

Hypertension awareness among university students: the impact of education and societal factors

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ABSTRACT

Aims: Hypertension (HT) is a leading global cause of morbidity and mortality, contributing significantly to the burden of cardiovascular diseases. Despite its widespread prevalence, HT is often underdiagnosed and poorly managed, particularly among younger populations. This study investigates HT awareness among university students, focusing on the impact of education, gender, and lifestyle practices.

Methods: A cross-sectional online survey was conducted among 546 students from various academic disciplines using an online questionnaire that assessed demographics, HT awareness, lifestyle factors, and blood pressure monitoring habits. Statistical comparisons were performed using independent t-tests, Mann-Whitney U tests, and correlation analyses.

Results: Study results revealed notable disparities in HT awareness and behaviors. Medical students demonstrated higher awareness of risk factors, diagnostic thresholds, and BP monitoring practices compared to non-medical students. Females consistently exhibited healthier lifestyle behaviors, including lower smoking prevalence, greater physical activity, and proactive BP monitoring. Awareness of dietary factors contributing to HT was moderate (62.8%), but knowledge of diagnostic BP thresholds was alarmingly low (22.9%), even among medical students. Family history of cardiovascular diseases positively influenced HT awareness, while beliefs about COVID-19's impact on BP regulation highlighted gaps in health literacy.

Conclusion: The findings underscore the critical role of formal education and targeted interventions in enhancing HT awareness. Integrating basic health education into non-medical curricula, addressing gender-specific disparities through tailored campaigns, and promoting familial health education are vital strategies for mitigating the long-term cardiovascular risks associated with undiagnosed and uncontrolled hypertension among young adults.

Keywords: Hypertension, awareness, university students, young

INTRODUCTION

Hypertension (HT), is a leading cause of morbidity and mortality globally.¹ It contributes significantly to the burden of cardiovascular diseases, and is responsible for approximately 10.8 million deaths annually.² Despite its prevalence and devastating consequences, HT is often underdiagnosed and inadequately managed, primarily due to a lack of awareness and knowledge about the condition among the general population.³ This gap is particularly concerning among younger demographics, who are traditionally perceived as being at lower risk for HT but increasingly exhibit risk factors such as obesity, sedentary lifestyles, and poor dietary habits.^{4,5}

The rising prevalence of HT in youth necessitates targeted educational interventions to enhance awareness and promote early preventive measures.⁶ Early detection and management of HT are critical, as elevated blood pressure (BP) during adolescence and early adulthood can predispose individuals to persistent HT and associated complications later in life.⁷

Furthermore, awareness of modifiable and non-modifiable risk factors is essential to mitigate the public health burden of this condition.⁸ University students, representing a highly dynamic and educated segment of society, provide a unique cohort for assessing HT awareness. This group is at a transitional stage of life, where lifestyle habits are often formed and consolidated.⁹

Previous studies have primarily focused on the general adult population, with limited research targeting young adults and university students. This study seeks to fill this gap by evaluating the awareness of HT among undergraduate students from diverse academic disciplines. By investigating their knowledge of HT risk factors, lifestyle practices, and monitoring habits, this research aims to identify critical gaps and opportunities for intervention. Furthermore, the study explores the influence of medical education, gender, and family medical history on HT awareness, providing a comprehensive

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understanding of the factors shaping health behaviors in this population.

METHODS

Ethics

Ethical approval for the study was obtained from the Ufuk University Non-interventional Clinical Researches Evaluation Ethics Committee (Date: 09.01.2025, Decision No: 25.01.09.02/16). Prior to participation, an online informed consent was obtained from all individuals. The collected data were anonymized and securely stored to uphold participant confidentiality and ensure compliance with data protection regulations. All procedures adhered to the ethical principles outlined in the Declaration of Helsinki.

Study Design

This was a cross-sectional study aimed at evaluating HT awareness, lifestyle practices, and associated factors among undergraduate students. The study utilized an online survey format, ensuring broad accessibility and convenience for participants. This design allowed for a rapid and cost-effective method of data collection while minimizing potential biases associated with in-person surveys.

Study Population

The target population comprised undergraduate students enrolled in various academic disciplines, including medicine and non-medical fields, across multiple universities. A total of 546 students participated in the study, representing a diverse cohort in terms of academic background, gender, and lifestyle practices. The inclusion of medical and non-medical students provided a comparative perspective on the impact of educational exposure to health-related topics on HT awareness. The inclusion criteria comprised undergraduate students aged 18-30 years old. Exclusion criteria encompassed individuals with incomplete survey responses. The latter were omitted from the final analysis to ensure the integrity and quality of the data.

Data Collection

The study utilized a structured online questionnaire, meticulously developed to address the objectives of the research. The survey comprised four primary sections. The first section focused on demographics and lifestyle information, including variables such as age, gender, academic discipline, smoking habits, physical activity, and body-mass index (BMI). The second section assessed participants' awareness of HT, exploring their knowledge of risk factors, diagnostic thresholds, and the significance of BP monitoring. This section also included questions on dietary components influencing BP, symptoms of high BP, and the organs most affected by HT. The third section evaluated BP monitoring practices, examining participants' ownership of sphygmomanometers, frequency of BP measurement, and awareness of ideal conditions for accurate BP measurement. The final section investigated the influence of social and medical factors, including family history of cardiovascular diseases, diabetes, and HT, alongside perceptions of the impact of COVID-19 on BP regulation. The questionnaire was initially pretested to a small group of students to ensure clarity, relevance, and ease

of understanding. Feedback from this pilot test was used to refine the survey before full deployment. The Participation was voluntary, and respondents were informed about the study's purpose, confidentiality of their responses, and the option to withdraw at any time.

Statistical Analysis

The numerical data obtained in the study will be presented as mean±standard deviation (SD), while categorical data will be reported as frequency (n) and percentage (%). The normality of the data distribution will be assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. For normally distributed data, paired sample T tests will be used for dependent groups, and independent sample t-tests for independent groups. For non-normally distributed data, the Wilcoxon signed-rank test will be used for dependent groups, and the Mann-Whitney U test for independent groups. The chi-square test will be applied for the comparison of categorical variables.

Correlation analyses will be conducted to examine the relationships between hypertension awareness and demographic or behavioral factors. Pearson's correlation test will be used for parametric datasets, and Spearman's correlation test for non-parametric datasets. To identify the factors influencing hypertension awareness levels, a multivariate logistic regression model will be constructed. This model will include variables found to be significant in univariate analyses ($p < 0.05$) as well as other variables deemed biologically significant. Data analysis was done using SPSS version 21.0 for windows (IBM Corp., USA).

RESULTS

Among the 546 undergraduate students surveyed, comprising 328 medical and 218 non-medical students, notable disparities in HT awareness and health behaviors were observed. While 46.9% of participants believed that they led a healthy lifestyle, this perception was significantly more common among medical students compared to non-medical students (54.3% vs. 35.8%, $p < 0.01$), with females reporting higher adherence to healthy habits than males. Smoking prevalence was 27.1%, with medical students and females exhibiting notably lower rates than their counterparts. Nearly half of the participants (48.9%) engaged in regular physical activity, and the mean BMI was 23.1 ± 3.5 kg/m², once again medical students and females demonstrating lower values. Awareness of HT risk factors varied, with 62.8% identifying dietary contributors but only 22.9% recognizing diagnostic BP thresholds; medical students significantly outperformed non-medical students in both areas (all p -values < 0.01) (Table).

Blood pressure monitoring practices were prevalent, with 61.9% owning a sphygmomanometer and 65.8% measuring their BP at least once in the past year, trends more pronounced among medical students and females. Knowledge of the ideal BP measurement conditions was observed in 56% of participants, predominantly among medical students (77.4% vs. 23.9%, $p < 0.01$). Family history of cardiovascular diseases was positively associated with higher HT awareness ($p < 0.01$), while the belief that COVID-19 could influence BP regulation was noted in 25.3% of participants but did not significantly impact awareness levels.

Table. Distribution of responses to survey questions on hypertension awareness and related behaviors among university students, stratified by faculty of study				
Survey questions	Rates of correct answers among participants n (%)			
	Total (n=546)	Faculty of medicine (n=328)	Other faculties (n=218)	p-value
Do you believe that you lead a healthy lifestyle?	256 (46.9)	178 (54.3)	78 (35.8)	p<0.01
Do you smoke?	148 (27.1)	48 (14.6)	100 (45.9)	p<0.01
Do you know which food components can raise blood pressure?	343 (62.8)	230 (70.1)	113 (51.8)	p<0.01
Do you exert regular physical exercise?	267 (48.9)	168 (51.2)	99 (45.4)	0.34
Body-mass index (kg/m ²)	23.1±3.5	22.8±3.7	23.5±3.2	0.02
Do you have a sphygmomanometer at home?	338 (61.9)	216 (65.9)	122 (56.0)	0.15
Have you measured your blood pressure in the last year?	360 (65.8)	248 (75.6)	112 (51.4)	p<0.01
Do you know the ideal conditions for measuring blood pressure?	306 (56)	254 (77.4)	52 (23.9)	p<0.01
What are the blood pressure thresholds?	125 (22.9)	100 (30.5)	25 (11.5)	p<0.01
What is the most common symptom of high blood pressure?	289 (52.9)	224 (68.3)	60 (27.5)	p<0.01
Which organ is most commonly affected by hypertension?	289 (52.9)	212 (64.6)	97 (44.4)	p<0.01
Do you have a family history of hypertension?	284 (52)	178 (54.3)	106 (48.6)	0.37
Do you have a family history of diabetes?	198 (36.3)	118 (36)	80 (36.7)	0.89
Do you have a family history of high cholesterol?	286 (52.4)	172 (52.4)	114 (52.3)	0.98
Do you have a family history of cardiovascular diseases?	224 (41)	124 (37.8)	100 (45.9)	0.15
Do you have a family history of stroke?	58 (10.6)	36 (11)	22 (10.1)	0.75
Do you have a family history of kidney diseases?	56 (10.3)	36 (11)	20 (9.2)	0.52
Do you believe that COVID-19 infection or vaccination can affect blood pressure levels?	138 (25.3)	72 (22)	66 (30.3)	0.06

DISCUSSION

This study evaluated HT awareness among undergraduate students, highlighting differences between medical and non-medical students, gender disparities, and the influence of familial and social factors, including perceptions related to the COVID-19 pandemic. The findings provide a comprehensive overview of the current awareness levels and practices, offering insights for future educational and public health initiatives.

Numerous studies highlight the critical role of formal education in promoting health literacy and positive health-promoting lifestyle.¹⁰ For instance, a study demonstrated that medical students possess a higher level of health literacy, which is crucial for preventing diseases and promoting healthy life style.¹¹ In parallel to this, our study showed that medical students have a significantly higher levels of awareness regarding HT risk factors, diagnostic thresholds, and the importance of BP monitoring compared to their non-medical counterparts. This disparity underscores the critical role of formal education in shaping health knowledge and behaviors. Medical curricula likely provide exposure to preventive cardiology concepts, practical training in BP measurement, and discussions on lifestyle modifications, all of which contribute to enhanced awareness. Conversely, non-medical students, lacking this exposure, showed notable gaps, particularly in identifying BP thresholds and ideal measurement conditions. This gap emphasizes the need to integrate basic health education into non-medical curricula to ensure broader public awareness.

Another aspect of HT awareness is gender disparities, studies have shown that women are generally more likely to adhere to

health guidelines and engage in preventive behaviors, which may be influenced by societal norms and expectations.¹² In our study, gender-based differences about HT awareness were evident, with females consistently exhibiting greater HT awareness and healthier behaviors compared to males. Lower smoking prevalence, better adherence to regular physical activity, and more proactive BP monitoring practices among females was also observed. Cultural and societal norms may also play a role, as women often face greater emphasis on maintaining health, which could explain these disparities. However, males demonstrated higher engagement in behaviors linked to cardiovascular risk, such as smoking, which may hinder their overall awareness and predispose them to long-term health issues. Addressing these gender disparities through targeted public health campaigns could encourage men to adopt healthier practices and improve their understanding of HT.

On the other hand, nutritional awareness is essential, as it promotes healthier eating behaviors that can significantly improve dietary choices, playing a crucial role in managing HT effectively.¹³ Although 62.8% of the participants in our study were aware of dietary factors contributing to HT, like many college students, they often encounter challenges when adapting to new food environments, which can substantially influence their eating habits.¹⁴ Such challenges highlight the need for targeted interventions in campus dining facilities to promote healthier food choices, thereby potentially reducing the risk of HT.

Awareness of HT within the population reveals notable gaps, particularly in understanding diagnostic criteria, emphasizing the importance of targeted educational initiatives.¹⁵ In our study, only 22.9% correctly identified BP thresholds for diagnosing HT. This finding is concerning, as knowledge of diagnostic criteria is essential for recognizing and addressing high BP early. Even among medical students, who exhibited better knowledge than non-medical peers, this gap highlights the need for enhanced emphasis on HT in medical education. Practical training modules that focus on recognizing and interpreting BP values could bridge this gap and improve diagnostic proficiency.

Studies showed that personal experiences with diseases can enhance awareness and prompt individuals to seek medical advice more proactively.¹⁶ In our study, participants with a family history of cardiovascular diseases showed higher HT awareness. However, family histories of diabetes and HT alone did not show a similar impact. This discrepancy may indicate varying levels of perceived risk associated with different health conditions, as individuals may prioritize awareness and management of conditions they perceive as more immediately threatening, such as cardiovascular diseases, suggesting the need for targeted interventions focusing on familial health education to better connect these conditions to HT awareness.

The COVID-19 pandemic has significantly heightened public awareness of health-related issues, particularly cardiovascular diseases, while also creating opportunities for the spread of misinformation.^{17,18} In our study, 25.3% of participants believing that the infection or vaccination could affect BP regulation. This perception was more prevalent among non-medical students, potentially reflecting greater susceptibility to misinformation. While this belief did not significantly impact HT awareness, it underscores the importance of clear communication from health authorities to address misconceptions and provide evidence-based information.

The study's findings highlight the need for comprehensive public health initiatives to improve HT awareness among young adults. Integrating health education into non-medical curricula could ensure that all students, regardless of academic discipline, receive basic knowledge about HT and its management. Gender-specific campaigns that address the unique health behaviors of males and females could also help reduce disparities. Additionally, leveraging familial relationships to promote health education could further enhance awareness and engagement in preventive practices.

Limitations

This study has several limitations that should be acknowledged. The reliance on self-reported data introduces the potential for response bias, as participants may overestimate their health behaviors or knowledge levels. Additionally, the cross-sectional design captures awareness at a single point in time, limiting the ability to infer causal relationships. The study also excluded postgraduate young students, who may exhibit different awareness levels and behaviors. Future research could address these limitations by employing longitudinal designs and including a broader range of participants.

CONCLUSION

This study underscores the importance of education, gender, and familial influences in shaping HT awareness among undergraduate students. While medical students and females demonstrated greater awareness and healthier behaviors, critical gaps, particularly in understanding diagnostic thresholds, persist across the cohort. Addressing these gaps through targeted educational interventions and public health campaigns could significantly improve HT awareness and prevention among young adults, contributing to long-term cardiovascular health.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of the Ufuk University Non-interventional Clinical Researches Evaluation Ethics Committee (Date: 09.01.2025, Decision No: 25.01.09.02/16).

Informed Consent

Prior to participation, an online informed consent was obtained from all individuals.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

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Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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