Dietary habits and risk of hypertension

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Introduction

Hypertension is a widespread condition, affecting around 50 million individuals in the United States and approximately one billion people globally [1, 2]. The seriousness of high blood pressure and hypertension is categorized by the Joint National Committee (JNC) on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. (see Table 1) [1].

Table 1 Classification of blood pressure (BP) for adults*

BP classification	Systolic BP (mm Hg)	Diastolic BP (mm Hg)
Normal	<120	<80
Prehypertension	120–139	80–89
Stage 1 hypertension	140–159	90–99
Stage 2 hypertension	≥160	≥100

The prevalent concern regarding the high occurrence of hypertension stems from compelling indicating that it is a significant contributor toidity

and mortality [3–5]. Lifestyle factors have been shown to play a crucial role in the development and prevalence of hypertension. Factors such as overweight and obesity (especially visceral obesity), low birth weight, and imbalanced intake of various nutrients have been linked to high blood pressure (BP) [6–9]. The rates of overweight and obesity have surged to epidemic levels in developed countries, with a rapid increase seen in the developing world as well [7, 10]. Approximately 1.4 billion adults globally are estimated to be overweight or obese, with this number on the rise [11]. Extensive evidence supports the idea that dietary choices can impact blood pressure regulation. Established dietary modifications that can help lower BP include reducing salt intake, achieving weight loss, and moderating alcohol consumption (for those who consume alcohol). Additionally, increasing potassium intake and following dietary patterns like the Dietary Approaches to Stop Hypertension (DASH) diet have emerged as effective strategies for reducing BP over the past decade. Notably, findings concerning blacks and older individuals are of significant public health importance. Blacks tend to be particularly responsive to the BP-lowering effects of reduced salt intake, increased potassium consumption, and adherence to the DASH diet. Moreover, older individuals, who are at a heightened risk for BP-related cardiovascular and renal diseases, can successfully implement and sustain dietary changes. The risk of cardiovascular disease rises progressively with increasing BP, beginning at 115/75 mm Hg. Given the ongoing prevalence of BP-related conditions and the rising incidence of hypertension, efforts to lower BP in both nonhypertensive and hypertensive individuals are crucial. Dietary modifications have proven effective in lowering BP and preventing hypertension in nonhypertensive individuals. For those with uncomplicated stage I hypertension (systolic BP of 140 to 159 mm Hg or diastolic BP of 90 to 99 mm Hg), dietary changes can serve as an initial treatment before resorting to drug therapy. Furthermore, among hypertensive patients already receiving drug therapy, lifestyle adjustments, particularly a reduction in salt intake, can further lower BP [27].

These observations underscore the significant relationship between blood pressure and factors such as obesity, energy intake, and the adequacy of nutrient intake, highlighting their importance in clinical practice and public

health efforts. Interactions between BP and both obesity and nutrient intake are discussed in turn below.[29]

Table 2 Nutritional factors that may affect blood pressure
1. Obesity
2. Energy intake
3. Fat intake
4. Sodium intake
5. Potassium intake
6. Magnesium intake
7. Dietary fiber
8. Nutrient/gene interactions
9. Nutrient/medicine interactions

Aetiology

Primary hypertension

Primary hypertension is thought to the result of a combination of genetic factors can impact an individual's blood pressure. However, environmental and lifestyle influences have also been recognized as potential contributors elevated BP levels. Commonly implicated substances that can raise blood pressure include non-steroidal anti-inflammatory drugs, corticosteroids, calcineurin inhibitors, hormonal oral contraceptives and hormone replacement therapy, sympathomimetic stimulant medications, illicit drugs, liquorice, salt (sodium chloride), and alcohol [12,13,28].

Moreover, a sedentary lifestyle, poor intake of fruits and vegetables, as well as diets high in saturated fats and carbohydrates leading to obesity, are also known to play a role. Additionally, psychosocial stress is increasingly acknowledged as a factor that can lead to elevated blood pressure. In cases where no single identifiable cause for hypertension exists, the term "primary hypertension" is now preferred over the traditional label of "essential hypertension" [13,14,25,27].

Secondary hypertension

In approximately 5-15% of individuals with hypertension, a specific and potentially reversible or treatable cause of high blood pressure can be pinpointed through thorough evaluation. These underlying causes are typically classified into renal, vascular, endocrine, and neural categories [12,23]. Among young patients (under 40 years of age), those experiencing a sudden onset of severe hypertension, and individuals with resistant hypertension (uncontrolled blood pressure despite being on at least three antihypertensive medications, including a diuretic), the likelihood of secondary causes increases to 20-60% [23,24]. The primary culprits in cases of resistant hypertension are obstructive sleep apnea, which leads to sympathetic overdrive, and primary hyperaldosteronism (Conn's adenoma or bilateral adrenal hyperplasia), resulting in excess mineralocorticoid production.

Hypertensive emergencies

Hypertensive emergencies are characterized by severely elevated blood pressure (typically SBP >180 mmHg and/or DBP >110 mmHg) along with evidence of acute organ damage caused by hypertension (HMOD), requiring immediate and careful reduction of blood pressure to prevent further deterioration and potential fatality. [17–19] HMOD, also known as target organ damage, can manifest differently depending on the underlying cause and affected organs. Cardiovascular hypertensive emergencies may include acute aortic dissection, myocardial ischemia, or heart failure, while neurological presentations could involve acute stroke or encephalopathy. [17,22]

Malignant hypertension, although somewhat outdated as a term, describes elevated blood pressure associated with advanced hypertensive retinopathy,[21] often accompanied by acute kidney injury and neurological symptoms. Hypertensive emergencies can also arise during pregnancy, leading to conditions like pre-eclamptic toxaemia.[22] Other significant causes encompass conditions such as phaeochromocytoma and the ingestion of sympathomimetic drugs like cocaine, though most commonly, it stems from worsening primary hypertension. [17,19,20]

Aim of study

The primary objective of this research study is to investigate the relationship between dietary habits and the risk of developing hypertension. This study aims to assess the dietary behaviors of individuals and their potential association with the incidence of hypertension.

Patient and method

A dietary questionnaire was conducted from October 22 to December 29 over 150 patients from Diyala city (73 male 77 female) diagnosed with hypertension

The following questionnaire was done to investigate the association between dietary habits (e.g., consumption of fruits, vegetables, processed foods and fats) and the risk of chronic diseases (hypertension)

Sample of the questionnaire

Title: Study on Dietary Habits and Risk of Hypertension

Objective: The primary objective of this research study is to investigate the relationship between dietary habits and the risk of developing hypertension. This study aims to assess the dietary behaviors of individuals and their potential association with the incidence of hypertension.

Methodology:

1. Study Design: This will be a questionnaire-based cross-sectional study conducted over a period of three months.

2. Participant Selection:

Inclusion Criteria (Cases):

- Adults aged 20-80 years.
- Diagnosed with hypertension (systolic blood pressure ≥ 140 mm Hg and/or diastolic blood pressure ≥ 90 mm Hg) within the past 2 years.
- Willingness to participate in the study and provide informed consent.

3. Questionnaire included information about

Section 1: Demographic Information

Section 2: Dietary Habits

Section 3: Physical Activity

Section 4: Family Medical History

Section 5: Lifestyle Factors

Section 6: General Health Information

Statistical Analysis

Descriptive statistical analysis was carried out to display the various variables in terms of frequency, percentage, mean, standard deviation (SD), and range. Analytical statistical analysis employed Pearson's Chi-square test ($\chi 2$ test) to compare proportions, with the application of Fisher's exact test when needed. A p-value of less than or equal to 0.05 was considered to be statistically significant. All statistical analyses were carried out using SPSS-28 (Statistical Package for the Social Sciences, version 28).

Results

A total of 150 participants previously diagnosed with hypertension (HT) were enrolled in this study. The age ranged from 23 to 77 years with a mean ± SD of 49.53 ± 12.152, and the majority of participants were in the age group of 35-<50 and 50-<65 years (39.3% and 35.3%, respectively), signifying a statistically significant association between age and risk of developing HT ($p<0.001$). Participants were almost equally distributed across gender categories (48.7% males and 51.3% females), with no statistically significant difference ($p = 0.744$).

The mean weight ± SD was 78.81 ± 13.961 kg, ranging from 45 to 117 kg, with most participants (57, 38.0%) weighing 80-<95 kg, with a statistically significant effect on risk of developing HT ($p<0.001$). No significant difference was found between smokers (44.7%) and nonsmokers (55.3%), with a p-value of 0.191. Having a family history of HT had a statistically significant effect on risk of developing the disease ($p<0.001$), with almost two-thirds of participants (64.7%) having such a family history. Details in Table 1, Figure 1 and 2.

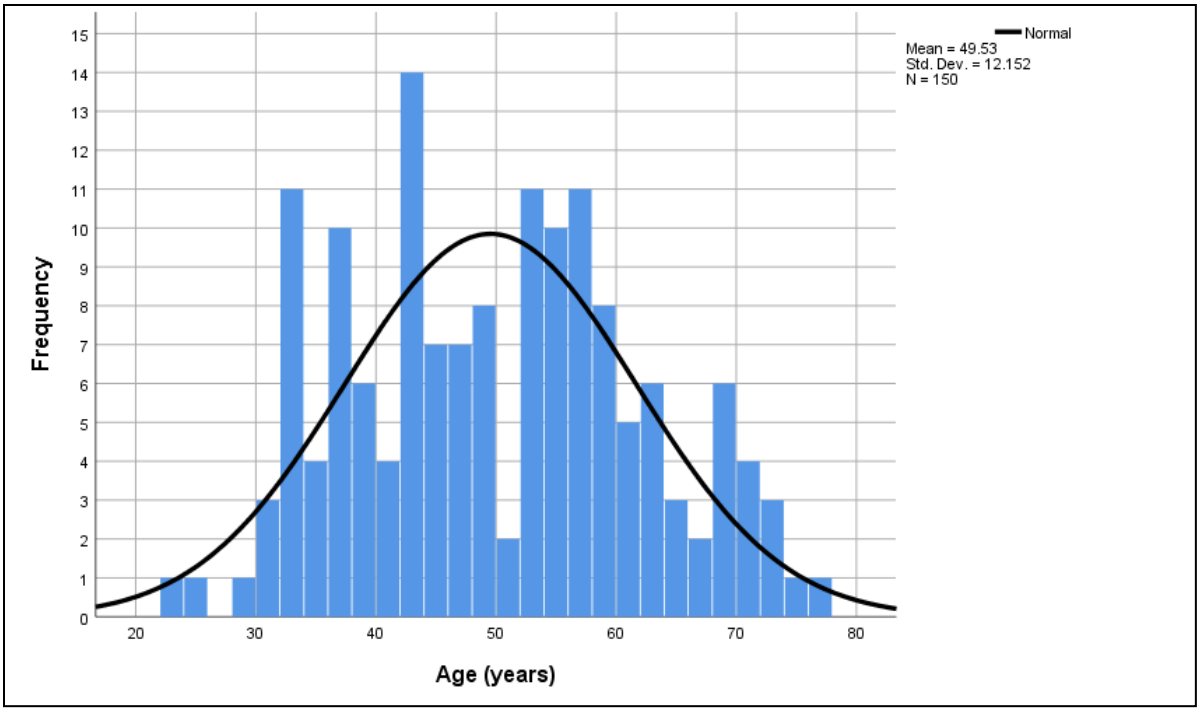

Figure 1: Distribution of participants according to age (in years).

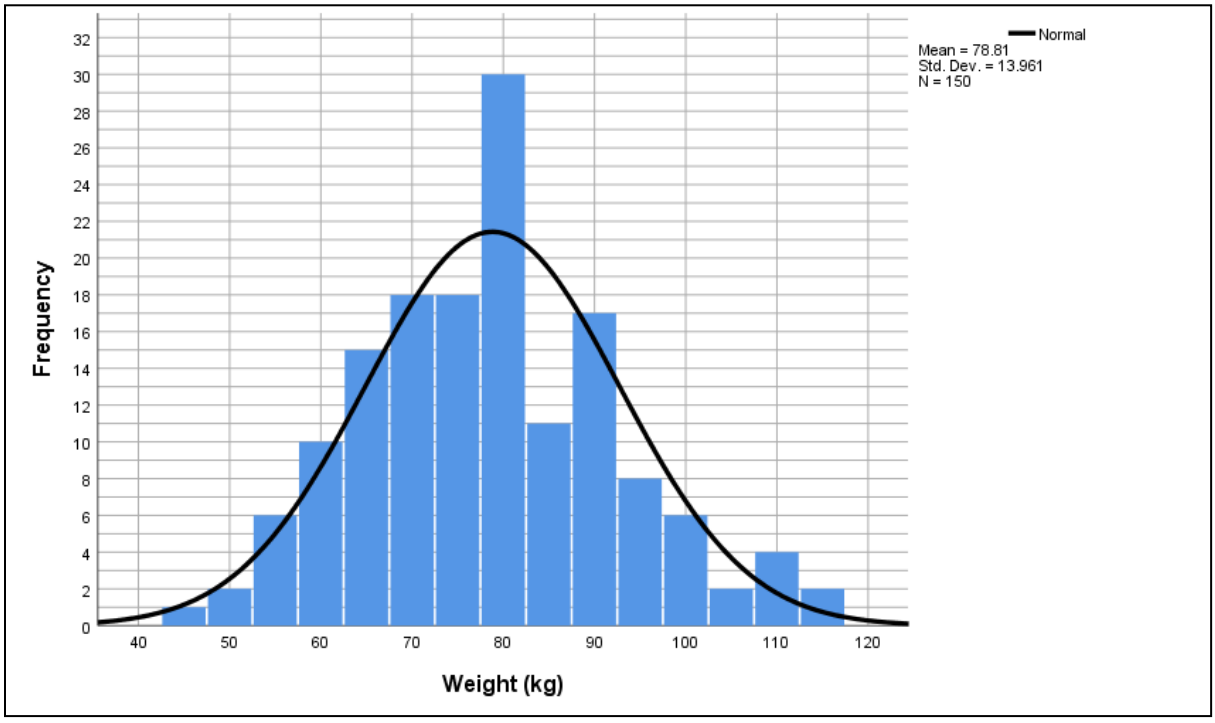

Figure 2: Distribution of participants according to weight (in kg).

Table 1: Distribution of participants based on age group, gender, weight, smoking status, and family history of hypertension.

Variable	Category	Number	Percentage	p-value
Age group (years)	20-<35	18	12.0	<.001*
	35-<50	59	39.3	
	50-<65	53	35.3	
	65-80	20	13.3	
	Total	150	100.0	
Gender	Male	73	48.7	.744
	Female	77	51.3	
	Total	150	100.0	
Weight (kg)	<65	21	14.0	<.001*
	65-<80	53	35.3	
	80-<95	57	38.0	
	≥95	19	12.7	
	Total	150	100.0	
Smoking	No	83	55.3	.191
	Yes	67	44.7	
	Total	150	100.0	
Family history of hypertension	No	53	35.3	<.001*
	Yes	97	64.7	
	Total	150	100.0	

*Significant difference between percentages using Pearson's Chi-square test at 0.05 level.

As shown in Table 2, a statistically significant association was seen between the risk of developing HT and intake frequency of fruits and vegetables (79.3% daily intake, p<0.001), processed foods (28.7% daily intake, p<0.001), whole grains (78.7% daily intake, p<0.001), sugary beverages (46.7% daily intake, p<0.001), and fatty and fried foods (46.7% daily intake, p<0.001). Moreover, physical activity level also significantly affected the risk of developing HT (44.0% moderate activity, p = 0.003).

Table 2: Distribution of participants based on dietary habits and physical activity.

Variable	Category	Number	Percentage	p-value
Fruits and vegetables intake	Never	0	0.0	<.001*
	Rarely	2	1.3	
	Monthly	2	1.3	
	Weekly	27	18.0	
	Daily	119	79.3	
	Total	150	100.0	
Processed foods intake	Never	3	2.0	<.001*
	Rarely	36	24.0	
	Monthly	27	18.0	
	Weekly	41	27.3	
	Daily	43	28.7	
	Total	150	100.0	
Whole grains intake	Never	2	1.3	<.001*
	Rarely	9	6.0	
	Monthly	5	3.3	
	Weekly	16	10.7	
	Daily	118	78.7	
	Total	150	100.0	
Sugary beverages intake	Never	4	2.7	<.001*
	Rarely	45	30.0	
	Monthly	13	8.7	

	Weekly	48	32.0	
	Daily	40	26.7	
	Total	150	100.0	
Fatty and fried foods intake	Never	2	1.3	<.001*
	Rarely	21	14.0	
	Monthly	11	7.3	
	Weekly	46	30.7	
	Daily	70	46.7	
	Total	150	100.0	
Physical activity	Light	52	34.7	.003*
	Moderate	66	44.0	
	Vigorous	32	21.3	
	Total	150	100.0	

*Significant difference between percentages using Pearson's Chi-square test at 0.05 level.

Table 3 explores the effect of various variables on frequency of fruits and vegetables intake, with smoking being the only variable with statistically significant effect (p = 0.006), and the rest of variables failing to reach the level of statistical significance.

Table 3: Association of fruits and vegetables intake with age group, gender, weight, smoking status, and physical activity.

Variable	Category	Fruits and vegetables intake										p-value
		Rarely		Monthly		Weekly		Daily		Total		
		No.	%	No.	%	No.	%	No.	%	No.	%	
Age group (years)	20-<35	0	0.0	1	50.0	2	7.4	15	12.6	18	12.0	.887
	35-<50	1	50.0	1	50.0	12	44.4	45	37.8	59	39.3	
	50-<65	1	50.0	0	0.0	10	37.0	42	35.3	53	35.3	
	65-80	0	0.0	0	0.0	3	11.1	17	14.3	20	13.3	
	Total	2	100.0	2	100.0	27	100.0	119	100.0	150	100.0	
Gender	Male	1	50.0	1	50.0	18	66.7	53	44.5	73	48.7	.124
	Female	1	50.0	1	50.0	9	33.3	66	55.5	77	51.3	
	Total	2	100.0	2	100.0	27	100.0	119	100.0	150	100.0	
Weight (kg)	<65	0	0.0	0	0.0	3	11.1	18	15.1	21	14.0	.995
	65-<80	1	50.0	1	50.0	9	33.3	42	35.3	53	35.3	
	80-<95	1	50.0	1	50.0	11	40.7	44	37.0	57	38.0	
	≥95	0	0.0	0	0.0	4	14.8	15	12.6	19	12.7	
	Total	2	100.0	2	100.0	27	100.0	119	100.0	150	100.0	
Smoking	No	2	100.0	1	50.0	8	29.6	72	60.5	83	55.3	.006*
	Yes	0	0.0	1	50.0	19	70.4	47	39.5	67	44.7	
	Total	2	100.0	2	100.0	27	100.0	119	100.0	150	100.0	
Physical activity	Light	0	0.0	0	0.0	10	37.0	42	35.3	52	34.7	.619
	Moderate	2	100.0	2	100.0	13	48.1	49	41.2	66	44.0	
	Vigorous	0	0.0	0	0.0	4	14.8	28	23.5	32	21.3	
	Total	2	100.0	2	100.0	27	100.0	119	100.0	150	100.0	

*Significant difference between percentages using Pearson's Chi-square test at 0.05 level.

Table 4 exhibits a statistically insignificant relationship between age (p = 0.522), gender (p = 0.796), weight (p = 0.758), smoking (p = 0.553), and physical activity (p = 0.773) on one hand, and frequency of processed foods intake on the other.

Table 4: Association of processed foods intake with age group, gender, weight, smoking status, and physical activity.

Variable	Category	Processed foods intake										p-value*
		Never		Rarely		Monthly		Weekly		Daily		Total		
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Age group (years)	20-<35	0	0.0	1	2.8	4	14.8	6	14.6	7	16.3	18	12.0	.522
	35-<50	2	66.7	16	44.4	8	29.6	13	31.7	20	46.5	59	39.3	
	50-<65	1	33.3	12	33.3	12	44.4	16	39.0	12	27.9	53	35.3	
	65-80	0	0.0	7	19.4	3	11.1	6	14.6	4	9.3	20	13.3	
	Total	3	100.0	36	100.0	27	100.0	41	100.0	43	100.0	150	100.0	
Gender	Male	2	66.7	16	44.4	15	55.6	18	43.9	22	51.2	73	48.7	.796
	Female	1	33.3	20	55.6	12	44.4	23	56.1	21	48.8	77	51.3	
	Total	3	100.0	36	100.0	27	100.0	41	100.0	43	100.0	150	100.0	
Weight (kg)	<65	0	0.0	8	22.2	2	7.4	6	14.6	5	11.6	21	14.0	.758
	65-<80	0	0.0	12	33.3	10	37.0	16	39.0	15	34.9	53	35.3	
	80-<95	2	66.7	11	30.6	13	48.1	15	36.6	16	37.2	57	38.0	
	≥95	1	33.3	5	13.9	2	7.4	4	9.8	7	16.3	19	12.7	
	Total	3	100.0	36	100.0	27	100.0	41	100.0	43	100.0	150	100.0	
Smoking	No	2	66.7	24	66.7	15	55.6	20	48.8	22	51.2	83	55.3	.553
	Yes	1	33.3	12	33.3	12	44.4	21	51.2	21	48.8	67	44.7	
	Total	3	100.0	36	100.0	27	100.0	41	100.0	43	100.0	150	100.0	
Physical activity	Light	1	33.3	12	33.3	7	25.9	16	39.0	16	37.2	52	34.7	.773
	Moderate	2	66.7	14	38.9	12	44.4	17	41.5	21	48.8	66	44.0	
	Vigorous	0	0.0	10	27.8	8	29.6	8	19.5	6	14.0	32	21.3	
	Total	3	100.0	36	100.0	27	100.0	41	100.0	43	100.0	150	100.0	

*Difference between percentages using Pearson's Chi-square test at 0.05 level.

A statistically highly significant association was demonstrated between physical activity and frequency of whole grains intake (p = 0.016), as displayed in Table 5. Conversely, statistical analysis did not yield a significant result when exploring the relationship of the rest of variables with whole grains intake.

Table 5: Association of whole grains intake with age group, gender, weight, smoking status, and physical activity.

Variable	Category	Whole grains intake										p-value
		Never		Rarely		Monthly		Weekly		Daily	Total	
		No.	%	No.	%	No.	%	No.	%	No. %	No. %	
Age group (years)	20-<35	0	0.0	0	0.0	1	20.0	2	12.5	15 12.7	18 12.0	.870
	35-<50	1	50.0	4	44.4	3	60.0	7	43.8	44 37.3	59 39.3	
	50-<65	1	50.0	3	33.3	0	0.0	6	37.5	43 36.4	53 35.3	
	65-80	0	0.0	2	22.2	1	20.0	1	6.3	16 13.6	20 13.3	
	Total	2	100.0	9	100.0	5	100.0	16	100.0	118 100.0	150 100.0	
Gender	Male	1	50.0	2	22.2	3	60.0	7	43.8	60 50.8	73 48.7	.510
	Female	1	50.0	7	77.8	2	40.0	9	56.3	58 49.2	77 51.3	
	Total	2	100.0	9	100.0	5	100.0	16	100.0	118 100.0	150 100.0	
Weight (kg)	<65	0	0.0	2	22.2	2	40.0	1	6.3	16 13.6	21 14.0	.086
	65-<80	1	50.0	1	11.1	0	0.0	10	62.5	41 34.7	53 35.3	
	80-<95	1	50.0	3	33.3	2	40.0	5	31.3	46 39.0	57 38.0	
	≥95	0	0.0	3	33.3	1	20.0	0	0.0	15 12.7	19 12.7	
	Total	2	100.0	9	100.0	5	100.0	16	100.0	118 100.0	150 100.0	
Smoking	No	2	100.0	6	66.7	4	80.0	7	43.8	64 54.2	83 55.3	.447
	Yes	0	0.0	3	33.3	1	20.0	9	56.3	54 45.8	67 44.7	
	Total	2	100.0	9	100.0	5	100.0	16	100.0	118 100.0	150 100.0	
Physical activity	Light	1	50.0	2	22.2	1	20.0	4	25.0	44 37.3	52 34.7	.016*
	Moderate	1	50.0	7	77.8	1	20.0	4	25.0	53 44.9	66 44.0	
	Vigorous	0	0.0	0	0.0	3	60.0	8	50.0	21 17.8	32 21.3	
	Total	2	100.0	9	100.0	5	100.0	16	100.0	118 100.0	150 100.0	

*Significant difference between percentages using Pearson's Chi-square test at 0.05 level.

Statistical analysis (as demonstrated in Table 6) resulted in a p-value of 0.302, 0.242, 0.360, 0.210, and 0.654 between frequency of sugary beverages intake and age, gender, weight, smoking, and physical activity, respectively, denoting absence of statistically significant effect of these variables on frequency of sugary beverages intake.

Table 6: Association of sugary beverages intake with age group, gender, weight, smoking status, and physical activity.

Variable	Category	Sugary beverages intake										p-value*
		Never		Rarely		Monthly		Weekly		Daily		Total		
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Age group (years)	20-<35	0	0.0	5	11.1	1	7.7	6	12.5	6	15.0	18	12.0	.302
	35-<50	2	50.0	18	40.0	2	15.4	21	43.8	16	40.0	59	39.3	
	50-<65	1	25.0	12	26.7	7	53.8	17	35.4	16	40.0	53	35.3	
	65-80	1	25.0	10	22.2	3	23.1	4	8.3	2	5.0	20	13.3	
	Total	4	100.0	45	100.0	13	100.0	48	100.0	40	100.0	150	100.0	
Gender	Male	1	25.0	22	48.9	3	23.1	24	50.0	23	57.5	73	48.7	.242
	Female	3	75.0	23	51.1	10	76.9	24	50.0	17	42.5	77	51.3	
	Total	4	100.0	45	100.0	13	100.0	48	100.0	40	100.0	150	100.0	
Weight (kg)	<65	1	25.0	6	13.3	1	7.7	11	22.9	2	5.0	21	14.0	.360
	65-<80	2	50.0	17	37.8	4	30.8	16	33.3	14	35.0	53	35.3	
	80-<95	1	25.0	16	35.6	6	46.2	13	27.1	21	52.5	57	38.0	
	≥95	0	0.0	6	13.3	2	15.4	8	16.7	3	7.5	19	12.7	
	Total	4	100.0	45	100.0	13	100.0	48	100.0	40	100.0	150	100.0	
Smoking	No	3	75.0	30	66.7	8	61.5	21	43.8	21	52.5	83	55.3	.210
	Yes	1	25.0	15	33.3	5	38.5	27	56.3	19	47.5	67	44.7	
	Total	4	100.0	45	100.0	13	100.0	48	100.0	40	100.0	150	100.0	
Physical activity	Light	2	50.0	17	37.8	6	46.2	16	33.3	11	27.5	52	34.7	.654
	Moderate	1	25.0	16	35.6	6	46.2	21	43.8	22	55.0	66	44.0	
	Vigorous	1	25.0	12	26.7	1	7.7	11	22.9	7	17.5	32	21.3	
	Total	4	100.0	45	100.0	13	100.0	48	100.0	40	100.0	150	100.0	

*Difference between percentages using Pearson's Chi-square test at 0.05 level.

The relationship between frequency of fatty and fried foods intake and weight was found to be statistically significant with a p-value of 0.027, as expressed in Table 7. That was not the case, however, with the rest of variables, as the relationship did not reach the level of statistical significance.

Table 7: Association of fatty and fried foods intake with age group, gender, weight, smoking status, and physical activity.

Variable	Category	Fatty and fried foods intake										p-value
		Never		Rarely		Monthly		Weekly		Daily		Total		
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Age group (years)	20-<35	0	0.0	2	9.5	2	18.2	4	8.7	10	14.3	18	12.0	.187
	35-<50	2	100.0	5	23.8	3	27.3	18	39.1	31	44.3	59	39.3	
	50-<65	0	0.0	7	33.3	4	36.4	21	45.7	21	30.0	53	35.3	
	65-80	0	0.0	7	33.3	2	18.2	3	6.5	8	11.4	20	13.3	
	Total	2	100.0	21	100.0	11	100.0	46	100.0	70	100.0	150	100.0	
Gender	Male	1	50.0	9	42.9	6	54.5	18	39.1	39	55.7	73	48.7	.441
	Female	1	50.0	12	57.1	5	45.5	28	60.9	31	44.3	77	51.3	
	Total	2	100.0	21	100.0	11	100.0	46	100.0	70	100.0	150	100.0	
Weight (kg)	<65	1	50.0	4	19.0	0	0.0	11	23.9	5	7.1	21	14.0	.027*
	65-<80	0	0.0	6	28.6	8	72.7	15	32.6	24	34.3	53	35.3	
	80-<95	1	50.0	7	33.3	3	27.3	18	39.1	28	40.0	57	38.0	
	≥95	0	0.0	4	19.0	0	0.0	2	4.3	13	18.6	19	12.7	
	Total	2	100.0	21	100.0	11	100.0	46	100.0	70	100.0	150	100.0	
Smoking	No	1	50.0	11	52.4	7	63.6	28	60.9	36	51.4	83	55.3	.851
	Yes	1	50.0	10	47.6	4	36.4	18	39.1	34	48.6	67	44.7	
	Total	2	100.0	21	100.0	11	100.0	46	100.0	70	100.0	150	100.0	
Physical activity	Light	1	50.0	5	23.8	3	27.3	24	52.2	19	27.1	52	34.7	.120
	Moderate	0	0.0	11	52.4	6	54.5	16	34.8	33	47.1	66	44.0	
	Vigorous	1	50.0	5	23.8	2	18.2	6	13.0	18	25.7	32	21.3	
	Total	2	100.0	21	100.0	11	100.0	46	100.0	70	100.0	150	100.0	

*Significant difference between percentages using Pearson's Chi-square test at 0.05 level.

Discussion

The findings of this study provide valuable insights into the complex interplay of demographic factors, lifestyle choices, and hypertension (HT) risk among the study participants. Several key points emerge from the analysis, which warrant discussion:

1. Age and Hypertension Risk: The study demonstrates a significant association between age and the risk of developing hypertension. Participants in the older age groups (50-<65 and 65-80 years) showed a higher prevalence of hypertension compared to younger individuals. This highlights the importance of age as a non-modifiable risk factor for hypertension, likely attributed to physiological changes and cumulative exposure to risk factors over time.
2. Weight and Hypertension Risk: The study reveals a significant relationship between weight and hypertension risk, with a majority of participants falling within the overweight or obese categories. Obesity is a well-established risk factor for hypertension, as excess adiposity contributes to insulin resistance, dyslipidemia, and increased sympathetic activity, all of which can lead to elevated blood pressure levels.
3. Family History of Hypertension: The presence of a family history of hypertension was found to have a significant effect on the risk of developing the disease. This underscores the role of genetic predisposition in hypertension and emphasizes the importance of early screening and preventive measures among individuals with a family history of the condition.
4. Dietary Habits and Hypertension: The study highlights the impact of dietary habits on hypertension risk, with significant associations observed for intake frequency of fruits and vegetables, processed foods, whole grains, sugary beverages, and fatty and fried foods. These findings underscore the importance of dietary modifications, such as increasing consumption of fruits, vegetables, and whole grains, while reducing intake of processed and high-fat foods, in hypertension prevention and management.

5. Physical Activity and Hypertension Risk: The study demonstrates a significant association between physical activity level and hypertension risk, with moderate physical activity showing a protective effect. Regular physical activity has been shown to lower blood pressure, improve endothelial function, and reduce the risk of hypertension. Therefore, promoting physical activity as part of lifestyle interventions is crucial for hypertension prevention and control.
6. Limitations and Implications: While the study provides valuable insights, several limitations should be acknowledged, including its cross-sectional design, which limits causal inference, and potential recall bias in self-reported data. Furthermore, the study's findings may be subject to selection bias, as participants were recruited from a specific population.

In conclusion

the findings of this study underscore the multifactorial nature of hypertension risk, with age, weight, family history, dietary habits, and physical activity playing significant roles. These findings have important implications for hypertension prevention and management strategies, highlighting the need for comprehensive lifestyle modifications and targeted interventions aimed at reducing modifiable risk factors. Further longitudinal research is warranted to validate these findings and explore additional factors contributing to hypertension risk.

Recommendations:

- Implement targeted interventions aimed at reducing hypertension risk factors, including age, weight, and family history.
- Promote healthy lifestyle behaviors, such as maintaining a balanced diet, engaging in regular physical activity, and avoiding smoking.
- Provide education and resources for weight management, dietary modification, and smoking cessation.
- Encourage regular blood pressure monitoring and early detection of hypertension through routine screening.
- Collaborate with healthcare providers, community organizations, and policymakers to implement population-based strategies for hypertension prevention and control.

By addressing these conclusions and recommendations, healthcare professionals and policymakers can work towards reducing the burden of hypertension and improving cardiovascular health outcomes in the population.

Summery

Diet and physical inactivity contribute to approximately 30% of morbidity and mortality caused by noncommunicable diseases, which includes deaths and diseases resulting from high blood pressure.

High blood pressure is a condition associated with an increased risk of stroke, heart failure, kidney failure, and peripheral vascular disease. Eating large amounts of saturated fatty acids, along with consuming large amounts of salt and sugar, are risk factors for cardiovascular diseases, including high blood pressure. Public health approaches (such as reducing calories, saturated fat, and salt in processed foods, and increasing community and school opportunities for physical activity) can transform the distribution of blood pressure in the population. Hence, it may reduce mortality and morbidity rates and the risk of high blood pressure in individuals throughout their lives.

Public health approaches can provide an opportunity to interrupt the continuum of high blood pressure treatment and prevention.