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RESEARCH ARTICLE

Hypertension among adult population of Herat city of Afghanistan: A cross-sectional study

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ABSTRACT

Background: Hypertension as a major health problem around the world which is responsible for 7.5 million or 12.8% of all deaths yearly around the world. To date, there is a scarcity of data concerning prevalence and risk factors of hypertension in Herat province of Afghanistan. Therefore, the present study estimated the prevalence of hypertension and its predictors among Afghan adults living in Herat city.

Methods: A cross-sectional study was administered in August 2022 among adults (N=504) in the Herat province of Afghanistan. The study examined hypertension, its risk factors among people living in Herat province of Afghanistan.

Results: Of the 504 participants, 27.4% of them had hypertension. age group, gender, body mass index (BMI), marital status, occupation, smoking, presence of another disease, and use of social media, were among the main variables associated with hypertension among participants of the study. Multiple regression analysis indicated that age (AOR=1.036, p<0.001), BMI (AOR=1.077, p=0.003), gender (AOR=2.910, p<0.001), presence of disease (AOR=0.541, p=0.026), use of social media (AOR=0.504, p=0.007), and Borani (AOR=1.316, p=0.028) were significantly associated with presence of hypertension.

Conclusion: The prevalence of hypertension is found high among adults living in Herat province of Afghanistan. One of the variables found to have a major impact on the prevalence of hypertension was eating Borani food. There is a need for health practitioners to assess self-care activities and blood pressure control, and educate patients the importance of hypertension monitoring and teaching practical techniques to boost their confidence and motivation to achieve a better self-care to have a healthier life.

Introduction

Hypertension, commonly known as high blood pressure, is a medical condition characterized by abnormally high pressure in the arteries. Blood pressure is the force of blood pushing against the walls

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of the arteries as the heart pumps blood throughout the body (1). Hypertension as a major health problem around the world which is responsible for 7.5 million or 12.8% of all deaths yearly around the world (1). Currently, 1.25 billion people worldwide suffer from hypertension. It was predicted that 1,5 billion people will suffer from this disease by 2025 (2-3).

Hypertension is the main risk factor of coronary heart disease, stroke, and chronic heart disease. It is the main cause for 54% of stroke and 47% of ischemic heart disease (4-5). Hypertension is a serious medical condition that can lead to a range of health problems if left untreated, including heart disease, stroke, kidney disease, and vision loss. It is often referred to as the "silent killer" because it often has no symptoms until it has caused significant damage to the body (4-5). High Blood pressure or hypertension is defined as Systolic Blood Pressure level of ≥ 140 mmHg and/or Diastolic Blood Pressure level of ≥90 mmHg (6).

Hypertension can be divided to essential hypertension and secondary hypertension. Essential hypertension makes 95% of all hypertension cases, while secondary hypertension is responsible for only 5% the whole hypertension cases (7-8).

There are many factors which cause Hypertension like age, family history, sex, alcohol, stress, salt, obesity, rapid urbanization, and many other factors (9-10). Many mechanisms involve to make blood pressure high like increase of output of heart, vasoconstriction, hormonal factors, neuronal factors, and many more (11-12).

Hypertension can often be managed through lifestyle changes, such as maintaining a healthy weight, regular exercise, reducing salt intake, and avoiding smoking and excessive alcohol consumption. In some cases, medication may also be necessary to control blood pressure levels. It is important to regularly monitor blood pressure levels and consult with a healthcare provider for appropriate management and treatment of hypertension (24).

Cardio vascular disease (CVD) causes 30% deaths of all deaths in the world, and hypertension is the key cause of CVD (13-14). If high blood pressure is untreated it would cause end organ damage (15). The clinical trials on hypertensive patients who take antihypertensive medicines show a reduction in myocardial infarction (MI) up to 20 -25%, stroke up to 35-40% and in heart failure up to 50% (16).

To date, there is a scarcity of data concerning prevalence and risk factors of hypertension in Afghanistan. Therefore, the present study estimated the prevalence of hypertension and its predictors among Afghan adults living in Herat city.

Materials and Methods

This cross-sectional study was conducted among adult population between August 8, 2022, to November 16, 2022, in Herat city (Afghanistan). Participants were interviewed using a print-based questionnaire, and their blood pressure was checked using a Sphygmomanometer and stethoscope by sitting position from the left arm. Data were collected utilizing a random sampling method. More specifically, male and female adult population in the selected Herat city who agreed to participate in this study were interviewed. A questionnaire was developed and used included in this survey to assess the socio-demographic characteristics and food habits along with items to note the systolic and diastolic blood pressure. Blood pressure for each participant was check double. First time their blood pressure was checked ahead of answering the interview questions. Second time their blood pressure was checked after answering the interview questions. Participants with a systolic blood pressure of equal or more than 140 mmHg, or a diastolic blood pressure of equal or more than 90 or both were considered as having hypertension. A total of 504 male and female participated in this study. Providing informed consent and being above 18 years old were the pre-requisites for participations in this study.

The questionnaire used in this study consisted of three sections: socio-demographic information, food habits section, and assessment of hypertension section.

Socio-demographic information included questions on age, gender (*male, female*), height (*in centimeter*), weight (*in kilograms*), marital status (*single, married*), occupation (*occupied, non-occupied*), smoking (*non-smoker, smoker*), presence of disease (*no, yes*), use social media (*yes, no*), and economic status (*high income, medium income, low income*).

To calculate the body mass index (BMI) of each participant, weight of each participant in kilogram was

divided by their square of height in meters. In this study we organized the BMI of each participant into one of the four categories. A BMI score of less than 18.5 was added to the Underweight category. A BMI score of between 18.5 and <25.0 was added to the healthy weight category. A BMI score of between 25.0 to <30.0, was added to the overweight category and finally a BMI score of 30 or over was added to the obesity category (17).

Local foods section included questions on eating Borani (*once or more than once in a day, once in two days, twice a week, once a week or less, never*), eating Gholortorush (*once or more than once in a day, once in two days, twice a week, once a week or less, never*), eating Yougurt (*once or more than once in a day, once in two days, twice a week, once a week or less, never*), and eating Kichiri (*once or more than once in a day, once in two days, twice a week, once a week or less, never*).

The assessment of hypertension section included two questions on systolic blood pressure, and diastolic blood pressure.

IBM SPSS version 26 was used for data entry and data analysis. The frequency option was used to obtain the numbers and percentages of the sociodemographic variables, and hypertension. To evaluate the relationship between different variables, chi-square tests were used. Multivariate regression analysis was used to report the predictors of hypertension. A p-value of less than 0.05 was considered significant in the present study.

Ethical approval for this study was obtained from the Afghanistan Center for Epidemiological Studies - Ethical Committee (reference number #1.011; Aug 1, 2022). During the initial contact with the participants, the whole procedure and aim of the study was demonstrated to the participants. All methods were carried out in accordance with relevant ethical guidelines and regulations.

Results

A total of 504 adults participated in this study with an age range of 18 to 90 years. The mean age of the participants was 36.14 years. More than half of the participants were female (54.6%). Almost half of the participants were healthy weight (48.8%). Almost two-third of the participants were married (64.7%). One-third of the participants were occupied (36.5%). 13.3% of the participants of this study were smoking cigarette. More than two third of the participants of this study were using social media (66.9%). **[Table 1]**

Table 1. Characteristics of participants (Afghanistan, 2022)

Characteristic	Category	N	(%)
Age group	18-30 years	264	52.4
	≥31 years	240	47.6
Gender	Male	229	45.4
	Female	275	54.6
BMI Groups	Underweight	33	6.5
	Healthy weight	246	48.8
	Overweight	155	30.8
	Obese	70	13.9
Marital status	Single	178	35.3
	Married	326	64.7
Occupation	Occupied	184	36.5
	Non-occupied	320	63.5
Smoking	Non-smoker	437	86.7
	Smoker	67	13.3
Presence of disease	No	392	77.8
	Yes	112	22.2
Use social media	Yes	337	66.9
	No	167	33.1
Economic status	High income	38	7.5
	Medium income	213	42.3
	Low income	253	50.2
Total		**504**	**100.0**

Almost one-quarter of the participants were found to have hypertension (27.4%). One-third of participants who were married had hypertension (35.9%) and half of participants who were had another known disease, also had hypertension (50.9%). There was a significant relationship between age group, gender, BMI group, marital status, occupation, smoking, presence of disease, use social media with the presence of hypertension. **[Table 2]**

The prevalence of either systolic blood pressure and/or diastolic blood pressure was found to be 27.4% among adult population of Herat city. The distribution of the systolic blood pressure, and diastolic blood pressure can be reviewed in **[Figure 1]** and **[Figure 2]**.

Table 2. Relationship of participants' characteristics with presence of hypertension (Afghanistan, 2022)

Characteristic	Category	Hypertension		p-value
		No, N (%)	Yes, N (%)	
Age group	18-30 years	226 (85.6)	38 (14.4)	**<.001**
	≥31 years	140 (58.3)	100 (41.7)	
Gender	Male	147 (64.2)	82 (35.8)	**<.001**
	Female	219 (79.6)	56 (20.4)	
BMI Groups	Underweight	30 (90.9)	3 (9.1)	**.001**
	Healthy weight	185 (75.2)	61 (24.8)	
	Overweight	112 (72.3)	43 (27.7)	
	Obese	39 (55.7)	31 (44.3)	
Marital status	Single	157 (88.2)	21 (11.8)	**<.001**
	Married	209 (64.1)	117 (35.9)	
Occupation	Occupied	124 (67.4)	60 (32.6)	**.046**
	Non-occupied	242 (75.6)	78 (24.4)	
Smoking	Non-smoker	333 (76.2)	104 (23.8)	**<.001**
	Smoker	33 (49.3)	34 (50.7)	
Presence of disease	No	311 (79.3)	81 (20.7)	**<.001**
	Yes	55 (49.1)	57 (50.9)	
Use social media	Yes	274 (81.3)	63 (18.7)	**<.001**
	No	92 (55.1)	75 (44.9)	
Economic status	High income	27 (71.1)	11 (28.9)	.683
	Medium income	159 (74.6)	54 (25.4)	
	Low income	180 (71.1)	73 (28.9)	
Total		**366 (72.6)**	**138 (27.4)**	

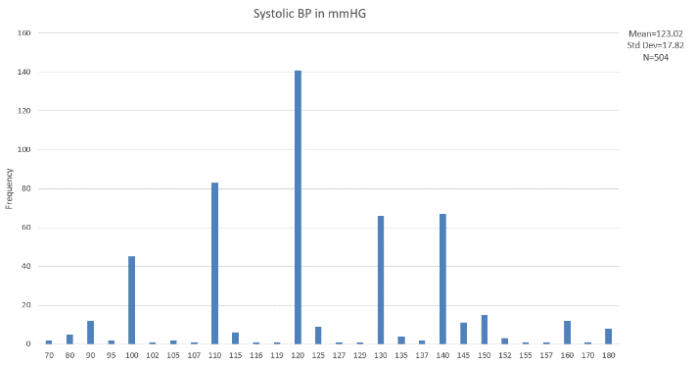

Figure 1. Distribution of systolic blood pressure of participants

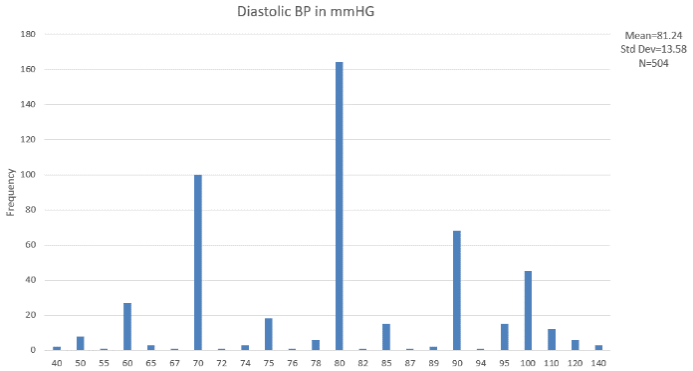

Figure 2. Distribution of diastolic blood pressure of participants

Multinomial logistic regression analysis was run to predict hypertension comprising the following socio-demographic variables: age, BMI, gender, marital status, occupation, smoking, presence of disease, and use of social media. Analysis indicated that age (AOR=1.036, p<.001), BMI (AOR=1.025, p=.003), gender (AOR=2.910, p<.001), presence of disease (AOR=0.541, p=.026), and use of social media (OR=0.504, p=.007) were significantly associated with presence of hypertension. These variables significantly predicted hypertension. **[Table 3]**

Table 3. Multinomial regression analysis of hypertension and participants' socio-demographic characteristics (Herat, Afghanistan-2022)

Variable	AOR [95% CI]	*p*-value
Age	1.036 [1.018, 1.054]	**<.001**
BMI	1.077 [1.025, 1.131]	**.003**
Gender		
Male	2.910 [1.601, 5.291]	**<.001**
Female	Reference	
Marital status		
Single	0.972 [0.494, 1.914]	.935
Married	Reference	
Occupation		
Occupied	0.819 [0.474, 1.417]	.476
Non-occupied	Reference	
Smoking		
Non-smoker	0.689 [0.365, 1.302]	.251
Smoker	Reference	
Presence of disease		
No	0.541 [0.315, 0.929]	**.026**
Yes	Reference	
Use social media		
Yes	0.504 [0.307, 0.829]	**.007**
No	Reference	

Multinomial logistic regression analysis was run to predict hypertension comprising the following variables: Borani, Gholortorush, Yougurt, and Kichiri. Analysis indicated that out of the local food included for prediction, only Borani (AOR=1.316, p<.028) was significantly associated with presence of hypertension. These variables significantly predicted hypertension. **[Table 4]**

Table 4. Multinomial regression analysis of hypertension and participants' use of local food diet (Herat, Afghanistan-2022)

Variable	AOR [95% CI]	*p*-value
Borani	1.316 [1.030, 1.681]	**.028**
Gholortorush	0.930 [0.721, 1.199]	.574
Yougurt	1.117 [0.945, 1.320]	.194
Kichiri	0.991 [0.808, 1.215]	.931

Discussion

The objective of this research study was to estimate and learn the prevalence of hypertension and its predictors among Afghan adults in Herat, Afghanistan ages between 18 to 90 years old. The study found the prevalence of hypertension (either systolic blood pressure and/or diastolic blood pressure) to be 27.4%, which is one-quarter of the participants. Although HTN is a growing public health challenge in the city of Herat, still the prevalence is lower than in the Kabul city shown in studies (18).

Many risk factors that are significantly associated with hypertension according to this study. Prevalence of HTN was 41.7% among the age group ≥31 years compared to the age group 18-30 years (14.4%). The presence of high blood pressure increases with age. The underlying reasons for HTN in older people could be kidney aging, arterial stiffness, hemodynamic changes, neurohormonal, and autonomic dysregulation. Aging causes blood vessels to get stiffer which causes the blood pressure to rise (19). Moreover, BMI (AOR=1.025, p=.003) is also a significant factor in the prevalence of HTN. Our findings indicate that 44.3% in the BMI group obese had HTN compared to the BMI group healthy weight with 24.8%, which is much lower. According to an article study published by NIH, 68-75% of hypertension cases are

primarily due to obesity (20). Overactivation of the sympathetic nervous system, activation of the renin-angiotensin-aldosterone system, changes in adipose-derived cytokines, insulin resistance, and structural and functional changes to the kidneys are just a few of the complicated mechanisms by which obesity results in hypertension (20).

The next major risk factor is smoking. 50.7% of participants who smoke had high blood pressure while the non-smoking participants with HTN only 23.8%. The real reason why smoking causes high blood pressure is still uncertain and is being studied. However, smoking and being around secondhand smoke both raise the risk of atherosclerosis, which is the development of fatty substances in the arteries (plaque), and which high blood pressure is known to hasten. Smoking also produces a brief temporary rise in blood pressure each time you do it (21). Presence of other diseases could also be a factor that can lead up to hypertension ultimately. Our findings of the study show that 50.9% of the participants with other disease had high blood pressure too, and only 20.7% of participants with no other diseases had HTN. Some of the health conditions that can cause high blood pressure are kidney disease, diabetes, obstructive sleep apnea, glomerulonephritis, hormonal problems, lupus, and scleroderma (22).

Conducting multinomial logistic regression analysis, the results indicate that for participants who consumed Borani (eggplant) more frequently p-value of 0.028 is significantly associated with the presence of hypertension. This finding was unexpected and does not quite align with other studies. Eggplants are high and rich in choline esters, particularly acetylcholine (ACh). In a research study conducted by NIH, they reported the use of eggplant as a secure treatment for high blood pressure and mental health. The study indicated that eggplant improved blood pressure and has antihypertensive effects (23-24). Saturated fats, such as those found in margarine, and vegetable oil and table salt can lead to HTN. Participants' intake of borani may vary; if it is prepared with excessive amounts of vegetable oil, margarine, or table salt, the health benefits of eggplants may be negated and HTN may result.

This study could provide Herat city with a baseline understanding of the prevalence of HTN in the area. The survey was essential to figure out some of the risk factors of HTN in the urban setting of Herat. The data available can be used to plan prevention strategies accordingly for further studies. You can assist keep your blood pressure in a healthy range by leading a healthy lifestyle. High blood pressure or hypertension can increase your chance of developing heart disease and stroke. The ministry of public health and education should raise awareness on hypertension and design screening programs for adults, particularly the older age group. Due to the current political situation in Afghanistan not a lot of people are willing to participate in surveys like this. The poor security situation, and not enough participants are further limitations to be taken into consideration. Further studies could be done in the area by having a detailed survey questionnaire and more participants from different regions of Herat city for better accuracy of the data.

Conclusion

The prevalence of hypertension is found high among adults living in Herat province of Afghanistan. One of the variables found to have a major impact on the prevalence of hypertension was eating Borani food. There is a need for health practitioners to assess self-care activities and blood pressure control, and educate patients the importance of hypertension monitoring and teaching practical techniques to boost their confidence and motivation to achieve a better self-care to have a healthier life.

Consent for publication

Not applicable.

Availability of data and materials

The datasets during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflict of interest

The authors declare no conflict of interest.

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Author contributions

All authors of the manuscript have equally contributed to this study. Prior to submission, all the reviewed and approved the final version of the manuscript.

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