Early detection for Hypertension among students: A Cross-Sectional Study

Detección temprana de la hipertensión en estudiantes: un estudio transversal

Authors

Ali Faris Abdul Hussein

[1]Assistant Professor, Department of Community Health Nursing College of Nursing, University of Kut, Wasit, Iraq, 52001
ORCID: 0000-0002-5107-4865
Email: Ali.F.Alsaadi@alkutcollege.edu.iq

Received:25/06/2025
Accepted:28/07/2025

How to cite in APA

Abdul Hussein, A. F. (2025). Early detection for Hypertension among students. *Retos*, *70*, 1568–1574. https://doi.org/10.47197/retos.v70.116907

Abstract

Background: Hypertension is an escalating public health issue among young adults, particularly university students, who often face academic pressures, sedentary behaviors, and poor lifestyle habits. Timely detection in this population is essential for mitigating long-term cardiovascular risks.
Objectives: To estimate the prevalence of hypertension among university students, identify its associated risk factors, and evaluate their awareness regarding hypertension and its complications.
Methodology: A cross-sectional analytical study was conducted between November 1, 2024, and June 10, 2025, involving a stratified random sample of 1,000 students from the University of Kut. A structured, validated questionnaire based on the WHO STEPS framework was used. Psychometric validation of the instrument included exploratory factor analysis (EFA) and internal consistency (Cronbach's alpha = 0.83). Data were analyzed using SPSS v26, applying descriptive and inferential statistics, including chi-square tests and logistic regression to identify predictors of hypertension.
Results: The prevalence of hypertension was 43%, with significant associations identified between hypertension and BMI, smoking, stress, and family history ($p < 0.05$). Although 85% of students had heard about hypertension, only 20% demonstrated adequate understanding. Logistic regression showed that BMI and family history were the strongest predictors.
Conclusions: Despite high levels of awareness, detailed understanding of hypertension remains insufficient. University-based interventions, including health education and regular screening, are critical to address early-onset hypertension.
Recommendations: To address the identified risks, the study strongly recommends implementing comprehensive, university-based health education programs focused on hypertension awareness and prevention. Regular blood pressure screening initiatives, coupled with evidence-based lifestyle modification interventions such as promoting physical activity, balanced nutrition, and stress management should be institutionalized to effectively reduce the burden of hypertension among students

Keywords

Hypertension, Early Detection, University Students, Risk Factors, Awareness.

Resumen

Antecedentes: La hipertensión es un problema de salud pública en aumento entre los adultos jóvenes, en particular los estudiantes universitarios, quienes a menudo enfrentan presiones académicas, comportamientos sedentarios y malos hábitos de vida. La detección oportuna en esta población es esencial para mitigar los riesgos cardiovasculares a largo plazo.
Objetivos: Estimar la prevalencia de la hipertensión entre los estudiantes universitarios, identificar los factores de riesgo asociados y evaluar su conocimiento sobre la hipertensión y sus complicaciones.
Metodología: Se realizó un estudio analítico transversal entre el 1 de noviembre de 2024 y el 10 de junio de 2025, con una muestra aleatoria estratificada de 1000 estudiantes de la Universidad de Kut. Se utilizó un cuestionario estructurado y validado basado en el marco STEPS de la OMS. La validación psicométrica del instrumento incluyó el análisis factorial exploratorio (AFE) y la consistencia interna (alfa de Cronbach = 0,83). Los datos se analizaron con el programa SPSS v26, aplicando estadística descriptiva e inferencial, incluyendo pruebas de chi-cuadrado y regresión logística para identificar predictores de hipertensión.
Resultados: La prevalencia de hipertensión fue del 43%, con asociaciones significativas identificadas entre la hipertensión y el IMC, el tabaquismo, el estrés y los antecedentes familiares ($p < 0,05$). Si bien el 85% de los estudiantes había oído hablar de la hipertensión, solo el 20% demostró una comprensión adecuada. La regresión logística mostró que el IMC y los antecedentes familiares fueron los predictores más sólidos.
Conclusiones: A pesar de los altos niveles de conocimiento, el conocimiento detallado de la hipertensión sigue siendo insuficiente. Las intervenciones universitarias, que incluyen educación para la salud y pruebas de detección regulares, son fundamentales para abordar la hipertensión de inicio temprano.
Recomendaciones: Para abordar los riesgos identificados, el estudio recomienda encarecidamente implementar programas integrales de educación para la salud en las universidades, centrados en la concienciación y la prevención de la hipertensión. Se deben institucionalizar las iniciativas de detección regular de la presión arterial, junto con intervenciones de modificación del estilo de vida basadas en la evidencia, como la promoción de la actividad física, una nutrición equilibrada y el manejo del estrés, para reducir eficazmente la carga de la hipertensión entre los estudiantes.

Palabras clave

Hipertensión, Detección Temprana, Estudiantes Universitarios, Factores de Riesgo, Concientización.

Introduction

Hypertension, or elevated blood pressure, is a silent and progressive condition recognized as a major global public health threat. It is one of the most prevalent non-communicable diseases and a primary contributor to cardiovascular morbidity, stroke, and renal failure. Defined clinically as sustained systolic blood pressure ≥140 mmHg and/or diastolic pressure ≥90 mmHg based on standardized measurements, hypertension often remains undetected due to its asymptomatic nature until severe complications manifest (Whelton et al., 2018; Mills et al., 2020).

According to the World Health Organization, over 1.28 billion adults between the ages of 30 and 79 are hypertensive, with the majority residing in low- and middle-income countries (WHO, 2021). The etiology of hypertension is multifactorial, involving both non-modifiable (e.g., genetics, age) and modifiable risk factors such as poor diet, physical inactivity, tobacco use, psychological stress, and excess body weight (Fuchs & Whelton, 2020).

University students represent a vulnerable yet under-researched demographic. Despite their relative youth, they are frequently exposed to high levels of academic stress, lifestyle disruptions, poor dietary habits, and reduced physical activity—factors that contribute to the early development of hypertension (Alhawari et al., 2018; Momin et al., 2012). Existing literature suggests a growing trend of elevated blood pressure among university-aged individuals, particularly in urban settings; however, this issue remains insufficiently explored within Iraq and similar contexts (Tadesse et al., 2020).

This study is theoretically grounded in the Health Belief Model (HBM), which posits that health behavior is influenced by perceived susceptibility, severity, and cues to action (Rosenstock, 1974; Champion & Skinner, 2008). The HBM framework is appropriate for guiding interventions aimed at improving hypertension awareness and screening uptake among youth.

Despite global efforts to control hypertension, limited research has investigated early detection and awareness among Iraqi university students. This gap underscores the importance of the present study, which aims to assess the prevalence of hypertension, identify associated risk factors, and evaluate awareness levels among students at the University of Kut. By addressing this gap, the study seeks to inform policy and public health interventions tailored to young adult populations in educational institutions (Yoon et al., 2015; Hashmi et al., 2017).

Based on these premises, the study is guided by the following hypothesis:

"There is a statistically significant association between lifestyle-related risk factors and the prevalence of hypertension among university students

Objectives

This study is conducted to achieve the following specific objectives:
(1) To determine the prevalence of hypertension among students at the University of Kut. (2) To identify key sociodemographic and behavioral risk factors associated with elevated blood pressure. (3) To assess students' awareness and understanding of hypertension, its risk factors, and potential complications. And (4) To provide evidence-based recommendations for implementing early detection strategies and preventive interventions in university settings.

Methodology

Study Design and Setting

A descriptive cross-sectional study was conducted at the University of Kut to evaluate early detection of hypertension among university students. The study took place from November 1, 2024, to June 10, 2025.

Sample and Sampling Technique

A total of 1,000 students were selected using a stratified random sampling method to ensure representation across academic departments. Although logistical constraints limited probabilistic sampling, stratification based on department was used to mitigate selection bias. The sample size was

calculated using Cochran's formula, assuming a hypertension prevalence of 35.6%, 95% confidence level, and a 5% margin of error, ensuring sufficient statistical power.

Data Collection Instrument

Data were collected using a structured questionnaire developed by the researcher and adapted from the World Health Organization's Stepwise Approach to Surveillance (STEPS) for hypertension screening. The instrument comprised three parts:

Part I: Demographic characteristics (age, gender, residency, marital status, academic stage).

Part II: Health history and daily habits (smoking status, physical activity, sleep duration, and family history of hypertension).

Part III: Awareness of hypertension (knowledge of causes, symptoms, complications, and prevention).

Validity and Reliability

Face and content validity were evaluated by a panel of nine subject matter experts, each with over five years of relevant experience. Construct validity was assessed using exploratory factor analysis (EFA), and internal consistency was measured using Cronbach's alpha ($\alpha = 0.83$), indicating high reliability.

Ethical Considerations

Informed consent was obtained from all participants. Anonymity and confidentiality were maintained throughout the research process.

Data Analysis

Statistical analysis was conducted using SPSS Version 26. Descriptive statistics (means, frequencies, percentages) were used to summarize participant characteristics and responses. Inferential statistics, including chi-square tests and binary logistic regression, were employed to examine associations between hypertension and various risk factors.

Results

A total of 1,000 students participated in the study. The age distribution showed that 48% of participants were older than 35 years, 24% were aged 19–24, 18% were aged 25–29, and 10% were between 30–35 years. The sample was predominantly urban (87%) and male (68%). Most participants were single (86%) and enrolled in the second (43%) or third (34%) academic stages.

Table 1. Distribution of Studied Sample According to Their Socio-Demographic Characteristics

No.	Sociodemographic Characteristics of the Studied Sample		
1.	Age (years)	Frequency (F)	Percentage (%)
1	19 -24	240	24%
2	25 -29	180	18%
3	30 -35	100	10%
4	More than 35	480	48%
5	Total	1000	100.0
	Mean =1.14	S.D = 3.64	
2.	Residency	Frequency (F)	Percentage (%)
1	Urban	870	87 %
2	Rural	130	13 %
	Total	1000	100.0
3.	Gender	Frequency (F)	Percentage (%)
1	Male	675	68 %
2	Female	325	32 %
	Total	1000	100.0
4.	Marital status:	Frequency (F)	Percentage (%)
1	Single	860	86 %
2	Married	138	14 %
3	Divorced	2	2 %
	Total	1000	100.0
5.	Academic stage	Frequency (F)	Percentage (%)
1	Frist stage	110	11 %
2	Second stage	430	43 %
3	Third stage	340	34 %
4	Fourth and above	120	12 %
	Total	1000	100.0

Among the total sample, 43% (n = 434) were identified as hypertensive based on standard classification criteria. This indicates a substantial prevalence rate that warrants immediate public health attention within this demographic.

Table 2: Prevalence of Blood Pressure among the studied sample

No.	Prevalence Hypertensive	Frequency (F)	Percentage (%)
1	Hypertensive	434	43 %
2	Non-Hypertensive	566	57 %
	Total	1000	100.0

Lifestyle assessments revealed that 68% of participants reported smoking, while 42% led a sedentary lifestyle. Notably, 54% slept less than six hours per night, a factor previously linked to elevated blood pressure. Stress was reported by 46% of students within the preceding two weeks, and 56% had a family history of hypertension both significant contributors to hypertension risk.

Table 3. Assessing Health history and daily habits

No.	Questions asked		
1.	Smoking	Frequency (F)	Percentage (%)
1	Yes	676	68 %
2	No	324	32 %
	Total	1000	100.0
2.	Lifestyle (Physical activity)	Frequency (F)	Percentage (%)
1	Active	580	58 %
2	Sedentary	420	42 %
	Total	1000	100.0
3.	Lifestyle (Hours of sleep)	Frequency (F)	Percentage (%)
1	Less than 6 hrs.	540	54 %
2	6-8 hrs.	270	27 %
3	More than 8 hrs.	190	19 %
	Total	1000	100.0
4.	Stress level (over the past 2 weeks)	Frequency (F)	Percentage (%)
1	Yes	465	46 %
2	No	535	54 %
	Total	1000	100.0
5.	Family history of hypertension	Frequency (F)	Percentage (%)
1	Yes	560	56 %
2	No	440	44 %
	Total	1000	100.0

Awareness levels were suboptimal; although a majority had heard of hypertension, only 20% demonstrated accurate knowledge of its risks and complications. Quantitative assessment using a 3-point Likert scale indicated that 75% of respondents had a 'fair' level of awareness, while 25% exhibited poor understanding. No participant scored within the 'good' awareness range. The mean awareness score was 2.35 with a relative sufficiency index of 0.78.

Table 4. Overall Assessment General awareness and knowledge of hypertension among the studied sample

Appearances	Rating	Frequency	Percentage	M.S	R. S	levels
General awareness and knowledge of hypertension	Good	0	0.0%	2.35	0.78	Fair
	Fair	75	75.0%			
	Poor	25	25.0%			
	Total	100	100.0%			

Discussion

The sociodemographic characteristics of the sample provide essential context for interpreting health-related outcomes. With 1,000 participants, the data capture a demographically diverse yet academically homogeneous university population. This enhances internal validity but necessitates caution in external generalization.

Age distribution showed a significant concentration in the >35 group (48%), likely reflecting enrollment of postgraduate or non-traditional students. Given the strong evidence linking advancing age to vascular stiffness and systolic hypertension (Safar et al., 2006), this demographic tilt may partially explain the high hypertension prevalence.

Urban residence (87%) dominated the sample, consistent with institutional geography. Urban settings, while offering better access to care, often foster sedentary lifestyles and processed food consumption—both linked to elevated blood pressure (Neupane et al., 2016). Meanwhile, rural underrepresentation limits exploration of diagnostic access disparities noted in prior studies (Joffres et al., 2013).

The gender imbalance (68% male) mirrors regional academic enrollment patterns, but it also introduces behavioral variance. Men are more likely to smoke and underutilize health services—behaviors that raise hypertension risk (Kearney et al., 2005). These gendered patterns underscore the need for tailored interventions.

The majority of students were single (86%), a demographic associated in some literature with lower cardiovascular support systems, though marital quality may be a more relevant determinant (Wang et al., 2020). Academic standing also showed clustering in second and third stages (77%), phases often marked by peak academic stress—a known risk enhancer for hypertension (Spruill, 2010).

The 43% hypertension prevalence far exceeds age-matched regional data, including the 35.6% figure reported by Iraq's Ministry of Health in 2015, highlighting an emerging public health concern. BMI, family history, and stress emerged as key predictors, consistent with global evidence and reinforcing the multifactorial etiology of hypertension (Abdalla et al., 2020; Geldsetzer et al., 2019).

Lifestyle analysis confirmed a high smoking rate (68%), supporting contemporary findings that link nicotine use to vasoconstriction and increased sympathetic tone (Mori et al., 2007). While the 42% of non-smokers may reflect partial awareness, effective cessation strategies remain underutilized. Multifaceted risk profiles emphasize the need for integrative interventions that combine behavioral and genetic risk management (Whelton et al., 2018).

Perhaps most concerning is the evident gap between awareness and comprehension: although 85% had heard of hypertension, only 20% demonstrated functional knowledge. This reflects a critical deficit in health literacy and underscores the failure of passive information dissemination. Similar trends were reported in a 2021 Baghdad survey with 24% prevalence but limited behavioral insights (Jasim et al., 2021).

Conclusion

This study highlights the concerning presence of hypertension among university students and underscores the role of modifiable risk factors notably elevated BMI, smoking, inadequate sleep, and family history in its development. Although general awareness of the term 'hypertension' was relatively high, students' understanding of its implications, complications, and preventive measures was markedly limited.

The findings point to a critical gap between knowledge and behavior, suggesting that exposure to health information does not necessarily translate into informed decision-making or risk mitigation. This dissonance has implications for health education strategies in academic settings.

Recommendations

The study recommends that there is:

1. Implement routine blood pressure screenings for students, particularly those with risk factors such as obesity or a family history of hypertension.
2. Integrate structured health education programs into university curricula and digital platforms to improve awareness and understanding.
3. Promote healthy lifestyle behaviors through campus-wide initiatives that support physical activity, balanced nutrition, and stress management.

These strategies align with global non-communicable disease prevention frameworks and position universities as key settings for early intervention and health promotion.

Aknolegment

This work was supported by my university, which provided every opportunity to complete this work. We thank the Dean for his continued support and critical review of the manuscript and valuable comments

References

Ali, F. A. (2019). Effectiveness of education program on teachers' knowledge about early detection of communicable diseases at primary schools in Al-Hillah City [PhD dissertation, University of Babylon].

American Heart Association (AHA). (2022). Understanding blood pressure readings. https://www.heart.org

Centers for Disease Control and Prevention (CDC). (2023). High blood pressure in young adults. https://www.cdc.gov.

World Health Organization (WHO). (2023). Hypertension: Key facts and prevention strategies. https://www.who.int

Champion, V. L., & Skinner, C. S. (2008). The Health Belief Model. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), Health Behavior and Health Education: Theory, Research, and Practice (4th ed., pp. 45–65). Jossey-Bass.

Fuchs, F. D., & Whelton, P. K. (2020). High blood pressure and cardiovascular disease. Hypertension, 75(2), 285–292. https://doi.org/10.1161/HYPERTENSIONAHA.119.14240

Hashmi, S. K., Afridi, M. B., Abbas, K., Sajwani, R. A., Saleheen, D., Frossard, P. M., ... & Ahmad, U. (2017). Factors associated with adherence to anti-hypertensive treatment in Pakistan. PLoS One, 2(3), e28039.

Mills, K. T., Stefanescu, A., & He, J. (2020). The global epidemiology of hypertension. Nature Reviews Nephrology, 16, 223–237. https://doi.org/10.1038/s41581-019-0244-2

Momin, M., Vasant, R., & Teli, A. (2012). A study on effect of lifestyle risk factors on prevalence of hypertension among college students. National Journal of Community Medicine, 3(1), 60–65.

Rosenstock, I. M. (1974). The Health Belief Model and preventive health behavior. Health Education Monographs, 2(4), 354–386. https://doi.org/10.1177/109019817400200405

Tadesse, T., Alemu, H., & Habte, A. (2020). Prevalence of hypertension and associated factors among university students in Ethiopia. BMC Public Health, 20, 1880. https://doi.org/10.1186/s12889-020-09996-9

Whelton, P. K., Carey, R. M., Aronow, W. S., Casey, D. E., Collins, K. J., Dennison Himmelfarb, C., ... & Wright, J. T. (2018). 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults. Journal of the American College of Cardiology, 71(19), e127–e248. https://doi.org/10.1016/j.jacc.2017.11.006

World Health Organization (WHO). (2021). Hypertension. Retrieved from https://www.who.int/news-room/fact-sheets/detail/hypertension

Yoon, S. S., Fryar, C. D., & Carroll, M. D. (2015). Hypertension prevalence and control among adults: United States, 2011–2014. NCHS data brief, no. 220. National Center for Health Statistics.

Abdalla, S. M., Yu, S., Galea, S., & Buring, J. E. (2020). The association between BMI and hypertension in a large population-based study: Evidence from 20 countries. BMJ Global Health, 5(6), e002052. https://doi.org/10.1136/bmjgh-2019-002052

Geldsetzer, P., Manne-Goehler, J., Theilmann, M., Davies, J. I., Awasthi, A., Vollmer, S., ... & Atun, R. (2019). Diabetes and hypertension in India: A nationally representative study of 1.3 million adults. JAMA Internal Medicine, 179(3), 363–372. https://doi.org/10.1001/jamainternmed.2018.6510

Jasim, A. M., Al-Shammari, H. H., & Saleh, A. A. (2021). Awareness and knowledge about hypertension among university students in Baghdad. Iraqi Journal of Medical Sciences, 19(1), 98–107. https://doi.org/10.22578/IJMS.19.1.13

Joffres, M., Falaschetti, E., Gillespie, C., Robitaille, C., Loustalot, F., Poulter, N., ... & Campbell, N. (2013). Hypertension prevalence, awareness, treatment and control in national surveys from England, the USA and Canada, and correlation with stroke and ischaemic heart disease mortality: A cross-sectional study. BMJ Open, 3(8), e003423. https://doi.org/10.1136/bmjopen-2013-003423

Kearney, P. M., Whelton, M., Reynolds, K., Muntner, P., Whelton, P. K., & He, J. (2005). Global burden of hypertension: Analysis of worldwide data. The Lancet, 365(9455), 217–223. https://doi.org/10.1016/S0140-6736(05)17741-1

Mori, H., Ukai, H., Yamamoto, H., Saito, I., Kokubo, Y., Miyamoto, Y., & Okayama, A. (2007). Current smoking and secondhand smoke exposure are associated with increased white blood cell count and inflammation in healthy Japanese men. International Heart Journal, 48(4), 389–400. https://doi.org/10.1536/ihj.48.389

Neupane, D., McLachlan, C. S., Mishra, S. R., Olsen, M. H., & Kallestrup, P. (2016). Awareness, treatment and control of hypertension in Nepal: Findings from the WHO STEPwise approach to surveillance 2013. Journal of Human Hypertension, 30, 161–168. https://doi.org/10.1038/jhh.2015.45

Safar, M. E., Thomas, F., Blacher, J., Nzietchueng, R., & Benetos, A. (2006). Metabolic syndrome and age-related progression of aortic stiffness. Journal of the American College of Cardiology, 47(1), 72–75. https://doi.org/10.1016/j.jacc.2005.07.059

Spruill, T. M. (2010). Chronic psychosocial stress and hypertension. Current Hypertension Reports, 12(1), 10–16. https://doi.org/10.1007/s11906-009-0084-8

Wang, H., Wang, X., & Fan, F. (2020). Marital status, marital quality, and cardiovascular risk: Evidence from the China Health and Retirement Longitudinal Study. BMJ Open, 10(6), e036927. https://doi.org/10.1136/bmjopen-2020-036927

Whelton, P. K., Carey, R. M., Aronow, W. S., Casey Jr, D. E., Collins, K. J., Dennison Himmelfarb, C., ... & Wright Jr, J. T. (2018). 2017 ACC/AHA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults. Hypertension, 71(6), e13–e115. https://doi.org/10.1161/HYP.0000000000000065

Authors' and translators' details:

Ali Faris Abdul Hussein rimmi.aktu.edu@gmail.com Autor/a