

Assessment of Hypertension and its Associated Risk Factors Among Medical Students

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Abstract

Introduction: Hypertension refers to the condition where the pressure of blood against the artery walls is consistently too high. The increase and decrease in blood pressure throughout the day is normal but if it stays too high for a longer period, it causes severe health problems. Globally, Hypertension accounts for 28,000 deaths each day. The risk factors that can increase the likelihood of developing hypertension include older age, obesity, lack of exercise, high salt intake, family history, and certain medical illnesses such as diabetes and chronic kidney disorders.

Objective: To assess hypertension and its associated risk factors among medical students.

Method: In this cross-sectional study, 314 medical students were assessed by both an online and an F2F survey. Online data collection was carried out through Google Forms and F2F data was collected by manual data collection forms for a period of three months. The collected data was then analyzed using appropriate statistical methods to draw conclusions and answer the research questions.

Result: The study findings depicted those students aged between 21 to 25 years were affected the most (79.0%). In terms of obesity, students weighing greater than 60kg were 51.9%. The largest percentage of students 24.8% belonged to their final year followed by their fourth year 22.0%. Most students who participated in this study belonged to the degree program PharmD (46.5%). 49.7% of participants reported to have a family history of hypertension. It appeared that most students know the potential risk factors of hypertension and 74.8% of participants believed that arterial hypertension leads to cardiac failure.

Conclusion: Our study suggested a good understanding of hypertension among medical students. Family history, sedentary lifestyle, and high salt intake are potential risk factors. These findings highlight the importance of awareness and interventions to promote healthy habits.

Keywords: hypertension; artery walls; blood pressure; older age; obesity; lack of exercise

Introduction

In hypertension, the pressure within the blood vessels increases. As the heart pumps blood into the vessels, blood pressure is created by the force of the blood against the walls of the arteries. [1]. Hypertension is a silent killer and leads to diseases affecting the brain, kidneys, heart, and other organs resulting in premature death. It globally affects 1 in 4 men and 1 in 5 women, The rate of hypertension is increasing more among low- and middle-class people and in low-income countries, where two-thirds of cases are found due to increased risk factors in those populations over decades [1]. Factors such as obesity, genetic history, and sedentary lifestyle contribute to its development. Symptoms vary between individuals. Exercise improves insulin sensitivity, and blood lipid

transport, and may provide protection against future cardiovascular disease [2].

Classification of Hypertension

BP is measured as systolic and diastolic blood pressure. Systolic BP measures the pressure in blood vessels when the heart beats, while diastolic BP measures the pressure in between beats [3]. Prehypertensive patients have their systolic BP between 120-140 and diastolic BP recorded to be greater than 80 consistently. Patients are hypertensive if their systolic BP is 140 mmHg or higher and their diastolic BP is 90 mmHg or higher consecutively. Blood pressure in adults is categorized as shown in Table 1 [3]. Table 2 presents the various blood pressure categories according to European hypertension guidelines [3].

Table 1: Blood pressure values for adults with respect to SBP and DBP [1, 2].

Blood pressure classification	SBP (mmHg)	DBP (mmHg)
Normal	<120	And <80
Prehypertension	120–139	Or 80–89
Stage-1 hypertension	140–159	Or 90–99
Stage-2 hypertension	≥160	Or ≥100

Table 2: SBP and DBP values and definitions of blood pressure according to the hypertension guidelines in Europe.

Blood pressure type	SBP	DBP
Classification	MmHg	mmHg
Optimal	<120	<80
Normal	120–129	80–84
High normal	130–139	85–89
Grade 1 hypertension	140–159	90–99
Grade 2 hypertension	160–179	100–109

Etiological factors

The actual causes of hypertension are unknown, but it is believed that genetic variations and lifestyle modalities contribute to high blood pressure. These include obesity, insulin resistance, high alcohol intake, high salt intake, aging, sedentary lifestyle, stress, low potassium intake, and low calcium intake. These factors can also interact with each other to further increase blood pressure [4].

Prevalence

Hypertension is a major public health issue with a global prevalence of 40.8% and a control rate of 32.3%. It is a significant risk factor for serious health conditions such as cardiovascular disease, cerebrovascular disease, and chronic kidney disease. Complications from hypertension account for 9.4 million deaths worldwide, including 45% of deaths from coronary artery disease and 51% of deaths from stroke. Hypertension is more prevalent in low-income countries where nearly 80% of cardiovascular disease-related deaths occur [5]. In Pakistan, two large epidemiological studies reported hypertension prevalence rates of 19.1% and 14%, respectively. However, these studies are not representative of the current burden of disease as data collection occurred 15-20 years ago. Studies from other countries have shown global increases in hypertension prevalence over time due to population growth, aging, and changes in behavioral risks. Therefore, updated data on the prevalence, awareness, treatment, and control of hypertension in Pakistan is needed [5].

Despite being considered asymptomatic, hypertension can cause cognitive changes, mood alterations, and general symptoms like dizziness and headache [6]. Additionally, drugs used to treat

hypertension may also cause symptoms, some specific to the drug and others similar to those attributed to hypertension itself [6]. Essential hypertension (EHTN) is a condition where blood pressure is raised without any major systemic illness. EHTN is characterized by increased blood pressure [systolic BP (SBP) ≥ 140 mmHg and diastolic BP (DBP) ≥ 90 mmHg] and may be associated with symptoms such as headache, anxiety, dizziness, tinnitus, confusion, fatigue, shortness of breath, nausea, and palpitation [7].

Diagnosis

Patients with hypertension are asymptomatic, but certain symptoms can suggest secondary hypertension or complications that require further investigation. A complete medical and family history is recommended, including information on blood pressure, risk factors, overall cardiovascular risk, and symptoms of hypertension or coexisting illnesses [8]. This should include details on the onset and duration of hypertension, previous blood pressure levels, medication use and adherence, personal and family history of cardiovascular disease and risk factors, and any symptoms suggestive of secondary hypertension [8]. The examination should include an assessment of circulation and heart function, including pulse rate and rhythm, jugular venous pulse and pressure, apex beat, extra heart sounds, and the presence of bruits or peripheral edema. Other organs and systems should also be examined, including the kidneys, thyroid, and body mass index or waist circumference [8].

Treatment

In 2017, the American Cardiology Association and the American Heart Association updated their

guidelines for blood pressure classification, revising the previous JNC8 recommendations. Blood pressure is now classified into four categories: normal, elevated, stage 1 hypertension, and stage 2 hypertension.

Normal blood pressure is characterized by a systolic blood pressure below 120 mm Hg and a diastolic pressure below 80 mm Hg.

Elevated blood pressure is when the systolic pressure is between 120-129 mmHg and the diastolic pressure is below 80 mm Hg.

Stage 1 hypertension occurs when the systolic pressure is between 130-139 mmHg, or the diastolic blood pressure is between 80-89 mmHg.

Stage 2 Hypertension is when the systolic blood pressure is above 140 mmHg or the diastolic blood pressure is 90 mmHg or higher[9].

Hypertension is treated using antihypertensive medications. Thiazide diuretics, especially chlorthalidone, are the first line of treatment for hypertension and are necessary for patients with resistant hypertension [9]. Angiotensin-converting

enzyme inhibitors (ACE inhibitors) or angiotensin receptor blockers (ARBs) are also first-line treatments for hypertension, particularly in patients with diabetes or chronic kidney disease. Calcium channel blockers are another first-line treatment for hypertension [9]. Beta-blockers are not recommended for use in isolated hypertension but are first-line treatments for heart failure, ischemic heart disease, and atrial fibrillation. Vasodilators such as hydralazine are not first-line treatments and should only be added when a third or fourth medication is needed for difficult-to-control hypertension or when contraindications exist for first-line medications.

Patients with stage 2 hypertension typically require two or more antihypertensive medications for adequate control. These patients should be started on two antihypertensives and reassessed within thirty days to evaluate their response to therapy. Two medications from the same class, such as an ACE inhibitor and an ARB, should not be used together. This is in accordance with JNC 8 guidelines [9].

Table 3: Drug classes with their dose range.

Drug Class	Hypertensive Dose Range
ACE Inhibitors	
Enalapril	5-40 mg daily or twice daily
Lisinopril	10-40 mg daily
Ramipril	2.5-20 mg daily or twice daily
Captopril	12.5-150 mg twice daily or 3 times a day
Perindopril	4-16 mg daily
Eosinophil	10-40 mg daily
ARBs	
Valsartan	80-320 mg daily
Candesartan	8-32 mg daily
Losartan	50-100 mg daily or twice daily
Aldosterone Antagonists	
Spirolactone	25-100 mg twice daily
Eplerenone	50-100 mg daily or twice daily
B-blockers	
Metoprolol succinate	50-200 mg daily
Bisoprolol	2.5-10 mg daily
Carvedilol	12.5-50 mg twice daily

New recommendations for hypertension treatment include the use of aldosterone antagonists for hypertension and systolic heart failure. A history of atrial fibrillation should not be a factor in deciding to prescribe an angiotensin-receptor blocker. The blood pressure target for patients with nondiabetic chronic kidney disease has been revised to less than 140/90 mm Hg [10]. The blood pressure target for patients

with hypertension and diabetes remains unchanged at less than 130/80 mm Hg. Recommendations on lifestyle modifications, treatment thresholds and targets, choice of therapy, and treatment for specific conditions such as pheochromocytoma and primary hyperaldosteronism remain unchanged [10].

Side Effects

Calcium Channel Blockers: CCBs proved to be the first line of treatment for hypertension. Common side effects of CCBs include headaches, flushing, palpitations, swelling in the limbs (peripheral edema), low blood pressure (hypotension), slowed heart rate (atrioventricular block), constipation, and nausea [11].

Alpha Blockers: Alpha-blockers are a type of medication that relaxes vascular smooth muscle and causes blood vessels to widen. However, The use of alpha-blockers can have several side effects, including a sudden drop in blood pressure when standing up (orthostatic hypotension), rapid heartbeat (tachycardia), an increased risk of fainting (syncope), falls, and fractures [11].

Beta Blockers: Beta-blockers are a type of medication that lowers blood pressure by preventing catecholamines from binding to beta-adrenergic receptors. Common side effects of beta-blockers include a slow heart rate (bradycardia), constipation, sexual dysfunction, fatigue, and tightening of the airways (bronchospasm). Beta-blockers can also shorten the QT interval on an electrocardiogram (ECG) [11].

ACE Inhibitors: ACE inhibitors lower blood pressure by blocking the angiotensin-converting enzyme, which reduces the production of angiotensin II and causes blood vessels to widen. ARBs work by blocking the binding of angiotensin II to angiotensin-1 (AT1) receptors. The main side effects of these medications include high potassium levels (hyperkalemia), kidney dysfunction, coughing, and a sudden drop in blood pressure after the first dose (first-dose hypotension) [11].

Methodology

Study Design

This study employed an observational design to investigate the research question. The population of interest were medical students in Pakistan. Data was collected from a sample of 314 participants using both online and face to face survey. Online data collection was carried out through a Google form, while face to face data collection was done using a data collection form. Time duration of this study was 6 months from December 2022 to May 2023. The data collected was then analyzed using appropriate statistical methods to draw conclusions and answer the research question.

Study Population

The study population consisted of medical students enrolled in various degree programs including MBBS, Pharm D, BDS, MLT, DPT, and DVM. Participants were selected based on their enrollment in one of these programs. Demographic data collected from participants included age, gender, weight in kilograms, degree program, and year of study. This information was used to describe the characteristics of the study population and to ensure that the sample was representative of the population of interest.

Inclusion Criteria

The inclusion criteria for this study specified that participants must be students enrolled in one of the medical degree programs mentioned are:

1. MBBS
2. Pharm-D
3. BDS
4. MLT
5. DPT
6. DVM

Participants must not have been medical professionals.

Participants must be between the ages of 15 and 30.

Only individuals who met these criteria were eligible for this study.

Exclusion criteria

Exclusion criteria include.

Individuals who were not students or who were not enrolled in one of the specified medical degree programs (MBBS, Pharm D, BDS, MLT, DPT, and DVM).

Additionally, individuals who were medical professionals or who were outside of the specified age range of 15-30 could also be excluded from the study.

Sample Size

The sample size for this study was 314 participants. This number was determined by adding or subtracting 20 from the sample size which is obtained by using Daniel 1999 formula as follows:

$$n = \frac{NZ^2P(1-p)}{D^2(N-1)+Z^2(1-p)}$$

Here,

n' = sample size with finite population correction,

N = Population size,

Z = Z statistic for a level of confidence,

P = Expected proportion (in proportion of one), and

d = Precision (in proportion of one).

Ethical Approval

The Department of Pharmacy at Riphah International University was granted ethical approval to conduct a research study for assessing the knowledge of risk factors of Hypertension among medical students.

Statistical Analysis

In this study, we used SPSS to conduct a **descriptive frequency analysis** of our data. Frequency analysis is a descriptive statistical method that shows the number of occurrences of each response chosen by the respondents. This technique allows us to summarize and describe the main features of our data set. By using SPSS, we were able to easily generate frequency tables and charts to help us visualize and understand the distribution of our data.

Results

The results of this study provide valuable insights into the risk factors of hypertension. By analyzing the demographics of the population, the study sheds light on the characteristics of individuals who are more likely to develop hypertension. Additionally, the study examines the co-occurrence of disease in individuals with hypertension, providing a deeper understanding of the impact of this condition on overall health.

Through a careful analysis of the frequency and percentage of responses, this study offers a comprehensive view of hypertension and its risk factors.

Demographics Data

The data from 314 medical students was collected and analyzed. Out of these, 172 (54.8%) were males and 142 (45.2%) were females. The majority of participants (79.0%) were between the ages of 21-25, with a smaller percentage (20.7%) between the ages of 15-20 and only one participant (0.3%) between the ages of 26-30. In terms of weight, the majority of participants (51.9%) had a weight above 60 kg, while smaller percentages fall into the weight categories of 40-50 kg (18.8%), 51-55 kg (16.2%), and 56-60 kg (13.1%). The participants were distributed across different years of study, with the largest percentage (24.8%) in their fifth year, followed by those in their fourth year (22.0%), third year (15.3%), second year (12.1%), and first year (5.4%). The participants were also enrolled in different degree programs, with the largest percentage (46.5%) in the PHARM-D program, followed by those in the MLT program (19.7%), MBBS program (18.8%), DVM program (18.8%), BDS program (7.6%), and DPT program (7.3%).

Table 4: Frequency and Percentage of Responses for Population Demographics Data

Demographics Data	Categories	Frequency (n =314)	Percentage %
Gender	Male	172	54.8
	Female	142	45.2
Age (in Years)	15-20	65	20.7
	21-25	248	79
	26-30	1	3
Weight (in Kg)	40-50	59	18.8
	51-55	51	16.2
	56-60	41	13.1
	Above 60	163	51.9
Year Of Study	1	17	5.4
	2	38	12.1
	3	48	15.3
	4	69	22
	5	78	24.8
Degree Program	MBBS	59	18.8
	BDS	24	7.6
	PHARM-D	146	46.5
	DPT	23	7.3
	MLT	62	19.7
	DVM	59	18.8

Potential Risk Factors of Hypertension

Table 4 gives brief information about potential risk factors of hypertension. A total number of 314 data was collected. Among these 49.7% of participants reported having hypertension in their parents, while 42.7% reported not having hypertension in their parents and 7.6% did not know. 54.8% of participants reported having a sedentary lifestyle, while 41.1% reported not having a sedentary lifestyle and 4.1% did not know. 17.5% of participants reported being obese, while 73.9% reported not being obese and 8.6% did not know. 32.5% of participants reported consuming excess dietary salt in their food, while 52.9% reported

not consuming excess dietary salt and 14.6% did not know. 8.3% of participants reported being daily smokers, while 89.2% reported not being daily smokers and 2.5% did not know. 4.8% of participants reported being smokers of electronic cigarettes, while 93.3% reported not being smokers of electronic cigarettes and 1.9% did not know. 23.2% of participants reported being passive smokers, while 69.7% reported not being passive smokers and 7.0% did not know. 15.3% of participants reported that their face reveals aging, while 78.0% reported that their face does not reveal aging and 6.7% did not know. For further information see Table 5.

Table 5: Frequency and Percentage of Responses for Risk Factors of Hypertension

Risk Factors of Hypertension	Categories	Frequency (n=314)	Percentage %
Hypertension in Parents	Yes	156	49.7
	No	134	42.7
	Don't Know	24	7.6
Sedentary Lifestyle	Yes	172	54.8
	No	129	41.1
	Don't Know	13	4.1
Obese	Yes	55	17.5
	No	232	73.9
	Don't Know	27	8.6
Excess dietary Salt in food	Yes	102	32.5
	No	166	52.9
	Don't Know	46	14.6
Daily smoker	Yes	26	8.3
	No	280	89.2
	Don't Know	8	2.5
Smoker of electronic cigarette	Yes	15	4.8
	No	293	93.3
	Don't Know	6	1.9
Passive smoker	Yes	73	23.2
	No	219	69.7
	Don't Know	22	7
Occasional Alcohol consumer	Yes	8	2.5
	No	299	95.2
	Don't Know	7	2.2
Frequent Alcohol consumer	Yes	5	1.6
	No	296	94.3
	Don't Know	12	3.8
	Yes	227	72.3
	No	5	1.6
	Don't Know	81	25.8
Work in shifts	Yes	135	43
	No	159	50.6
	Don't Know	20	6.4
2-3 cups of tea daily	Yes	121	38.5
	No	187	59.6
	Don't Know	6	1.9

Periodontitis (Gum infection)	Yes	34	10.8
	No	266	84.7
	Don't Know	14	4.5
Vitamin D deficiency	Yes	90	28.7
	No	196	62.4
	Don't Know	28	8.9
Consumer of energy drinks	Yes	108	34.4
	No	198	63.1
	Don't Know	8	2.5
Face reveals aging	Yes	48	15.3
	No	245	78
	Don't Know	21	6.7
Living in Air Polluted Area	Yes	155	49.4
	No	140	44.6
	Don't Know	19	6.1
Facing Environmental noise	Yes	202	64.3
	No	101	32.2
	Don't Know	11	3.5
Travelling to northern areas	Yes	142	45.2
	No	164	52.2
	Don't Know	8	2.5
Using painkillers	Yes	148	47.1
	No	159	50.6
	Don't Know	7	2.2
Using hormonal contraceptives	Yes	27	8.6
	No	276	87.9
	Don't Know	11	3.5
Pregnancy	Yes	7	2.2
	No	301	95.9
	Don't Know	5	1.6
Licorice in food	Yes	34	10.8
	No	233	74.2
	Don't Know	47	15

Effect Of Hypertension on Concurrence of Disease

Table 6 gives brief information about effect of arterial hypertension on concurrence of disease. A total number of 314 data was collected. Among these majority of participants believe that arterial hypertension can lead to various health conditions. 74.8% of participants believe that arterial hypertension can lead to heart failure, while 16.2% do not believe this and 8.9% do not know. 70.7% of participants believe that arterial hypertension can lead

to myocardial infarction, while 19.4% do not believe this and 9.9% do not know. 71.0% of participants believe that arterial hypertension can lead to stroke, while 19.7% do not believe this and 9.2% do not know. 55.4% of participants believe that arterial hypertension can lead to aortic aneurysm, while 20.7% do not believe this and 23.9% do not know. 58.6% of participants believe that arterial hypertension can lead to chronic kidney disease. For further information see Table 6.

Table 6: Frequency and percentage of Responses for effect of arterial hypertension on concurrence of disease.

Can arterial hypertension lead to?	Categories	Frequency (n=314)	Percentage %
Heart failure	Yes	235	74.8
	No	51	16.2
	Don't Know	28	8.9
Myocardial infarction	Yes	222	70.7
	No	61	19.4
	Don't Know	31	9.9
Stroke	Yes	223	71
	No	62	19.7
	Don't Know	29	9.2
Aortic Aneurysm	Yes	174	55.4
	No	65	20.7
	Don't Know	75	23.9
Chronic kidney disease	Yes	184	58.6
	No	86	27.4
	Don't Know	44	14
Atherosclerosis	Yes	184	58.6
	No	81	25.8
	Don't Know	49	15.6
Eye disease	Yes	157	50
	No	103	32.8
	Don't Know	54	17.2
Death in Covid-19	Yes	130	41.4
	No	108	34.4
	Don't Know	76	24.2

Discussion

Hypertension is the main cause of global cardiovascular disease and premature death [12]. Furthermore, global hypertension cases doubled from 648 million to 1.278 billion between 1990 and 2019 [13]. An increase in both systolic and diastolic blood pressure significantly raises the likelihood of death from any cause, as well as the risk of cardiovascular events, coronary heart disease, and stroke [14]. Thus, preventing hypertension is a crucial matter for public health. Individuals residing in rural regions have a particularly low understanding of the causes of hypertension. The elderly often lacks sufficient knowledge in this field. In a study by Cielecka-Piontek et al., 63% of 154 elderly Poles surveyed were found to have no knowledge or only knew one risk factor for arterial hypertension [15].

Raising awareness of risk factors among the general population is crucial in preventing hypertension. Medical intervention for hypertension includes advising lifestyle changes to reduce risk factors and improve blood pressure control [16]. It is crucial for medical providers to be knowledgeable about the

causes of hypertension and to educate the public about it. This education should begin early in their studies.

Our study was aimed to evaluate the understanding about risk factors of hypertension among medical students. It also examined the relationship between blood pressure, physical activity, and family history of cardiovascular disease. The goal was to identify key areas for health promotion practices related to hypertension. Our study evaluated the understanding of medical students regarding both classical and non-classical risk factors for hypertension. Additionally, we evaluated the medical students' understanding of factors that are commonly misidentified by the public as increasing the risk of hypertension. It has long been known that hypertension in parents, sedentary lifestyle, obesity, excess salt in the diet, daily and occasional smoking of traditional cigarettes, heavy alcohol consumption, aging, and male gender are risk factors for hypertension [17].

In recent years, several studies have documented that pet animals also can have an important supportive role and a positive influence on the health of their

owners. Pet ownership is a significant predictor of 1-year survival after myocardial infarction[18]. There is a link between a lack of Vitamin D and the development of cardiovascular disease. It may be beneficial to conduct further research to determine if addressing Vitamin D deficiency could help prevent cardiovascular disease[19]. Drinking more than 3 cups of coffee per day does not seem to increase the risk of hypertension when compared to drinking less than 1 cup per day. However, consuming 1 to 3 cups per day may be associated with a slightly higher risk[20].

Periodontitis, a chronic low-grade inflammation of gingival tissue, has been linked to endothelial dysfunction, with blood pressure elevation and increased mortality risk in hypertensive patients. Hypertension appears to be associated with Periodontitis [21]. Pregnancy also induces hypertension (PIH). It is estimated that 7% to 10% of all pregnancies in the United States are affected by Pregnancy-induced hypertension [22].

Our study revealed that even in the early years of their studies, medical students had a good understanding of most of the traditional risk factors for hypertension and that this understanding increased as they progressed through their studies.

According to the results provided, it appeared that our study included an even distribution of male (54.8%) and female (45.2%) participants. The majority of participants (79.0%) were between the ages of 21-25, with a smaller percentage (20.7%) between the ages of 15-20 and only one participant (0.3%) between the ages of 26-30. In terms of weight, the majority of participants (51.9%) had a weight above 60 kg, while smaller percentages fell into the weight categories of 40-50 kg (18.8%), 51-55 kg (16.2%), and 56-60 kg (13.1%). Overweight is a risk factor for hypertension (B.M.I>25).

The participants were distributed across different years of study and degree programs, with the largest percentage (24.8%) in their fifth year and the largest percentage (46.5%) enrolled in the PHARM-D program. These demographic details provided important context for understanding the risk factors for hypertension among medical students in our study.

It appeared that among the 314 participants in our study, nearly half (49.7%) reported having hypertension in their parents. This suggested that family history may be a significant risk factor for hypertension among medical students. More than half (54.8%) of the participants reported having a

sedentary lifestyle, which is another known risk factor for hypertension. Additionally, 17.5% of participants reported being obese and 32.5% reported consuming excess dietary salt in their food, both of which are also known risk factors for hypertension.

A smaller percentage of participants reported being daily smokers (8.3%) or smokers of electronic cigarettes (4.8%), while 23.2% reported being passive smokers. Smoking and exposure to second hand smoke are also known risk factors for hypertension.

It's interesting to note that 15.3% of participants reported that their face reveals aging. While aging is a known risk factor for hypertension, it's unclear how the participants' perception of their own aging relates to their actual risk for hypertension. Based on the additional data you provided, it appears that several other potential risk factors for hypertension were reported by participants in your study. These include working in shifts (43.0%), consuming 2-3 cups of tea daily (38.5%), having a vitamin D deficiency (28.7%), consuming energy drinks (34.4%), living in an air polluted area (49.4%), facing environmental noise (64.3%), using painkillers (47.1%), and using hormonal contraceptives (8.6%). These results suggested that there may be a variety of lifestyle and environmental factors that contribute to the risk of hypertension among medical students.

It appeared that most participants in our study are aware that arterial hypertension can lead to various health conditions. Specifically, 74.8% of participants believe that arterial hypertension can lead to heart failure, 70.7% believe it can lead to myocardial infarction, 71.0% believe it can lead to stroke, 55.4% believe it can lead to aortic aneurysm, and 58.6% believe it can lead to chronic kidney disease.

The study had a large sample size, but caution should be exercised when extrapolating the results to medical students. It can serve as a pilot for research at other medical universities and initiate discussions on hypertension education. Our study found that undergraduate students' knowledge of non-classical hypertension risk factors is insufficient, warranting further investigation into the causes. Future studies should ensure adequate representation of older students by maintaining the proportion of students concerning their year of study. Despite efforts to include both classical and non-classical risk factors, some may have been omitted.

Conclusion

Our study found that medical students had a good understanding of most traditional risk factors for hypertension, and this understanding increased as they progressed through their studies. Our results also revealed that family history of hypertension, sedentary lifestyle, obesity, and excess dietary salt were common risk factors among the medical students in our study. These findings highlight the importance of raising awareness about hypertension risk factors among medical students and the general population. Interventions to promote healthy lifestyle habits and reduce hypertension risk factors should be implemented to improve public health. Further research is needed to explore the effectiveness of such interventions and to identify additional risk factors for hypertension in this population.

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