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EVALUATION OF THE RISKFACTORS THAT CAN CAUSE HYPERTENSION IN POPULATION (AGE GROUP:20-60 YEARS) - AN ONLINE STUDY

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ABSTRACT

BACKGROUND: - It aims to investigate the increasing prevalence of hypertension among individuals aged between 20 to 60 years, who are more likely to develop hypertension compared to younger age groups. Hypertension is caused by several modifiable and non-modifiable risk factors, such as lack of physical activity, unhealthy lifestyle habits and poor dietary choices. To identify these risk factors, the study will use an online survey method, while maintaining anonymity and improving the generalizability of the findings. The study's results can inform public health interventionsto reduce the burden of hypertension in the population.

OBJECTIVE: - The study was conducted to evaluate the risk factors that can elevate the chances of acquiring hypertension in people. Risk factors such as age, gender, weight, lifestyle choices, family history, physical activities and diet.

MATERIALS AND METHODOLOGY: - This study was an online survey conductedby collecting responses via circulating an online form. The form consisted of structuredsurvey questionnaire which was framed to capture specific information related to the riskfactors that can cause hypertension.

RESULT: - Total of 251 individuals were analyzed, out of which 138 (55%) were female, (113) 45% were male, hypertension was seen most prevalent among the age group of 35-39. HTN was most seen in obese patients, were BMI between 23-26 was 59(24%) ,64 (46.4%) had a history of taking oral contraceptive, patient mostly suffered with high stress which was seen in 88 (35.10%) patients, the sleepduration of most of the patients was between 5-8 hours which was seen in 157(62.5%) patients, alcohol intake was seen in 60 (15.03%) , tea and coffee 245 (61.40%). Diabetes was the most common co-morbidity seen along with hypertension, it was seen in 85 (33.5%) patients, Hypertension which was genetics acquired was 57.4%. 67 (26.7%) performed physical activity and 184 (73.3%) did not perform any physical activity.

KEYWORDS: - Hypertension, Risk factors, Blood pressure , Mid-age population.

1. INTRODUCTION

The medical illness known as hypertension, commonly referred to as high blood pressure, is marked by persistently high blood pressure against the artery walls, which can harm internal organs and blood vessels. [1] It is a medical condition characterized by chronically elevated blood pressure levels above 130/80 mmHg, which is typically defined as a systolic pressure greater than or equal to 103 mmHg or a diastolic pressure greater than or equal to 90 mmHg.
[2] According to a recent article in the American Journal of Hypertension, making lifestyle changes including exercising, losing weight, and eating healthily can help people with hypertension lower their blood pressure. [3]

More than 1 billion individuals worldwide suffer from hypertension, a non-communicable condition that is a significant risk factor for cardiovascular disease. [1] A non-communicable disease is a medical condition that cannot be passed from one person to another since it is not contagious. According to the World Health Organization, noncontagious diseases account for 71% of all fatalities globally, with diabetes, chronic respiratory diseases, cancer, and cardiovascular diseases being the main killers. [5]

Hypertension is a prevalent global issue that has a significant impact on public health. It is estimated that approximately 1.13 billion people worldwide suffer from high blood pressure, and it is responsible for 9.4 million deaths annually. Hypertension is a leading risk factor for early mortality and disability. [1]

1.1 CLASSIFICATION OF BLOOD PRESSURE IN ADULTS

CATEGORY	SYSTOLIC BP(mmHg)	DIASTOLIC BP(mmHg)
Normal	<120	<80
Pre-hypertension	120-139	80-89
Stage 1	140-159	90-99
Stage 2	≥ 160	≥100

1.2 CAUSES OF HYPERTENSION

High blood pressure, also referred as hypertension, has several underlying factors and causes. Genetic, dietary, and environmental variables are a few of the main contributors. According toa recent study that was published in the Journal of the American College of Cardiology, hereditary variables may account for up to 50% of the risk of developing hypertension. [8] Hypertension has also been related to many lifestyle factors, including smoking, a poor diet, and a sedentary lifestyle. According to a systematic review and meta-analysis that was published in the Journal of Hypertension, those who regularly exercise have a decreased chanceof acquiring hypertension than people who don't. [9] Also recognized as a potential contributorto hypertension are environmental variables like air pollution. According to a study that was published in the European Heart Journal, being exposed to air pollution with particulate matter increases your risk of developing hypertension. [10] Genetic and environmental factors can both

be implicated as hypertension causes. A study that appeared in the Journal of Hypertension found that about 30% of a person's unique blood pressure variation is due to genetic factors.
[11] A high-salt diet, inactivity, and excessive alcohol intake are further lifestyle choices that have been demonstrated to raise the risk of hypertension. [12] Obesity, stress, and certain medicalproblems like sleep apnea and kidney illness are additional variables that can cause hypertension. [13]

1.3 SYMPTOMS OF HYPERTENSION

Since hypertension frequently exhibits no outward signs, It is common for people to use the term "silent killer" as it refers to something that can cause harm without noticeable symptoms, which signifies hypertension in some people, however, may encounter symptoms like headaches, breathlessness, chest pain, and eyesight issues. [14]

In extreme circumstances, hypertension can also cause symptoms including confusion, unbearably painful headaches, and nosebleeds, numbness in limbs [15] Headaches, especially those in the back of the head and the morning, are one of the most prevalent signs of hypertension. Dizziness or light-headedness is another symptom that may be brought on by blood vessel narrowing and reduced blood supply to the brain. The symptoms of hypertension, which can be a sign of heart failure or other cardiovascular issues, include fatigue, breathlessness, and chest pain. [16]

1.4 RISK FACTORS OF HYPERTENSION

Hypertension, or high blood pressure, is a prevalent health condition that affects many individuals that raises the risk of significant health issues like heart disease, stroke, and kidneyfailure. A person's likelihood of having hypertension can be increased by several risk factors, some of which can be changed and others that cannot. [18]

Some of the modifiable risk factors for hypertension include:

1. Obesity and overweight: Being overweight or obese raises the chance of developing hypertension. In comparison to people with a BMI of less than 25, those with a body mass index (BMI) of 30 or higher have a 2.5-fold higher chance of getting hypertension, according to published study of the American Journal of Epidemiology. [19]
2. Physical inactivity: Hypertension is significantly increased by a lack of physical activity. Astudy that was published in the Journal of the American Medical Association found that people who exercised moderately for at least 30 minutes each day had a 30% lower risk of hypertensionthan those who did not exercise. [20]
3. Unhealthy diet: A diet low in fruits and vegetables, high in trans and saturated fats, and highin salt can increase the risk of high blood pressure. According to a study published in the Journal of the American College of Cardiology, a diet high in fruits, vegetables, whole grains,nuts, and legumes may reduce the risk of high blood pressure. [21]

Other risk factors for hypertension that are not modifiable include:

1. Age: Being older raises the risk of hypertension. Almost half of all Americans over 60 havehypertension, according to the American Heart Association. [22]
2. Family history: Those who have a history of hypertension in their family are more likely todevelop the

condition. [23]

3. Race and ethnicity: African Americans and Hispanic Americans have a higher likelihood ofdeveloping hypertension in comparison to non-Hispanic whites. [24]

In conclusion, hypertension is a prevalent medical disorder that, if neglected, can result in major health issues. While certain risk factors for hypertension cannot be changed, others canbe managed via dietary and lifestyle modifications, including as maintaining a healthy weightand getting frequent exercise. Individuals can lower their risk of acquiring hypertension and enhance their general health by addressing these risk factors. [25]

1.5 COMPLICATIONS OF HYPERTENSION

The condition of hypertension, commonly referred to as high blood pressure, is a state where there is consistently elevated blood pressure pushing against the walls of the arteries. If left uncontrolled, it can lead to various complications and increase the likelihood of developing heart disease, stroke, kidney failure, and other health issues. Some of the consequences of highblood pressure include: [26]

1. Cardiovascular diseases: Coronary heart disease, heart failure, and peripheral artery diseaseare only a few of the conditions that are greatly increased by hypertension. 10.4 million deathsglobally were attributed to hypertension in 2017, according to a study in the Journal Circulation.[27]

2. Stroke: The most important modifiable risk factor for stroke is high blood pressure. According to a review article in the Journal of the American Heart Association, the severity and duration of high blood pressure are associated with an increased risk of stroke. [28]

3. Kidney disease: Chronic kidney disease can result from damage to the kidneys caused by high blood pressure. High blood pressure greatly increases your chances of developing kidney disease, according to a study published in the American Journal of Kidney Disease. [29]

4. Eye damage: The Journal Ophthalmology published a study which suggests that there is a connection between high blood pressure and a higher likelihood of developing retinopathy, a condition that can cause damage to the blood vessels in the eyes and potentially lead to variouseye diseases and loss of vision. [30]

5. Dementia: According to a study published in the Journal of Hypertension, there is a correlation between high blood pressure and a higher risk of dementia and cognitive decline in older individuals. The study suggests that hypertension may contribute to an increased likelihood of developing dementia. [31]

1.6 COMORBIDITIES ASSOCIATED WITH HYPERTENSION

High blood pressure, often known as hypertension, is a frequent medical disease that raises thepossibility of acquiring several comorbidities. Heart disease, stroke, kidney disease, and diabetes are some of the comorbidities associated with hypertension that are most frequently seen. [32]

Heart disease: Coronary artery disease, heart failure, and irregular heartbeats are all conditionsthat are greatly increased by hypertension.[33]

Stroke: The occurrence of a stroke is often due to an interruption of blood supply to the brain.Hypertension, commonly known as high blood pressure, is a major contributor to the risk of experiencing a stroke. [34]

Kidney disease: Chronic kidney disease (CKD) and end-stage renal disease are two examples of kidney diseases that can occur as a result of hypertension (ESRD) [35]

Diabetes: People with diabetes frequently experience hypertension. Almost 70% of people withdiabetes have hypertension, which significantly raises their risk of cardiovascular disease. [36]

1.7 PATHOPHYSIOLOGY OF HYPERTENSION

High blood pressure is a complex condition that arises from a combination of genetic, environmental, and lifestyle factors. Although the exact mechanisms behind hypertension are not yet fully understood, various pathophysiological processes have been identified as significant contributors to the condition.

The renin-angiotensin-aldosterone system (RAAS) is a key mechanism underlying hypertension. This system plays a crucial role in regulating the body's balance of salt and water, which is essential for maintaining normal blood pressure. When the RAAS becomes overactive, it leads to increased vasoconstriction, retention of salt and water, and ultimately results in elevated blood pressure in individuals with hypertension. [81]

It is influenced by endothelial dysfunction, which is characterized by a decline in the capacityof the inner lining of blood arteries known as endothelium to regulate blood flow and vasculartone. When endothelial function is impaired, there is a reduction in the widening of blood vessels and an increase in their constriction, contributing to hypertension. [82]

It is believed to be caused by various factors, including oxidative stress, inflammation, and insulin resistance. These factors can lead to dysfunction of blood vessels and damage to them,resulting in an increase in blood pressure.

Hypertension is associated with risk factors such as age, family history, obesity, physical inactivity, poor diet, smoking, and alcohol consumption. Treatment options for hypertension typically include lifestyle modifications, such as weight loss, regular exercise, and dietary changes, as well as medication options like diuretics , beta-blockers, Angiotensin receptor blockers , and ACE inhibitors. [83]

RISK FACTORS THAT CAUSE HYPERTENSION IN THE MID-AGE POPULATION

Millions of individuals worldwide suffer from hypertension, also known as high blood pressure. It poses a significant risk for many cardiovascular conditions, including heart attack,stroke, and renal failure which effectively prevent and treat hypertension, it is crucial to comprehend the risk factors that contribute to this condition in individuals in their middle age.[37]

There are several known risk factors for hypertension in middle-aged adults. Age, genetics, lifestyle elements including nutrition, inactivity, obesity, smoking, and underlying medical disorders like anemia, diabetes and kidney disease are a few of these. [38]

For instance, a study that appeared in the Journal of Hypertension indicated that having a familyhistory of

hypertension increased the likelihood of developing the condition in middle-aged individuals. The study also discovered that this group's high salt intake and lack of physical activity were important causes of hypertension. [39]

Similar findings were made by a systematic review and meta-analysis that was published in theJournal of Human Hypertension, which indicated that obesity and hypertension were closely related in populations of middle-aged people. The study also discovered that blood pressure reduction in this group was achieved with weight loss strategies. [40]

Also, a study indicated smoking to be a substantial risk factor for hypertension in middle-agedwomen. This study was published in the American Journal of Epidemiology. Also, the study indicated that giving up smoking could lower blood pressure and minimize the likelihood of getting hypertension. [41]

Overall, these studies emphasize how critical it is to recognize and manage the risk factors thatmiddle-aged populations are exposed to for hypertension. It may be feasible to prevent and treat hypertension and lower the risk of acquiring cardiovascular illnesses by making proper dietary and lifestyle modifications. [42]

Some of the risk factors for hypertension that cannot be changed include age, gender, height, race, family history, and genetics. However, the most important modifiable risk factors that contribute to the onset of hypertension are aspects of lifestyle, such as poor food, inactivity, smoking, and excessive alcohol intake. The development of hypertension in middle-aged people is highly correlated with a sedentary lifestyle and an unhealthy diet rich in sodium andlow in potassium. [43]

Obesity and hypertension are positively correlated, according to studies, especially in middle-aged people. Increased insulin resistance brought on by excessive body fat raises blood pressure. According to a study in the Journal of Hypertension, people who are overweight or obese have a higher risk of developing hypertension than people who are of a healthy weight.[44]

Stress is another risk factor for hypertension in middle-aged individuals. The activation of the sympathetic nervous system and the renin-angiotensin-aldosterone system due to chronic stresshas been found to increase blood pressure. A research article published in the American Journalof Hypertension revealed that stress was associated with an increased likelihood of developinghypertension in middle-aged women. [45]

Major risk factors which are associated with hypertension in middle age are:

1. Obesity: The risk of developing hypertension is significantly higher for individuals who areoverweight or obese. A comprehensive analysis of 97 studies discovered that obese individualshad a 1.98 times greater likelihood of developing hypertension than those who had a normal weight. [46]
2. Sedentary lifestyle: Inactivity is also a risk factor for hypertension. Engaging in physical activity has been shown to reduce blood pressure in individuals with hypertension and lower the chance of acquiring hypertension in the first place, according to a meta-analysis of 54 research. [47]
3. Smoking: Smoking is a widely recognized risk factor for hypertension and cardiovascular disease. A meta-analysis of 47 research found that smokers are far more likely than non-smokers to acquire hypertension [48]
4. Family history: Hypertension runs in families, which increases the likelihood of having thecondition. A study of more than 3,000 people found that those who had a family history of hypertension were far more

likely to develop it themselves [49]

5. Stress: Persistent stress is yet another risk factor for high blood pressure. Interventions for stress management can considerably lower blood pressure levels in individuals with hypertension., according to a meta-analysis of 30 trials [50]

Age is a significant risk factor for hypertension and has been demonstrated in numerous studiesto be more prevalent in middle-aged people. Inflammation and insulin resistance brought on byobesity which are additional risk factors for hypertension. Physical activity can help prevent hypertension, while a sedentary lifestyle is linked to a higher risk of illness. Another importantrisk factor is family history because people who have a history of hypertension run a higher chance of having it themselves. In addition, present individuals who smoke are at a higher riskof developing hypertension compared to those who have never smoked or those who quit smoking in the past. Smoking is a well-known risk factor for hypertension. [51]

Overall, these risk variables show how crucial lifestyle changes and regular blood pressure checks are for treating and preventing hypertension in the middle-aged population. People canlower their risk of getting hypertension and enhance their overall cardiovascular health by addressing these risk factors. [52]

According to the literature available, middle-aged people have an increased risk of getting hypertension, and several risk factors have been identified. Age, gender, ethnicity, obesity, physical inactivity, family history, and smoking are some of these risk factors.[53]

Aging is a major risk factor for hypertension in middle-aged persons, and the prevalence of hypertension increases with age. Obesity is also closely related to hypertension, and weight loss has been shown to lower blood pressure in overweight and obese adults. Another significant risk factor is sedentary behavior, and studies have shown that regular exercise reduces the likelihood of developing hypertension. [54]

An elevated risk of hypertension in the family is another significant risk factor. Those with thishistory ought to be closely monitored and, if required, given early intervention. Not to mention,smoking has long been linked to an increased risk of hypertension; giving up can help lower blood pressure. [55]

Overall, making lifestyle changes including increasing regular physical exercise, eating healthily, managing weight, and quitting smoking can greatly lower the chance of middle-aged people acquiring hypertension. Effective hypertension care in this population depends on earlydetection, regular blood pressure monitoring, and prompt action. [56]

MATERIALS AND METHODS

STUDY SITE: Online survey was conducted with a questionnaire through google forms.

DURATION OF STUDY: - Data was collected between March 2023-April 2023

STUDY DESIGN: -The study on risk factors that can cause hypertension in middle age population is an observational study done by online survey through google form.

PROPOSED SAMPLE SIZE: 251

STUDY CRITERIA

Inclusion criteria:

- Participants between the age group of 20-60 and are diagnosed with hypertension.

- Participants who are willing to participate in the study.

Exclusion Criteria:

- Participants with age group below 20 years and above 60 years, and those who are notdiagnosed with hypertension.
- Participants who are not willing to participate in the study.
- Patient suffering from debilitating conditions/mental illness where their capacity isrestrained for active participation in the survey.

Materials required:

- Online survey form
- Mobile phone or Computer.

Methodology:

An observational study was conducted for a period of 1 month, after the ethical approval and Subjects were enrolled based on the criteria for being included or excluded. The Subject datawas collected by using a well-designed google form. Prior to data collection, consent was taken from the subject. Google form questionnaire was designed and the link of the questionnaire was circulated through social media platforms such as - WhatsApp, Facebook, Instagram to friends and family members.

Statistical Methods:

The data was collected and analysed using Microsoft excel software for statistics, and differenttypes of graphs, figures and tables are used to summarize the data visually.

RESULT

Baseline Characteristics of the study population:-

Total 251 participants were obtained and analyzed baseline characteristics are crucial fordesigning an effective study that can accurately evaluate the risk factors that can cause hypertension in the mid-age population. The study aims to conduct an online survey, which makes it essential to consider the online accessibility of the population and ensurethat the sample size is large enough to make valid conclusions. By considering the baseline characteristics of the study population, researchers can identify potential confounding variables that may impact thestudy results and adjust their statistical models accordingly. Ultimately, a thorough analysis of the baseline characteristics will provide researchers with the necessary information to design an effective study, draw accurate conclusions, and make recommendations for preventing hypertension in mid-age individuals

These characteristics should include various demographic and health-related factors of the participants. Firstly, the age range of the participants should be specified as mid- age,which typicallyrefers to individuals between 40-60 years of age. Additionally, the gender,ethnicity, and race of the participants should be taken into account since hypertension rates can differ among different ethnic groups. The socioeconomic status of the participants, including their income level, education level, occupation, and marital status,can also impact hypertension risk. Furthermore, lifestyle factors such as physical activity, alcohol consumption,

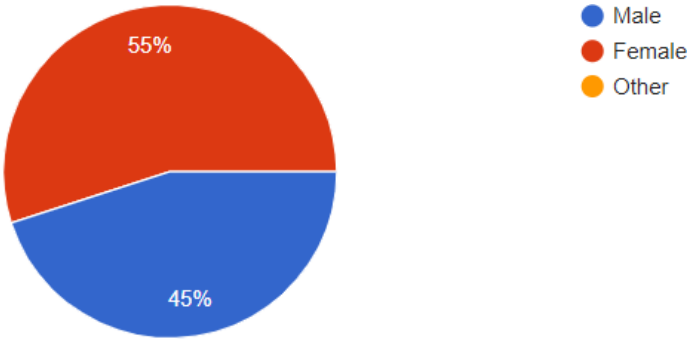
smoking status and dietary habits should be considered. The medical history of the participants, including any pre-existing conditions such as diabetesor cardiovascular disease, should also be accounted for. Lastly, the baseline blood pressure levels of the participants should be measured since the study aims to evaluate risk factors for hypertension. By analyzing these characteristics, researchers can developa comprehensive understanding of the study population and provide valuable insights into the risk factors that contribute to hypertension in mid-age individuals.

We identified 251 individuals with a mean age of 37.58 with female comprising of 55%of the population and male comprising of 45% of the population.

Table 1: Socio-demographic distribution of the study participants

Demographic Details	**Total N = 251 (%)**
Mean Age	37.58
Mean Weight	67.30
Gender	
Female	138 (55%)
Male	113 (45%)
Occupation	
Farmer	15 (5.98%)
Contract & Compliance Executive	1 (0.40%)
Dairy Worker	1 (0.40%)
Employee	78 (31.08%)
Executive	1 (0.40%)
General Manager	1 (0.40%)
Homemaker	75 (29.88%)
Intern	1 (0.40%)
Worker	28 (11.16%)
Psychotherapist	2 (0.80%)
Shopkeeper	7 (2.79%)
Truck Driver	1 (0.40%)
Student	40 (15.91%)

Graph 1.1: Gender-wise Distribution



Out of 251 participants, 55% were female and 45% were male.

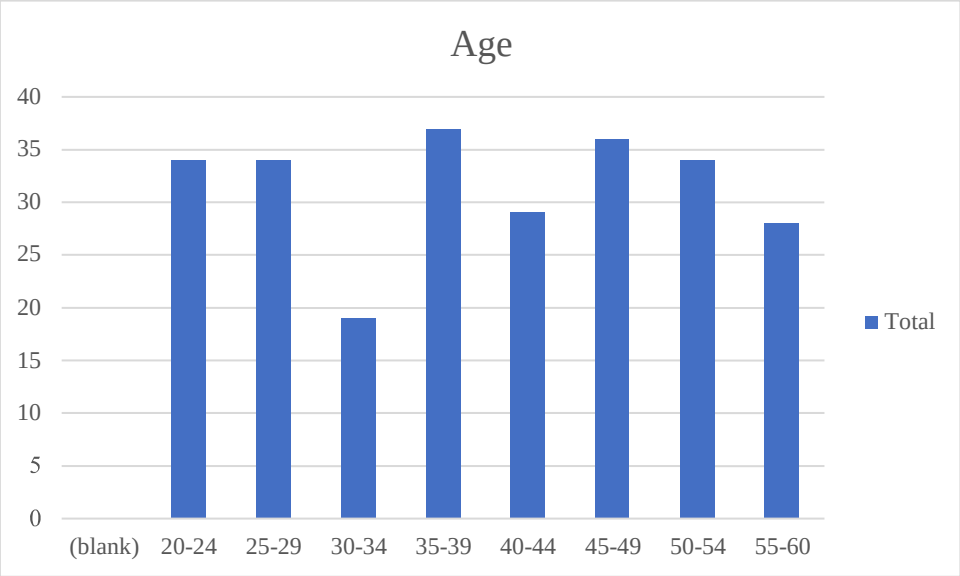
Table 2: Age of the study participant

Age	Total N = 251 (%)
20-24	34 (13%)
25-29	34 (13%)
30-34	19 (7%)
35-39	37 (16%)
40-44	29 (12%)
45-49	36(15%)
50-54	34 (13%)
55-60	28 (11%)

Table: P Value of age of the study participant

	Variable 1	Variable 2
Mean	31.375	0.125
Variance	34.83929	0.000743
Observations	8	8
Pearson Correlation	0.972364	
ɔthesized MeanDifference	0	
df	7	
t stat	15.04231	
P(T<=t) one tail	6.89E-07	
t critical one- tail	1.894579	
P (T<=t) two tail	1.38E-06	
t Critical two tail	2.364624	

Graph 2.1: Distribution according to age



Out of 251 participants 13% belonged to age group of 20-24, 13% belonged to 25-29, 7% belonged to 30-34, 16% belonged to 35-39, 12% belonged to 40-44, 15% belonged to 45-49, 13% belonged to 50-54, 11% belonged to age group of 55-60 years. The p-value was found tobe 1.38E-06 which was not significant.

Table 3: Body Mass Index of the study participants

Body Mass Index	Total N = 251 (%)
14-17	8 (3%)
17-20	15 (6%)
20-23	45 (18%)
23-26	59 (24%)
26-29	55 (22%)
29-32	34 (13%)
32-35	18 (7%)
38-38	13 (5%)
38-41	4 (2%)

Table: P value of Body Mass Index of study participants

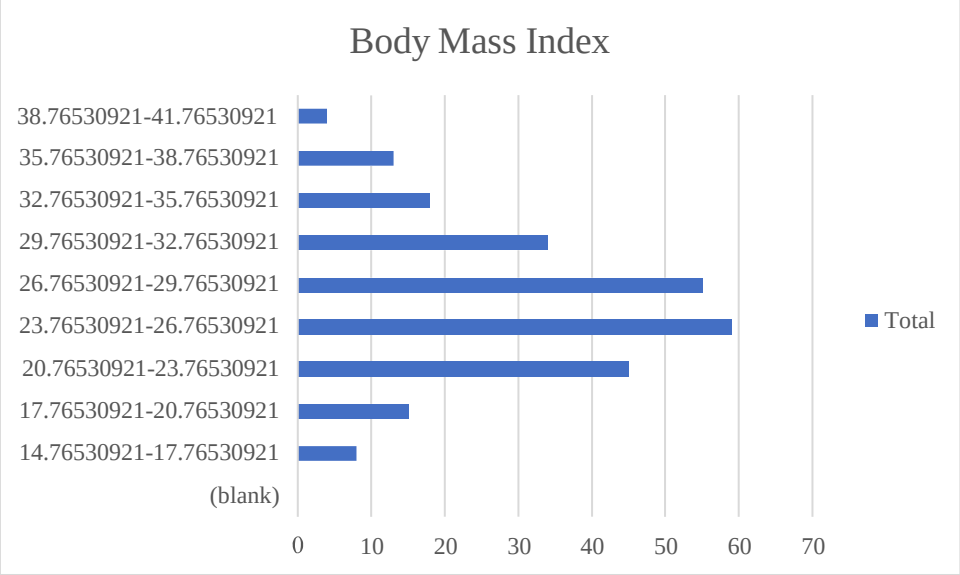
	Variable 1	Variable 2
Mean	27.8888959	0.111111
Variance	435.6111	0.007061
Observation	9	9
Pearson Correlation	0.999324	
ɒthesized MeanDifference	0	
df	8	
t stat	4.008853	
P (T<=t) one tail	0.001951	
T Critical one-tail	1.859548	
P (T<=t) two tail	0.003901	
T Critical two-tail	2.306004	

Table 4: Body Mass Index classification

Classification	BMI range
Underweight	<18
Normal	18.5-25
Overweight	25-30
Obese class I	30-35
Obese class II	35-40
Obese class III	>40

Subjects with BMI less than 18 are classified as underweight, ,18.5-25 is considered as normalBMI, 25-30 are overweight, 30-35 is obese class I, 35-40 as obese class II, and more than 40 is considered as obese class III.

Graph 4.1 Distribution according to Body Mass Index



Out of 251 participants 3% BMI ranged between 14-17, 6% ranged between 17-20, 18% ranged between 20-23, 24% ranged between 23-26, 22% ranged between 26-29, 13% ranged between 29-32, 7% ranged between 32-35, 5% ranged between 35-38, 2% BMI rangedbetween 38-41. The p- value was found to be 0.003901, which was significant.

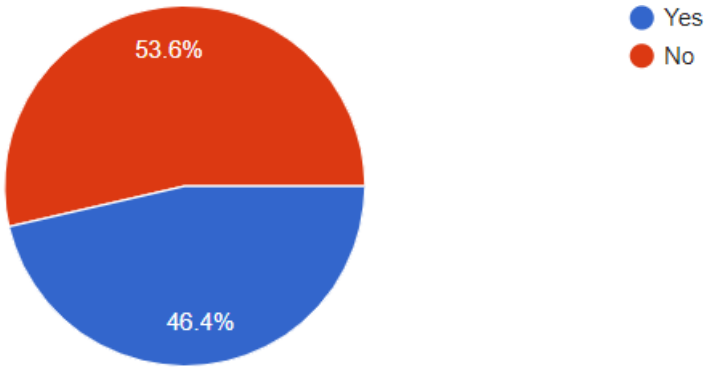
Table 5: Contraceptive History distribution of the study participants

Contraceptive History	**Total** **N = 138 (%)**
Yes	74 (53.6%)
No	64 (46.4%)

Table: P value of contraceptive history distribution of the study participants

	Variable 1	Variable 2
Mean	69	0.5
Variance	50	0.002592
Observations	2	2
Pearson Correlation	1	
othesized MeanDifference	0	
Df	1	
t Stat	13.79936	
P(T<=t) one-tail	0.023027	
t Critical one-tail	6.313752	
P(T<=t) two-tail	0.046054	
t Critical two-tail	12.7062	

Graph 5.1: Distribution according to Contraceptive History



Out of the total female participants, 53.6% have a contraceptive history while the other 46.4%do not have a contraceptive history. The p-value was found to be 0.046054, which was significant.

Table 6: Stress Distribution of the study participants

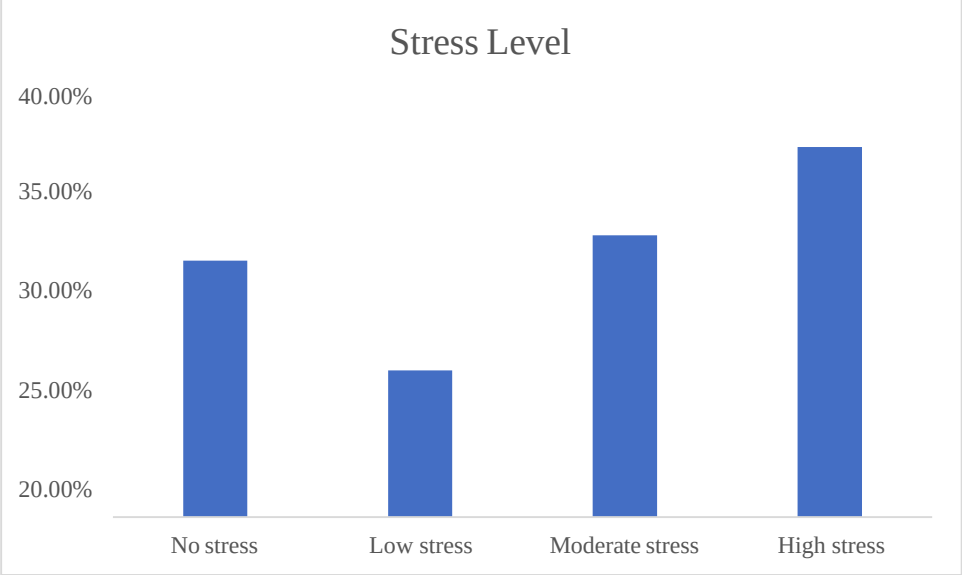
Stress Level	Total N = 251 (%)
No stress	61 (24.3%)
Low stress	35 (13.9%)

Moderate stress	67 (26.7%)
High stress	**88 (35.10%)**

Table: P value of Stress Distribution of the study participant

	Variable 1	**iable2**
Mean	62.75	0.25
Variance	476.25	0.00762
Observations	4	4
Pearson Correlation	1	
Hypothesized Mean Difference	0	
Df	3	
t Stat	5.750865	
P(T<=t) one-tail	0.005222	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.010445	
t Critical two-tail	3.182446	

Graph 6.1: Distribution according to Stress Level



Out of the 251 participants, 24.30% do not feel any stress, 13.90% have low stress,26.70% have a moderate stress level, and 35.10% have a high level of stress. The p-value was found tobe 0.010445 which was significant.

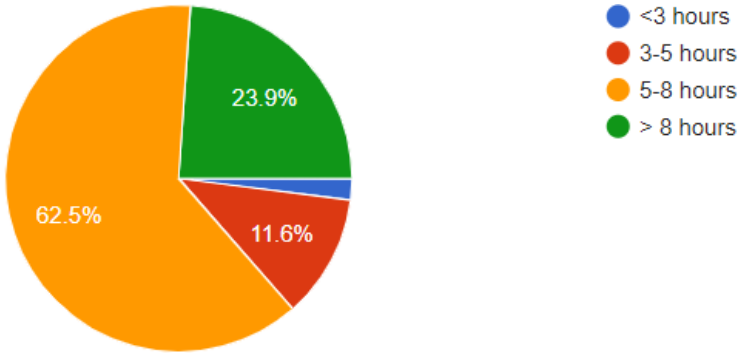
Table 7: Sleep duration of the study participants

Sleep Duration	Total N = 251 (%)
<3 hours	5 (2%)
3-5 hours	29 (11.6%)
5-8 hours	157 (62.5%)
>8 hours	60 (23.9%)

Table: P value of sleep duration of the study participants

	Variable 1	Variable2
Mean	62.75	0.25
Variance	4454.917	0.070534
Observations	4	4
Pearson Correlation	1	
ɒthesized MeanDifference	0	
Df	3	
t Stat	1.880277	
P(T<=t) one-tail	0.078326	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.156652	
t Critical two-tail	3.182446	

Graph 7.1: Distribution of Duration of Sleep



Out of the 251 participants, 2% of the population has less than 3 hours of sleep, 11.6%has a sleep duration of 3 to 5 hours, 62.5% has a sleep duration of 5 to 8 hours, and 23.9% has a sleep duration of more than 8 hours. The p-value was found to be 0.156652, which was significant.

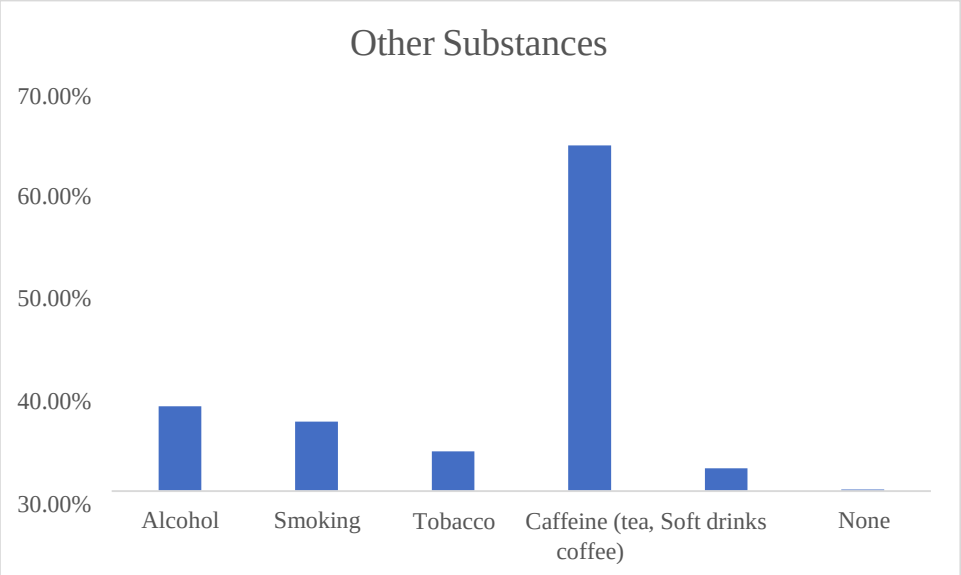
Table 8: Regular Consumption of other substances of the study participants

Other Substances	Total N = 251 (%)
Alcohol	60 (15.03%)
Smoking	49 (12.28%)
Tobacco	28 (7.02%)
Caffeine (tea, coffee)	245 (61.40%)
Soft drinks	16 (4.01%)
None	1 (0.26%)

Table : P value of Regular Consumption of other substances of the study participants

	Variable 1	Variable2
Mean	66.5	0.166667
Variance	8106.7	0.050908
Observations	6	6
Pearson Correlation	1	
ɒthesized MeanDifference	0	
Df	5	
t Stat	1.809152	
P(T<=t) one-tail	0.065107	
t Critical one-tail	2.015048	
P(T<=t) two-tail	0.130214	
t Critical two-tail	2.570582	

Graph 8.1: Distribution of Consumption of other substances



Out of the 251 participants, Alcohol has a consumption value of 15.03%, Smoking has12.28%,Tobacco has a consumption value of 7.02%, and Caffeine has a total consumption value of 61.40% which is the highest. 0.26% of the population does not consume any other substance. The p- value was found to be 0.130214, which was significant.

Table 9: Medical History distribution of the study participants

Medical History	**Total N = 251 (%)**
Co-morbidities other than Hypertension	
Diabetes	85 (33.5%)
Kidney Diseases	32 (12.7%)
Liver Diseases	18 (7.2%)
Heart Diseases	21 (8.4%)
Paralysis	2 (0.8%)
PCOD	2 (0.8%)
Thyroid	2 (0.8%)
Lungs Disease	2 (0.8%)
Cancer, Epilepsy	1 (0.4%)

Seizure Anemia	1 (0.4%)
Sickle cell disease	1 (0.4%)
Thyroid, Bone Marrow Disease	1 (0.4%)
No other co-morbid disease	83 (33.4%)
Family History of Hypertension	
Mother or the members from mother's side	79 (31.5%)
Father or the members from father's side	46 (18.3%)
Sibling	19 (7.6%)
No family history of hypertension	107 (42.6%)

Table: P value of co-morbidities other than hypertension

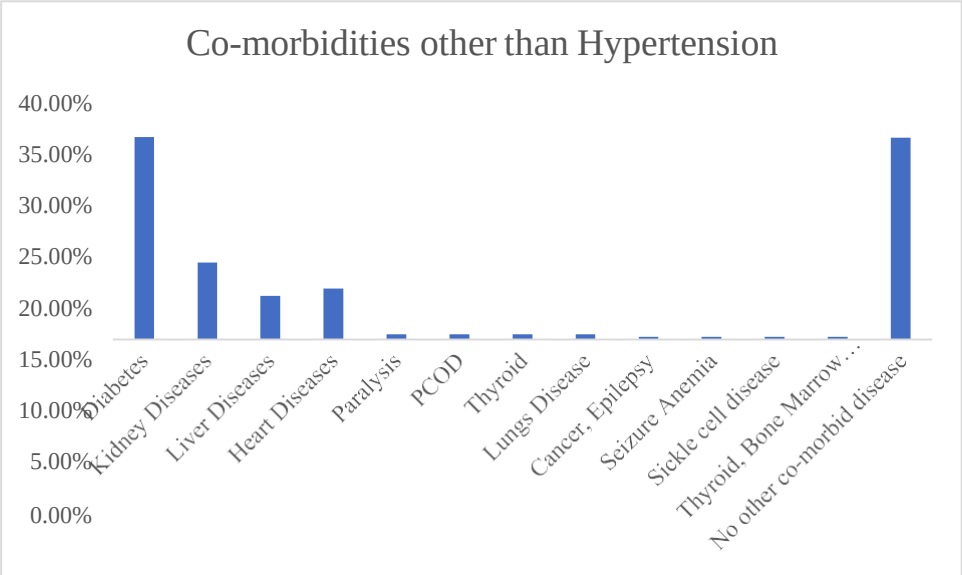
	Variable 1	**Variable 2**
Mean	19.30769	0.076923
Variance	923.0641	0.014629
Observations	13	13
Pearson Correlation	0.99993	
ɒthesized MeanDifference	0	
Df	12	
t Stat	2.291314	
P(T<=t) one-tail	0.020417	
t Critical one-tail	1.782288	
P(T<=t) two-tail	0.040834	
t Critical two-tail	2.178813	

Table: P value of family history of hypertension

	Variable 1	**Variable 2**
Mean	62.75	0.25
Variance	1472.25	0.023322
Observations	4	4
Pearson Correlation	0.999998	
ɒthesized Mean Difference	0	
Df	3	
t Stat	3.270779	
P(T<=t) one-tail	0.023375	
t Critical one-tail	2.353363	

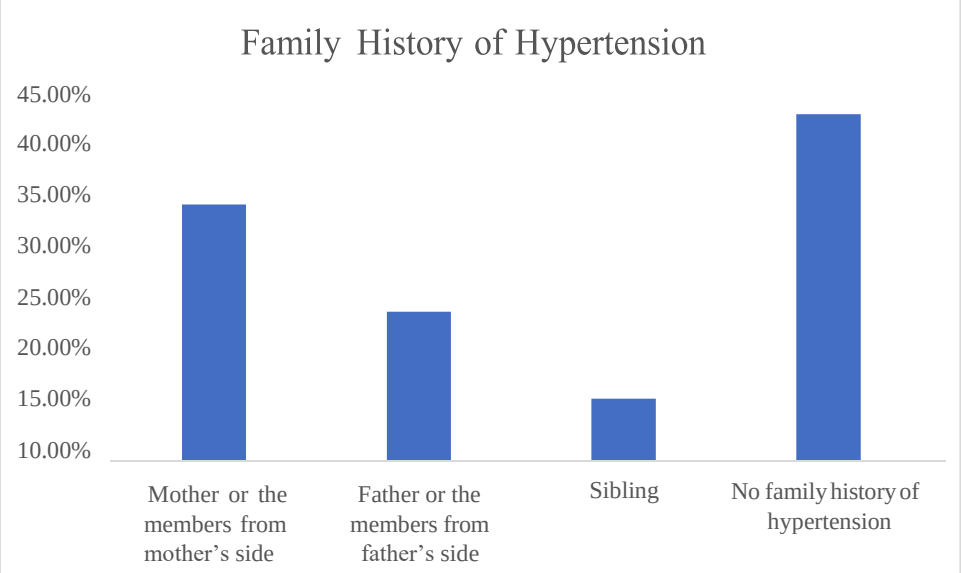
P(T<=t) two-tail	0.04675	
t Critical two-tail	3.182446	

Graph 9.1: Distribution according to Co-morbidities other than Hypertension



Out of the 251 participants, 33.50% has diabetes, 12.70% has Kidney related diseases,7.20%has liver diseases, 8.40% has heart diseases, 0.80% suffer from paralysis, 0.80%have PCOD,0.80% suffer from Thyroid, 0.80% have diseases related to lungs, 0.40% have cancer and epilepsy, 0.40% suffer from seizure and anemia. 0.40% have sickle cell disease, 0.40% have thyroid and bone marrow disease. 33.40% of the distribution has no other co-morbid disease.The p- value was found to be 0.040834 which was significant.

Graph 9.2: Distribution according to Family History of Hypertension



Out of the 251 participants, it was noticed that 31.50% of the participants have a family history of hypertension

from the mother or the mother's side of the family, 18,30% from the father orthe father's side of the family, and 7.60% from siblings. 43.60% individuals involved did nothave any prior record of hypertension in their families. The p- value was found to be 0.04675 which was significant.

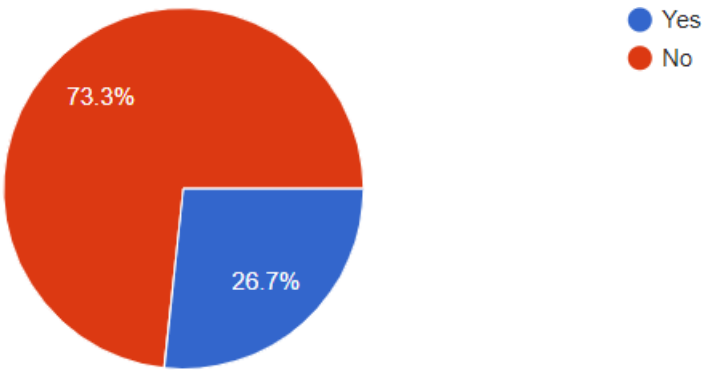
Table 10: Physical Activity History of the study participants

Physical Activity History	Total N = 251 (%)
Yes	67 (26.7%)
No	184 (73.3%)

Table: P value of physical activity history of the study participants

	Variable 1	Variable 2
Mean	125.5	0.5
Variance	6844.5	0.108578
Observations	2	2
Pearson Correlation	1	
ɔthesized Mean Difference	0	
Df	1	
t Stat	2.145297	
P(T<=t) one-tail	0.138844	
t Critical one-tail	6.313752	
P(T<=t) two-tail	0.277688	
t Critical two-tail	12.7062	

Graph 10.1: Distribution of Physical Activity History



Out of 251 participants, 26.7% do physical activity and 73.3% do not do any physicalactivity. The p-value was found to be 0.277688, which was not significant.

Table 11: Physical Activity of the study participants

Physical Activity	**Total N = 67 (%)**
Physical Activity	
Gym	12 (17.91%)
Walking	40 (59.70%)
Running	3 (4.48%)
Yoga	12 (17.91%)
Additional Supplements	
Protein Powder	4 (5.97%)
Mass Gainer	1 (1.49%)
No additional supplements	62 (92.54%)

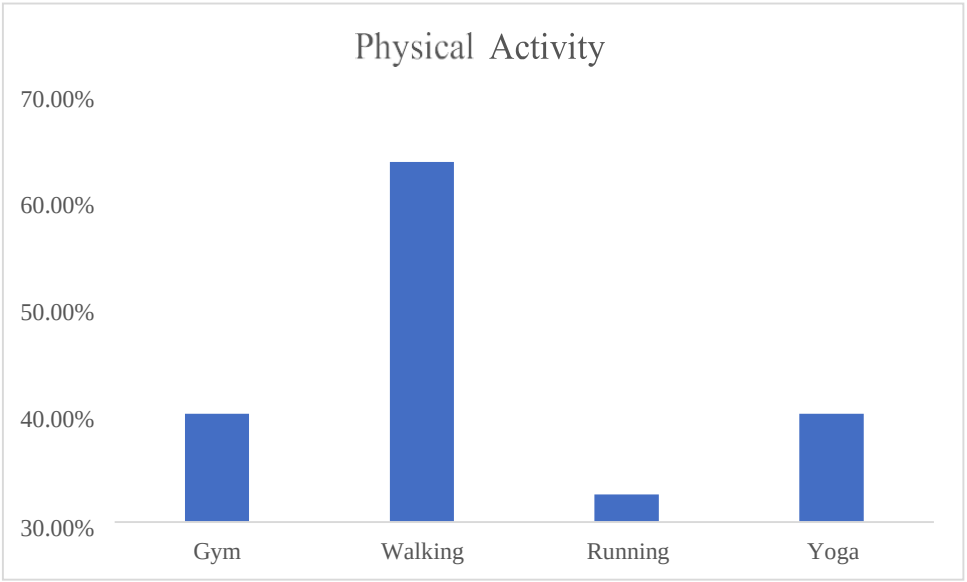
Table: P value of physical Activity of the study participants

	Variable1	**Variable 2**
Mean	16.75	0.25
Variance	258.25	0.057523
Observations	4	4
Pearson Correlation	1	
Hypothesized Mean Difference	0	
Df	3	
t Stat	2.084607	
P(T<=t) one-tail	0.064218	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.128436	
t Critical two-tail	3.182446	

Table: P value of additional supplements

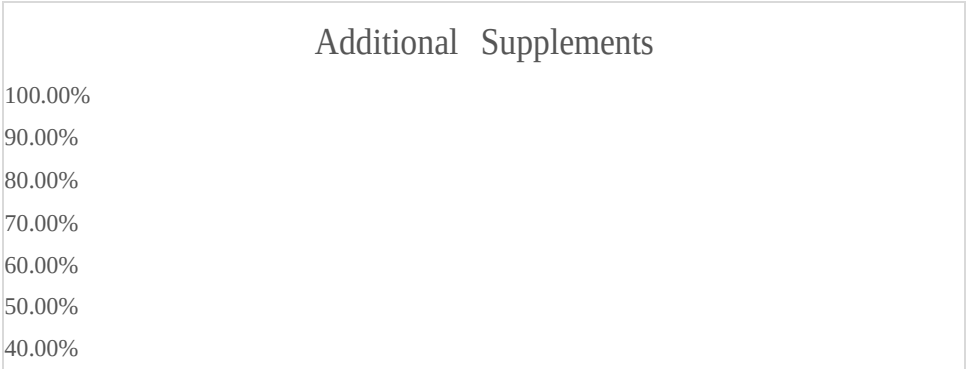
	Variable 1	Variable 2
Mean	22.33333	0.333333
Variance	1182.333	0.263409
Observations	3	3
Pearson Correlation	1	
othesized Mean Difference	0	
Df	2	
t Stat	1.124979	
P(T<=t) one-tail	0.188732	
t Critical one-tail	2.919986	
P(T<=t) two-tail	0.377464	
t Critical two-tail	4.302653	

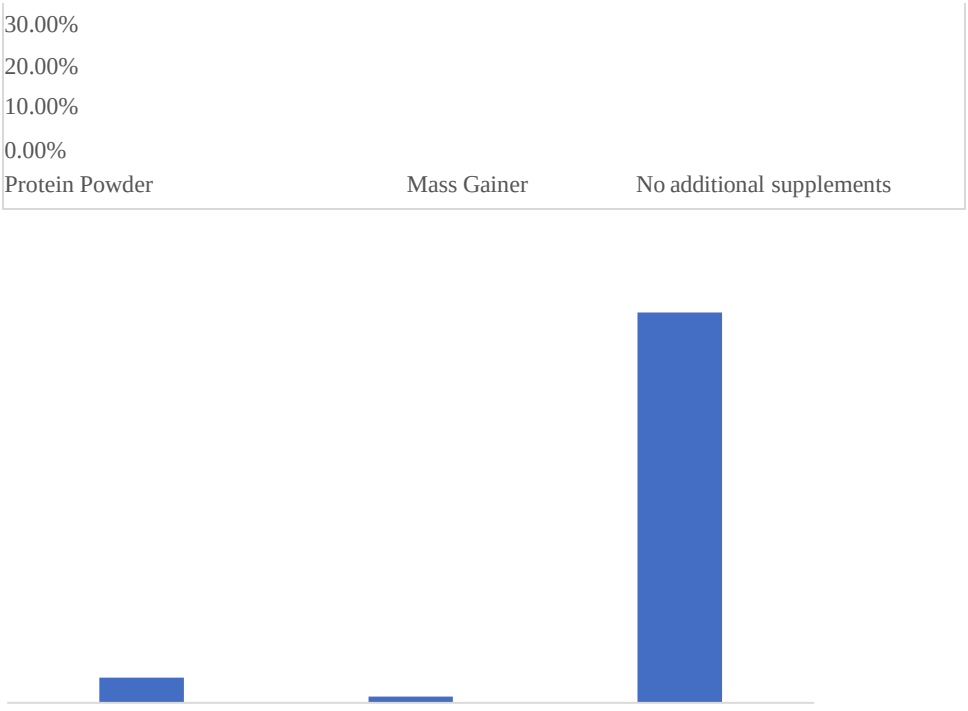
Graph 11.1: Distribution of Physical Activity



Out of the total participants who do physical activity, 17.91% go to gym, 59.70% walk,4.48%run, and 17.91% do yoga. The p- value was found to be 0.128436 which was significant.

Graph 11.2: Distribution of Additional Supplements





Out of the total participants who do physical activity, 5.97% take protein powder, and 1.49%take mass gainers as additional supplements. 92.54% of the physical activity population doesnot take any additional supplements. The p- value was found to be 0.377464, which was not significant.

Table 12: Additional Salt and Sugar Intake of the study participants.

Additional intake in teaspoon	**Total N = 251 (%)**
Salt	
0	116 (46.22%)
1	117 (46.61%)
2	12 (4.78%)
3	6 (2.39%)
Sugar	
0	152 (60.56%)
1	87 (34.66%)
2	10 (3.98%)
4	2 (0.80%)

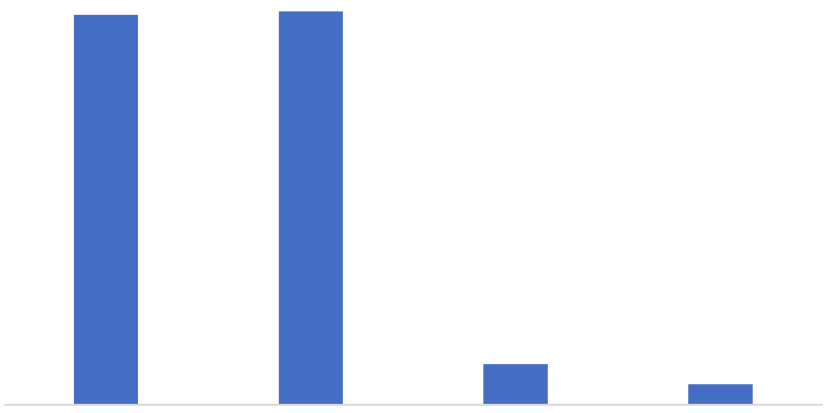
Table: P value of additional Salt Intake of the study participants

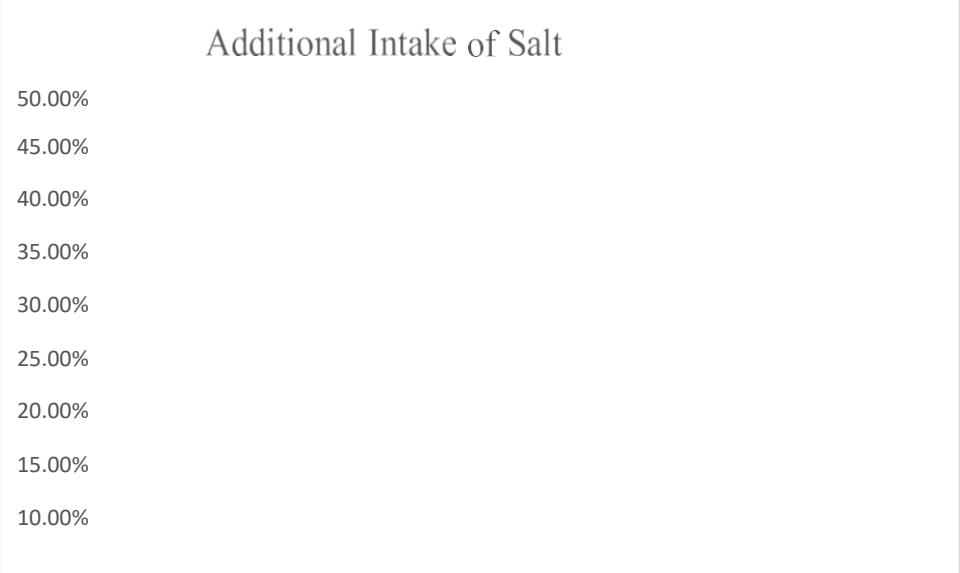
	Variable 1	Variable 2
Mean	62.75	0.25
Variance	3858.25	0.061245
Observations	4	4
Pearson Correlation	1	
ɒthesized Mean Difference	0	
Df	3	
t Stat	2.020452	
P(T<=t) one-tail	0.068298	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.136597	
t Critical two-tail	3.182446	

Table : P value of additional Sugar Intake of the study participants

	Variable 1	Variable 2
Mean	62.75	0.25
Variance	5008.917	0.07951
Observations	4	4
Pearson Correlation	1	
ɒthesized Mean Difference	0	
Df	3	
t Stat	1.773258	
P(T<=t) one-tail	0.087147	
t Critical one-tail	2.353363	
P(T<=t) two-tail	0.174295	
t Critical two-tail	3.182446	

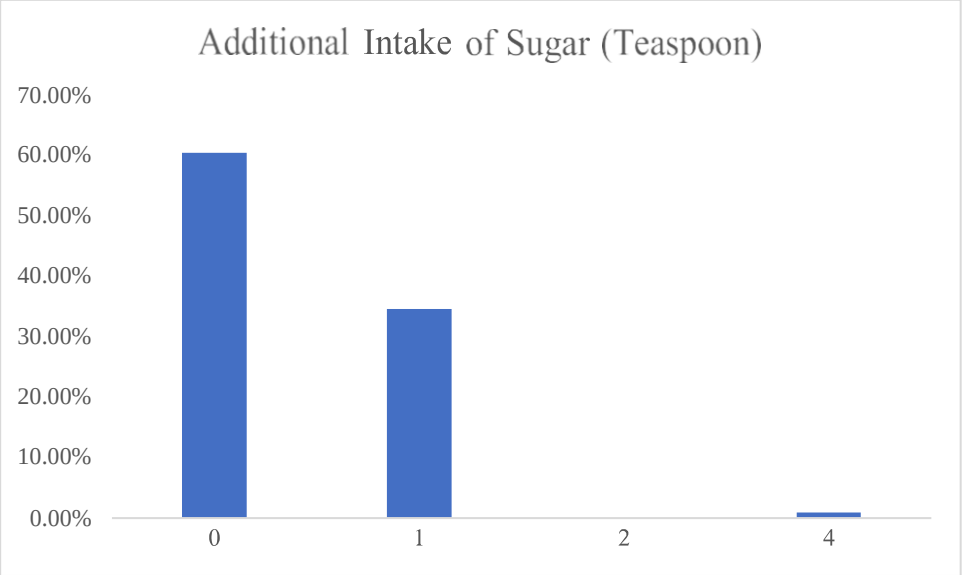
Graph 12.1: Distribution of Additional Intake of Salt in Teaspoon





Out of the 251 participants, 46.22% do not have an additional intake of salt. 46.6% have1 teaspoon of additional intake of salt, 4.78% consume 2 teaspoons of additional salt and 3.39%consume 3 additional teaspoons of salt. P-value was found to be 0.136597, which was significant.

Graph 12.2: Distribution of Additional Intake of Sugar in Teaspoon



Out of the 251 participants, 60.56% do not have an additional intake of salt. 34.66% have 1 teaspoon of additional intake of salt, 3.98% consume 2 teaspoons of additional salt and 0.80%consume 4 additional teaspoons of salt. The p-value was found to be 0.25, which was significant. The p- value was found to be 0.174295, which was significant.

DISCUSSION

According to the study, there are numerous variables that raise blood pressure in people of middle age. Age, gender, family history of high blood pressure, obesity, physical activity, smoking status, and alcohol use, stress are a few examples of the characteristics that have beenlinked to high blood pressure. Additionally, the study has found that stress levels and eating patterns are linked to hypertension in middle-aged populations.[84]

Physical activity is linked to a lower risk of hypertension, according to our study. This outcomeis in line with earlier studies that demonstrated a link between regular physical exercise and lower blood pressure levels as well as a lower risk of hypertension. In addition, the study's findings that drinking alcohol and smoking raise the risk of hypertension are in line with earlierstudies in this area.

Additionally, it's possible that your research revealed that a substantial risk factor for hypertension in middle-aged populations is a family history of the condition. This implies thatthose with a family history of high blood pressure should be regularly watched and urged to adopt good lifestyle habits.

Overall, the findings demonstrate how treatments aiming at lowering the incidence of hypertension in mid-age populations might be more effective when modifiable risk factors which includes elements such as physical activity, smoking, alcohol intake, and dietary habits, are identified. Additionally, the significance of a family history of hypertension as a risk factor highlights the need for focused prevention and management methods in people with a history of hypertension.

The potential effect of comorbidities on the risk of hypertension is another crucial factor to take into account. For instance, due to the interaction between these illnesses and the pathophysiology of

hypertension, those with diabetes, obesity, or sleep apnea may be more likely to acquire hypertension.

Furthermore, it's important to consider how cultural and environmental factors may affect a person's risk of developing hypertension. For instance, certain cultural practices, like consuming a lot of salt, may increase the likelihood of developing hypertension, whilst environmental variables, like air pollution, may make the condition worse in people who are predisposed to it.

Additionally, the study might have made clear the necessity for a multidisciplinary strategy formanaging and preventing hypertension. Healthcare providers, public health officials, and legislators must work together to prevent and manage hypertension because it is a complicateddisorder with numerous risk factors and underlying mechanisms. Interventions aimed at minimizing the risk of developing hypertension might include pharmacological measures likeantihypertensive drugs, as well as changes in lifestyle behaviors like increasing physical activity, cutting back on salt and alcohol consumption, and managing stress. The best method for managing and preventing hypertension may be a comprehensive strategy that incorporates pharmaceutical and lifestyle changes.Our research may also have shown variations in hypertension risk among distinct mid-age demographic subgroups. You may have learned, for instance, that some ethnic or racial groups are more likely than others to develop hypertension. By identifying these inequalities, interventions can better target those who need hypertension prevention and control the most.

A total of 251 replies were gathered via an online survey that was performed. It was discoveredthat there were more female patients (55%) than male patients (45%).

According to a case study by *Sara Azima et al.*, hypertension is one of the most serious side effects of oral contraceptives, which are used by millions of people worldwide. Fortunately, since oral contraceptives have a dose-dependent effect on blood pressure, taking the currently available pills with a low estrogen level has little effect on blood pressure. In order to identifyhigh-risk cases, it is advised to monitor blood pressure.[85] In our study, 46.4% of the women had previously taken oral contraceptives..

In our study, patients with hypertension were often diagnosed between the ages of 35 and 50. The interrelationships between hypertension and obesity, two prevalent and significant health concerns, are discussed in a review article by *Benjamin N. Chaing et al.*, In general, comparisons of simultaneous intra-arterial and cuff blood pressure readings show that there isa valid and independent relationship between blood pressure and body weight. Overweight people are more likely to have hypertension than non-obese people are, and vice versa, a sizablefraction of the population has hypertension. Obese hypertensive people have a higher chance of developing coronary heart disease than non-obese subjects, and their mortality rates are higher than those of obese or hypertensive subjects alone.[86] Our study asserts that despite obesity being a significant risk factor for hypertension, overweight and obese patients were more common than those with normal body weight.

Stress is another factor that raises blood pressure in middle-aged persons, *Bo Hu, Xiaoyu Liu et al,*. reported in a cross-sectional study that psychological stress was linked to a higher risk of hypertension in middle-aged people and that stress could account for around 9% of the riskof hypertension. In addition, women were more likely than men to develop hypertension as a result of psychological stress.[87] Our study found that mild stress affected 13.9% of people, moderate stress affected 26.7%, and high stress affected 31.1% of people.

Sleep length is another aspect of hypertension that may have an effect on a patient's blood pressure. The

corresponding estimate comparing the highest and lowest categories of percentage of sleep time below 90% Oxygen saturation (>12% vs 0.05%) was 1.46 in a large community-based study by *F. Javier Nieto et al*., which found that mean systolic and diastolicblood pressure and prevalence of hypertension increased significantly with increasing sleep disordered breathing measures. In middle-aged and older people of diverse sexes and ethnic backgrounds, systemic hypertension is linked to sleep disorders, according to their findings from the largest cross-sectional study.[88] According to our study, 2.5% of patients had sleep durations of less than 3 hours, 11.6% had sleep durations of between 3 and 5 hours, 62.5% had sleep durations of between 5-8 hours, and 23.9% had sleep durations of more than 8 hours. In a cohort research, *chein-hua chen et al*. reported enrolling 288,747 younger persons, including 139,413 men and 148,355 women, with a mean age of 30.6 4.8 years. According to their research, men, smokers currently, heavy drinkers, those with hypertension, and people with diabetes tended to consume more than two glasses of sugar-sweetened beverages each day. In the mid-age population, drinking and smoking have significantly grown, and both raisethe risk of hypertension.[89] Our study found that 84.5% of patients drank coffee, 19.5% smoked, 11.2% used cigarettes, and 23.9% of patients drank alcohol.

In a cross-sectional study, *Omer Abdelbagi et al*. observed that 818 (45.6%) of the 1,973 recruited patients were male, and that the median (interquartile) age of these patients was 58.0(50.065.0) years. The median (interquartile) time spent with diabetes was 5.0 (3.0-9.0) years. 21.7%, 1.3%, 37.1%, and 39.9% of the 1,973 participants were normal weight, underweight, overweight, and obese, respectively. 1,973 854 individuals overall (or 47.6%) also had hypertension. Patients who are older, male, employed, obese, and have diabetic foot (DF) are more prone to acquire hypertension, according to logistic regression analysis. On the other hand, patients with Type 2 DM (T2DM) had a decreased risk of acquiring hypertension. There was no association between obesity, uncontrolled DM, or hypertension. This study found that hypertension was significantly more common in DM patients. Notably, among those with DM,underweight, obesity, DF, older age, male gender, and occupation were all very significant predictors of hypertension.[90] In our analysis, diabetes, which afflicted 33.9% of participants, was the most common and serious co-morbidity linked with hypertension, followed by kidneydisease (12.7%), liver disease (8.4%), and heart disease (8.4%).

Genetics are commonly linked to genetics and play a significant effect in hypertension. According to a cross-sectional study by *TY. Hari et al*., A substantial risk factor for developinghypertension is a family history of the condition. Of the 125 patients in the study, 25.6% had afamily history of hypertension, with 17.6% of them being female and 8% being male. Gender was strongly associated with family history of hypertension. In our study, 18.3% of those withhypertension had fathers or family members on their father's side, 31.5% of those with hypertension had mothers or relatives on their mother's side, and 7.6% had siblings.

Excessive physical activity duration may be viewed as a risk factor for HTN in young and middle-aged populations, according to a study by *Zhonkai Zhu et al*. Blood pressure increasesare also closely linked to exercise. The results of this study showed that middle-aged and youngpeople in southwest China typically use the wrong PA duration. An suitable PA duration recommendation may reduce the risk of HTN in those who are young and middle-aged. 73.3 percent of the patients in our study did not exercise, compared to 26.7% of the patients who did.

According to a study by *Andrea Grillo et al.*, there are significant regional variations in the average daily intake of sodium, which ranges from 3.5 to 5.5 grammes (or 9 to 12 grammes ofsalt) around the world. The

World Health Organization advised limiting for the general population, this equates to a sodium intake of around 2.0 g per day, or 5.0 g of salt. In order tolimit salt intake for the hypertension population, which comprises more than a billion individuals globally, specific efforts should be made by decreasing blood pressure in hypertension individuals and possibly enhancing vascular function and the viscoelastic properties of the main arteries, reduced salt consumption can benefit the cardiovascular system.Adequate consideration should be given to artery structure and function when evaluating the cardiovascular consequences of salt intake and programs for salt reduction in the diet. According to our research, 33.1% of patients increased the sugar in their meals, while 46.8% of patients increased the salt.

Our study may have additionally evaluated the population's mid-age's knowledge and awareness of hypertension. It is significant to highlight that poor hypertension control and management have been connected to low levels of knowledge and awareness of the condition. Therefore, raising public awareness of hypertension through educational programs and publichealth campaigns may be a key tactic for lowering the prevalence of hypertension in mid-agedpopulations.

It's vital to keep in mind that our study was conducted online, which can affect how broadly applicable your conclusions are. Online research may suffer from selection biases since participants may exhibit different traits and behavior's than non-participants. To boost the generalizability of the results, future research might think about utilizing a more varied sample, which would include people from various socioeconomic backgrounds, racial and ethnic groups, and geographic locations.

Furthermore, our study might have made clear the necessity of a multidisciplinary strategy formanaging and preventing hypertension. Healthcare providers, public health officials, and legislators must work together to prevent and manage hypertension because it is a complicateddisorder with numerous risk factors and underlying mechanisms hence the goal of intervention is to restate something in a different way, minimizing the risk of developing hypertension might include pharmacological measures like antihypertensive drugs, as well as changes in lifestyle behavior's like increasing physical activity, cutting back on salt and alcohol consumption, andmanaging stress. The best method for managing and preventing hypertension may be a comprehensive strategy that incorporates pharmaceutical and lifestyle changes.

In conclusion, your study's findings show how critical it is to recognize and manage modifiablerisk factors for hypertension in midlife populations. The findings have resulted in a practical consequences or application which implicates for clinical practice and public health policy, highlighting the need for focused treatments designed to lower the prevalence of hypertensionand enhance health outcomes. To create better prevention and management strategies for hypertension, future research should continue to examine the intricate interactions between multiple risk variables, including socioeconomic, cultural, and environmental factors.

SUMMARY AND CONCLUSION

According to the study's findings, a variety of characteristics, such as age, gender, and a familyhistory of hypertension, are linked to hypertension in midlife populations. Some of the factorsthat have been linked to hypertension include obesity, physical activity, smoking status, alcohol use, stress, and sleep duration. The study has also discovered several previously unknown characteristics, such as stress levels, which are linked to hypertension in mid-age populations.Women are more likely than males to have hypertension.

Furthermore, our study may have found that family history of hypertension is a significant riskfactor for hypertension in mid-age populations. This suggests that individuals with a family history of hypertension should be closely monitored and encouraged to adopt healthy lifestylebehavior's.

Healthcare providers, public health officials, and legislators must work together to prevent andmanage hypertension because it is a complicated disorder with numerous risk factors and underlying mechanisms. Interventions aimed at reducing the risk of developing hypertension can include pharmacological measures like antihypertensive medication as well as behavioral changes like increasing physical activity, cutting back on salt and sugar as well as alcohol, tobacco, and smoking use. The best method for managing and preventing hypertension may bea comprehensive strategy that incorporates pharmaceutical and lifestyle changes.

The long-term effects of hypertension on one's health are a crucial factor to take into account. Heart attack, stroke, and heart failure are all cardiovascular diseases that are significantly impacted by hypertension. It can also result in further medical issues like kidney illness, eyesight loss, and cognitive decline. As a result, recognizing and managing hypertension risk factors in mid-age populations may not only lower the incidence of hypertension but also stopor delay the onset of these major health problems.

Additionally, it's possible that our study evaluated the population's mid-age's knowledge and awareness of hypertension. It is significant to highlight that poor hypertension control and management have been connected to low levels of knowledge and awareness of the condition. Therefore, raising public awareness of hypertension through educational programs and publichealth campaigns may be a key tactic for lowering the prevalence of hypertension in mid-agedpopulations.

In conclusion, our work has added to the body of knowledge on mid-age population hypertension risk factors. The findings of our study demonstrate the significance of identifyingand managing modifiable risk factors for hypertension in mid-age populations by outlining a number of significant risk variables. The results have ramifications for lowering the prevalenceof hypertension and enhancing health outcomes.

Limitations of the study:

There were several limitations to our study. Firstly, the study was conducted in an online mode,limiting the number of questions that can be included, Limited response options: Fixed response options are frequently used in online surveys, which may not accurately reflect the complexity of respondents' opinions. The acquired data may lose some of its nuance as a result.It may be challenging to guarantee that the sample is representative of the population being investigated due to the sample's limited control over who participates in an online survey.

Online surveys often just gather self-reported data, which isn't always precise or dependable,therefore there isn't much information collected. Furthermore, we could only have a limited amount of access to participant demographic data.

Technical Issues: Internet connectivity issues and other technical problems might cause incomplete or lost replies in online surveys.

Response rate: Compared to other techniques of data collecting, online surveys often have lower response rates, which can restrict the generalizability of the results.

Lack of rapport: Because this was an online survey evaluating risk factors that cause hypertension in a mid-age population, the responses might not be accurate because there was no personal interaction with the patient suffering from hypertension. Personal interaction between the researcher and participant is necessary to establish rapport and encourage participants to provide more detailed and accurate responses.

Limited reach: Because it is unable to monitor participants in their natural settings or performfollow-up interviews, online surveys may have a limited reach.

Future scope from the study:

Important new knowledge about the risk factors for hypertension in middle-aged populations has been gained from our study. Additionally, our study might have evaluated the population'smid-age's knowledge and awareness of hypertension. It is significant to highlight that poor hypertension control and management have been connected to low levels of knowledge and awareness of the condition. Therefore, it's crucial to increase hypertension knowledge and awareness in order to lower the prevalence of the disease in people of middle age.

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