational interventions.

Moreover, qualitative research could provide deeper insights into the barriers to knowledge acquisition and behavioral change regarding BP management. Understanding these barriers could help in designing more effective health communication strategies.

Conclusion

This study found that the mean blood pressure (BP) scores of participants were within the normal range, suggesting effective current health practices among the sample population. However, the moderate knowledge scores regarding high BP risks highlight the need for improved public health education. Enhancing awareness through targeted campaigns is essential to maintain healthy BP levels and prevent hypertension. Public health authorities should focus on educational initiatives to address this knowledge gap and ensure continued health and prevention efforts.

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