PREVALENCE AND FACTORS CONTRIBUTING TO HYPERTENSION AMONG PATIENTS IN NAIROBI: A CASE STUDY OF MBAGATHI HOSPITAL

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DECLARATION

This thesis is my original work and has not been presented for a degree or any other award in any other

University.

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We confirm that the work reported in this thesis was carried out by the candidate under our supervision affirm that the applicant under our guidance carried out the study stated in this thesis.

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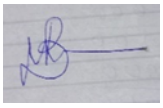
Signature  Date October 24, 2022

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DEDICATION

I would like to dedicate this thesis to the members of my family especially my parents and siblings for understanding and supporting me during the process of my study. I am indebted to them, for their support and encouragement.

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God bless you all!

ABSTRACT

Hypertension has become a major concern for public health globally. With 40% of people in the world's population suffering from hypertension, Africa ranks the highest with a prevalence of 46%. The high burden in developing countries is due to increased levels of risk factors (Sani et al., 2010). In Kenya 20-30% of the adults were said to have hypertension (Department of Non-Communicable Diseases, 2014). However, there is limited data about prevalence of high blood pressure as well as the factors that contribute to it among adult patients seeking treatment in Nairobi. The research's purpose was to give a better understanding of the factors that are associated with hypertension among patients attending Mbagathi hospital with an aim of curbing the associated risk factors in order to manage increase in hypertension. The main objective of the study was to determine the prevalence and factors associated with hypertension. Fisher's formula was adopted for calculating the sample size in the study population and systematic random selection was applied. The study used a descriptive cross-sectional design. Data collection was done using questionnaires that included open and closed ended questions. Participants were allowed to exercise an informed consent before responding to questions. Anthropometric and blood pressure measurements were obtained using appropriate measuring instruments. The instruments used included a sphygmomanometer, stadiometer scale and a weighing-scale. Descriptive statistics mainly means and frequencies were used to analyze data. Inferences were made using chi-square statistic. $P<.05$ was used as the statistical significance level. The prevalence of high blood pressure was 29.3%. A prevalence of hypertension of 42.2% was found among patients with hypertensive parents. A significant relationship between family history and hypertension ($P<0.05$) was found using a statistical chi- square test while 69.9% of the participants had a family member who had hypertension. About 4.7% of the participants smoked while 13% were obese. Most of the respondents (60.5%) ate vegetables daily, 32.2%ate weekly while 6.8% ate occasionally. Eating vegetables was inversely related to high blood pressure. The high prevalence seen in hypertension as well as family history being an associated risk factor, calls for urgent interventions to address the high hypertension prevalence which will lead to its control. The County government of Nairobi needs to put more emphasis on intervention programs for hypertension and prioritize on factors contributing to hypertension in particular family history and age so as to bring out better from interventions in the population.

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ABBREVIATIONS AND ACRONYMS

BP	Blood Pressure
BMI	Body Mass Index
CDC	Centre for Disease Control
DBP	Diastolic Blood Pressure
HBM	Health Belief Model
HIV	Human Immunodeficiency Virus
IDH	Isolated Diastolic Hypertension
KeMU	Kenya Methodist University
LMICs	Low and Middle-income Countries
MDH	Mbagathi District Hospital
NGO	Non-governmental Organizations
OPD	Out Patient Department
SBP	Systolic Blood Pressure
SDH	Sysco-Diastolic hypertension
SPSS	Statistical Package for the Social Sciences
TB	Tuberculosis
WHO	World Health Organization

CHAPTER ONE- INTRODUCTION

1.1 Background of the study

Systolic pressure of the blood which is 140 mm Hg or more, as well as diastolic pressure of the blood which is 90 mm Hg or more, are considered hypertension. Systolic pressure of then blood, which is 120 mm Hg, as well as diastolic pressure of the blood, which is 80 mm Hg, are considered normal for adults (Gaffo et al., 2021). Normal systolic as well as diastolic pressure of the blood levels are both critical in the proper functoriality in major organs including the kidneys, brain, and heart as well as general health and well-being. High pressure of the blood is leading causative agent for death as well as morbidity (Stuart & Francesco, 2016). Identifying those at highest risk of hypertension and ensuring they receive appropriate treatment can prevent premature deaths (World Health Organization [WHO], 2016).

Blood pressure is expressed as two digits above each other and is expressed in mercury millimeters (mm Hg). The greater value is systolic pressure of the blood. This is peak pressure inside vessels that carry blood whenever there is contraction or bearing of the heart. Lower value is diastolic pressure of the blood, this is really least pressure within vessels of the blood during heart-beats whenever the muscle of the heart relaxes, is the lower value.

According to WHO, (2016) most hypertensive persons experience no symptoms at all. Symptoms of hypertension include head-aches, difficulty breathing, heart palpitations, drowsiness, chest pain, and nosebleeds. Ignoring such signs can be harmful, but they cannot be used to diagnose hypertension. Hypertension is indeed a red flag indicating major lifestyle adjustments are needed. According to the Center for Disease Control (CDC, 2013) advised that the only method of knowing

is if you measure the pressure of the blood.

Globally, around 40% of adults of age 25 and over had high blood pressure (WHO, 2014). Hypertension accounts for 7% of the worldwide disease burden, up from 4.5 percent. As a result, high pressure of the blood is indeed a factor of risk most observed causing illness as well as mortality worldwide (Vijver, 2014). Hypertension was listed as the main cause of death and disability worldwide in 2010, accounting for 9.4 deaths and 7% of disability life adjusted years.

At the moment, the impact of hypertension has been shown to be borne primarily by low- and middle-income countries. It affects around one in every five adults, and this number is expected to rise. Nearly 3 in every 4 individuals having hypertension would live in Low- and middle-income countries by 2025. As a result, the absolute percentage of individuals affected by high pressure of the blood in middle- and low-income nations is much higher. This number is anticipated to rise as longer life-expectancy and occur in the nations resulting from globalization and economic growth (Vijver, 2014).

One way of controlling the increase of hypertension is by identifying individuals who are at risk of acquiring the condition and modify the risk factors. According to Schiess (2020), tobacco is one of the risk factors of hypertension. The prevalence of smoking is very high in India and Nepal as well as other countries from the same region. Research by Goldstein et al. (2018) showed that the study of individuals' family history as well as other risk factors such as body mass index and dietary habits could help point to factors that lead to hypertension among healthy people even before the diagnosis is made.

For USA, 31% of adults have high blood pressure, or one out of every three adults (CDC, 2013). Until recently, hypertension was mostly connected with the world's

wealthier regions. However, it is becoming more prevalent for the middle- and low-income nations, where healthcare resources tend to be few and constrained because of the increased burden of diseases which are infectious, such as tuberculosis malaria and HIV. This is also seen in places where hypertension control knowledge and treatments are still at very low levels.

Africa is reported to currently have the largest prevalence of hypertension, at 46 percent of persons aged 25 and more, while America has the least prevalence, at 35%. Higher- income nations have much lower high blood pressure prevalence, (30%) in comparison with others (40%) in general (WHO, 2014). The high blood pressure prevalence for Nigeria was estimated at 42.8% (WHO, 2013). For Kenya, 20 to 30 per cent of adults had hypertension in the year 2013 (Department of non-communicable diseases, 2014). According to Joshi et al. (2014) the high pressure of the blood prevalence for adults from an urban-slum from Kenya was 22.8%. A study conducted among rural and urban communities in Kenya determined that the hypertension prevalence among the adults was 23.7% (Hendriks et al., 2012). However, data on prevalence and factors contributing to high blood pressure among adult patients seeking healthcare in Nairobi is not known. Further, there has been limited research on prevalence and the factors contributing to high blood pressure among patients seeking healthcare at Mbagathi hospital. Therefore, the research seeks an establishment of prevalence as well as factors contributing to high blood pressure in adult patients seeking healthcare from Mbagathi hospital.

1.2 Statement of the problem

The major cause for cardiovascular disease is high blood pressure. It is responsible for over half of the morbidity reported globally caused by stroke together with heart disease. Every year, 9.4 million individuals lose their lives due to

hypertension problems. In Kenya it accounts for 64% of stroke cases (WHO, 2016). In Africa, hypertension affects more than 46% of the adults with the region's average blood pressure being significantly higher than the global average. (WHO, 2013). While East Africa has lower rates of hypertension than the rest of the continent, we may be witnessing the beginnings of an epidemic, especially with increase in urbanization in the region (Stuart & Francesc, 2017). In Kenya 20-30% of the adults were said to have hypertension in 2013 (Department of Non-Communicable Diseases, 2014). According to Yaya et al. (2021), high blood pressure prevalence among adults from rural and urban communities in Kenya was 23.7%.

The cost of hypertension has kept going up over the years and the figures will keep increasing if hypertension is not managed properly in the population. Wierzejska (2020). In the United States of America, the cost of healthcare that is associated with hypertension alone is at a high of $131 billion Kirkland et al. (2018). This highlights the need for intervention to manage and contain hypertension in the population.

Developing countries have the highest burden of hypertension which is attributed to the high levels of risk factors. The increase in risk factors of hypertension has been mainly due to the increase in urbanization which has been witnessed in the region (Vijver, 2014).

There are few studies and research that have been done on the prevalence and contributing factors of hypertension among adult patients attending outpatient clinics in Africa while in Kenya no study has been done on the same. A study done on adult patients in Ethiopia reported that the prevalence among the adult patients was 27.3% with alcohol consumption, obesity and abdominal obesity showing

association with hypertension Belachew (2018). However, data concerning prevalence as well as risk factors of increased pressure of the blood in adult patients seeking healthcare in Nairobi is not known. The study sought to assess the prevalence and contributing factors to high pressure among adult patients seeking medical care at Mbagathi Hospital in Nairobi.

1.3 Purpose of the study

To give a better understanding of the factors that are associated with hypertension among patients attending Mbagathi hospital with an aim of curbing the associated risk factors in order to manage increase in hypertension.

1.4 Objectives

1.4.1 General objective

The main objective of the study was to assess the prevalence, and factors contributing to hypertension among adult patients attending Mbagathi Hospital.

1.4.2 Specific objectives

i. To determine the prevalence of hypertension, among adult patients attending Mbagathi Hospital
ii. To investigate the relationship between tobacco smoking and hypertension among adult patients attending Mbagathi hospital
iii. To analyze the relationship between family history and hypertension among adult patients attending Mbagathi hospital
iv. To determine the relationship between body mass index and hypertension among adult patients attending Mbagathi hospital
v. To identify the relationship between dietary habits and hypertension among adult patients attending Mbagathi hospital

1.5 Research questions

i. What is the prevalence of hypertension among adult patients attending

Mbagathi hospital?

ii. What is the relationship between tobacco smoking and hypertension among adult patients attending Mbagathi hospital?

iii. What is the relationship between family history and hypertension among adult patients attending Mbagathi hospital? What is the relationship between body mass index (BMI) and hypertension among adult patients attending Mbagathi hospital?

iv. What is the relationship between dietary habits and hypertension among adult patients attending Mbagathi hospital?

1.7 Justification

Hypertension among the cardiovascular diseases is the top cause of mortality (Sarrafzadegan & Mohammmadifard, 2019). It can be prevented by addressing the risk factors for hypertension; nevertheless, if no action is made to minimize exposure to the risk factors, the incidence of hypertension will rise. The necessity to study and treat hypertension's underlying contributing factors has become critical. Yet data on hypertension risk factors in Africa is still sparse. The WHO has highlighted the establishment of observational cohort studies to explore the high blood pressure risk factors for low- as well as middle-income nations as a necessary research priority in order to manage hypertension in the population.

Data on high blood pressure prevalence together with the associated causes is critical for focusing on and improving hypertension prevention and control (Asresahegn et al., 2017). However, there are limited research and studied that have been carried out in Africa on the prevalence and factors contributing to hypertension among adult patients generally while in Kenya no study has been undertaken on the same. This research closed the knowledge gap on the prevalence

and the contributing factors of high blood pressure among adult patients in Mbagathi Hospital. This study will bring out a clear understanding of the factors that are associated to hypertension among adult patients attending Mbagathi Hospital and lead to better outcomes in programs aimed at managing the increase of hypertension in the population. It will also direct researchers to study on this given topic.

1.8 Limitation of the study

This being a cross sectional study analysis there might have been influence from temporary effect which may occur during time of data collection. The temporary effect challenges cannot be overruled.

1.9 Delimitation of the study

A delimitation of this study was that only adult patients attending Mbagathi hospital and who were not in a critical condition and so had ability to answer study questions, were enrolled for the study.

1.10 Significance of the study

The community, policymakers, and researchers will benefit from the outcomes of this study. First, the information will help the community members to identify the factors that contribute to hypertension and help them come up with action to prevent hypertension by reducing the risk factors.

Second, the information will enable the policy makers to formulate policies as well as programs focused towards reducing hypertension in the general population by encouraging avoidance of unnecessary exposure to the identified risk factors.

Third, the information will assist researchers researching on hypertension and associated risk factors to come up with more research relating to interventions for prevention of hypertension at population level.

1.11 operational terms

i. Hypertension- also called high blood pressure, is pressure of the blood reading which is outside of the limits that are normal that is, a systolic pressure of the blood which is 140 millimeters of mercury or higher, and or even diastolic pressure of the blood which is 90 millimeters of mercury or higher.

ii. Prevalence - total number of people from a population with a disease or perhaps a health issue at a certain given time, typically stated as percentage of entire population.

iii. Body mass index - a weight to height ratio is a record of how much weight you have in relation to how tall you are (kg/m2). The World Health Organization (WHO) definitions were used to describe it: the reference (which is normal Body mass index) was set at 18.5 to 24.9 kilogram per meter squared, overweight was defined as 25 to 29.9 kilogram per meter squared, and obesity defined as 30 kilograms per meter squared and above.

iv. Obesity -a buildup of fat in the body that is excessive. Obesity was considered as having a BMI of thirty or higher.

CHAPTER TWO

LITERATURE REVIEW

This chapter has gathered information from different journals on the study problem. It analyzed what various authors said about hypertension and its risk factors. It explores hypertension and its prevalence. The chapter contains analysis of literature as well as conceptual framework on prevalence as well as factors that contribute to hypertensions among adult patients.

2.1 Prevalence of hypertension among adults

Hypertension has been defined as a blood pressure reading where the systolic blood pressure is equal to or above 140mm Hg or a diastolic blood pressure reading which is 90mm Hg or higher (Ondimu et al., 2019). Studies have been done on various cohorts of patients to determine the prevalence of hypertension among them. Such include studies among patients on dialysis, patients with rheumatoid arthritis, critically ill Patients and young adult patients. However, studies done in Kenya on the prevalence of hypertension among patients are few and the data is limited.

Hypertension among patients undergoing regular dialysis is common with the prevalence of hypertension being 70-80%. Only a small number of the patients have controlled blood pressure (Bucharles et al., 2018). Another research by Rabha and Mundra (2017) also enumerated that the overall prevalence of hypertension among patients who were attending outpatient clinic was high with 52% of them being hypertensive. A study among young adults (18-35) years from Tenwek Mission Center in Kenya enumerated that hypertension among young adults was not as low as expected. In another study, hypertension was found to be prevalent in 22% of patients attending a tertiary care center in India (Kulasekharam et al.,

2017). This study undertook a cross sectional study design among male and female adults who were 18 years and above. The sample was composed of 100 respondents who were patients who attended the tertiary care center for treatment. In a similar study also done in India Singh (2014) showed a lower prevalence of 13% among patients attending the outpatient department of the urban health care center. In the research, females showed slightly increased prevalence of high blood pressure as compared to males. This research also adopted a cross-sectional study design where 292 adult patients aged 30 years and above took part in the study.

In another research that was done among patients it was observed that 33 (42.48%) of the 306 males and 541 (44.97%) of the 1203 females evaluated were found to have hypertension (Mahmood et al., 2013). Though the proportion of females with hypertension (44.97%) was higher than that of males, the proportion of females who had high blood pressure was (44.97%) was discovered to be somewhat higher than for males (42.48%).

Research by Mahmood et al. (2013) done among adults attending the outpatient department of an urban health training center in India, hypertension was found to be prevalent among the participants with a figure of 44.46% and association between hypertension increasing with increase in age. Multiple logistic regression analysis was performed with high blood pressure being, dependent variable with risk factors based on socio demographic factors being independent variables. Inside this sample population, age was revealed to have been a major predictor of high blood pressure.

Hypertension was found to be widespread in 35.1% of the population, according to a study by Shafi and Shafi (2017), with a 34.4% standardized prevalence. It was observed that 62.3% of patients with hypertension knew

about their high blood pressure condition, while 75.3% were already receiving medication for it. 22.3% of the hypertensive respondents controlled their blood pressure. It was managed in 32.3% of individuals taking hypertension medication.

The studies analyzed reported high prevalence of hypertension among the patients. Different cohorts reported different average blood pressure readings. They reported that there is need to look into the risk factors as a way of preventing and managing hypertension among the patients.

2.2 Factors associated with hypertension among adults

The risk factor of hypertension can be divided into two broad categories. The modifiable risk factors and the non-modifiable risk factors. Modifiable risk factors of hypertension include tobacco smoking, being obese or overweight, diet that is unhealthy (low fruit and vegetable intake, high in trans- fats and saturated fats, excessive salt intake). The non-modifiable risk factors of hypertension include family history and age.

2.2.1 Tobacco smoking

Tobacco smoking is a modifiable risk factor to hypertension. Scholars have proposed the best and most efficient ways to control chronic diseases such as hypertension with tobacco smoking cessation being the most urgent intervention needed for the control (Fu et al., 2017). Various researchers have sought to determine the prevalence of hypertension among various cohorts some of them being patients with various conditions. There have been associations determined between tobacco smoking and hypertension while others have found no association between tobacco smoking and hypertension.

A cross sectional study done in rural China by Fu et al. (2017) among chronically

ill patients reported a prevalence of 26.2% for tobacco smoking. Out of the tobacco smokers reported, 64.3% of them had tried to stop smoking. Only 21% of them had successfully quit. In a study done among patients diagnosed with cancer, Jassem (2019) enumerated that 50% of cancer survivors continue to smoke even after they have been diagnosed with cancer.

Smoking was shown to be widespread in 30.2% of adult patients with severe and persistent mental disorders (Hamadeh et al., 2016). This research was done in Bahrain. In a study by Sohn (2018) on the fixed-effects models showed negative association between smoking and high blood pressure. The Indonesian Family Life Survey was used in this study, which followed 15-year-old men. Smoking was not associated to hypertension in the cohort due.

A study by Sharifi et al. (2017) carried out with aim of establishing prevalence in tobacco smoking it was determined that current smoking of cigarette was 20.9% in men and 2.2% in women. In both males and females, smoking prevalence was leading for those aged 45 to 50 years. For this study all non-institutionalized residents of Tehran over the age of 18 were the target group. It was concluded that in Tehran, the prevalence of cigarette smoking was worrying at 10.6%. In the study population, it was discovered that hookah experience of smoking, gender being male and low status of health were all substantial risk variables.

Adeloye et al. (2019) undertook research to determine prevalence of tobacco smoking in Nigeria. It was determined that in Nigeria, current smokers accounted for 10.4% (9.0–11.7) of the population, whereas ever smokers accounted for 17.7%. In both categories, this was higher among males than among women. It was seen that In Nigeria in 2015, The average daily cigarette use for each

individual was 10.1 (6.1-14.2), equating to one hundred and ten million cigarettes daily and approximately forty billion cigarettes smoked.

The association between cigarette smoking with blood pressure in males was investigated in research. When contrasted to never smokers, former smokers exhibited higher odds of high blood pressure while current smokers did not. Current smokers had lower adjusted blood pressure than nonsmokers as well as previous smokers, according to the data (Li et al., 2017). Health literacy and counselling should be considered when coming up with tobacco control strategies (Fu et al., 2017).

2.2.2 Family history

Family history is a modifiable risk factor of hypertension meaning it cannot be changed. However, the effect of this risk factor can be reduced by making lifestyle changes. Studies have been done among different cohorts to determine the association between family history and hypertension. Some of the studies have been reviewed below.

Research by Ranasinghe et al. (2015) established that the prevalence as seen in family history of high blood pressure to be 43%. This was a survey that was cross-sectional done among 5,000 adults from Sri Lanka. Ranasinghe et al. (2015) carried out research to find out the impact of the history of the family to the prevalence of hypertension as well as related metabolic risk variables. The study sample was drawn from a sample that was representative of nationality in Sri Lanka. Patients having history in the family in high blood pressure had a substantially greater high blood pressure prevalence (29.3%, n = 572 over 1951) as compared to those without (24.4%, n = 616 over 2530). The existence of history of high blood pressure in the family in parents (odds ratio: 1.28), grandparents (odds ratio: 1.34),

as well as siblings (odds ratio: 1.27) was linked to an increased risk of acquiring high blood pressure for all individuals. It was concluded that high blood pressure prevalence was increase when having a family history with high blood pressure, according to the finding.

In the research, prevalence of high blood pressure among healthy university-students was assessed, including its relationship with BMI, gender, smoking, as well as family history both for high blood pressure and cardiovascular disease. Students between the ages of 18 and 26. Systolic blood pressure was influenced by a history of the family of a first degree for high blood pressure as well as cardiovascular illness, however not diastolic pressure of blood (Alhawari et al., 2018).

There was a significant relationship between family history and hypertension as shown in research by Peng (2019). With increase in family history of hypertension the risk of hypertension also increased.

2.2.3 Body mass index

Body mass index is a measure of body fat based on the weight and height of an individual. The measurement results produce ranges which are categorized into the following groups: Overweight, underweight, normal, obese. Different studies done have shown that body mass index is associated with hypertension while others have shown there being no association between the two.

Channanath et al. (2015) revealed that hypertension probability rises together with the obesity levels, and it's higher among diabetic individuals as compared to in diabetic people with equal obesity levels. Age of beginning of hypertension is inversely associated to BMI; this relationship is lower in women as compared than in men, and in individuals with diabetes (especially women) than in those without.

The study concluded that the finding that diabetes increases the slope two times. This is the slope showing the inverse connection between high blood pressure start BMI and age in females leading to the possibility that shows diabetes precludes sex specific differences for impacting on blood pressure and obesity.

Hossain et al. (2019) revealed that the link between high pressures of the blood with body mass index is higher in populations of South Asia, even in lower overweight and obese cut-off points. In Bangladesh, the hypertension prevalence ranged from 17.4% in 35 to 44 years to 34.9% in 55 years; in India, it ranged from 4,6% in 18 to 24years to 28.6% in 45 to 54years. In Nepal, it ranged from 3.8% in 18 to 24 years to 39.2% in 55years. In Bangladesh, India, and Nepal, the odds ratios for high blood pressure were 1.79, 1.59, and two point zero three in each five kg/m2 rise in body mass index. The research findings suggest that a link between hypertension to body mass index is higher in South Asian populations, even at lower overweight and obese cut-off points.

Linderman et al. (2018) carried out research to investigate the variation from the association between pressure of the blood to BMI from various Chinese subgroups. From the subgroups, the respond number there was 1 727 411 (1, 027, 711 females and 699 700 males; mean age was 55.7 years. Mean (SD) BMI was 24.7, mean (SD) systolic blood pressure was 136.5millimeters of, and mean diastolic pressure of the blood was 81.1mm Hg among the study participants. It was concluded that the link of body mass index with pressure of the blood was positive for tens of thousands of people for different categories, and if causative, it would have major consequences for public health.

Visaria and Lo (2020) showed that in the Indian population, 28 % of the 147,342 (19%) individuals with hypertension had SDH, 26% had IDH, while 46% had ISH.

16 percent of 2886 hypertensive individuals in US population had SDH, 9% IDH, and 75% had ISH. In non-obese Indian adults, BMI showed to be significantly related in all high pressure of the blood sub-types, however isolated diastolic hypertension is significantly more related to BMI as compared to other high blood pressure sub-types. In Indian adults who are obese, the relationship is highly complicated, with an increased incidence of isolated systolic high blood pressure until sixth decade, then followed with systole-diastolic high blood pressure.

In Ankara, researchers looked into the link between hypertension and BMI in youngsters. Direct data on student weight, height, and pressure of the blood were analyzed in a cross-sectional investigation. A total of 2826 students aged 7-12 years old participated in the study at three schools. Obesity and overweight were both present in 13.9% of the population. Pressure of the blood was shown to be substantially associated with BMI. Boys were much more likely to be obese or overweight (Polat et al., 2014).

Body mass index was a risk factor of hypertension according to Peng (2019). The risk of hypertension increased with increase in hypertension. It is important to keep normal body mass index ranges in order to improve chances of hypertension prevention.

2.2.4 Dietary habits

Dietary habits have been shown to be associated with hypertension. The dietary habits include excessive salt intake, consumption of fruits and vegetables, consumption on fatty foods among other habits. Some studies are discussed below.

In a study by Safdar et al. (2015) dietary patterns had; fruit and vegetable, sweet and fat, and seafood and patterns of yogurt were obtained by the use of factor analysis principal component. Seafood together with patterns of yogurt showed

lower likelihood of being associated to high blood pressure, while no substantial association showed for remaining two diet patterns. The results suggested, some patterns of diet could be associated with high blood pressure for urban adults in Pakistani who earn low income.

FuYan and Wei (2015) undertook a study to investigate the association between rural people' dietary habits and hypertension, as well as to establish a scientific foundation for hypertension prevention and treatment in Anqiu City. With multistage cluster random sample, 2400 adult inhabitants were chosen from 9 villages in three towns. Poultry, pork, aquatic products, and fried foods were consumed by 94.6 percent, 66.7%, 71.6%, and 42.7% of residents, respectively. Approximately 80% of participants said they never or only occasionally drank milk or ate milk products. Residents ate salted vegetables in 98.7% of cases. Low salty foods and reduced red meat consumption, according to the study findings, can assist minimize hypertension prevalence.

An Asian population was studied to see if there was a association between hypertension and fruit consumption. There were 9791 people in all 3819 men and 5972 women (Song et al., 2014). Only non-obese women had a negative association between high pressure of the blood and fruit consumption. The study found no association between high pressure of the blood and fruit consumption for males or obese women.

The focus of a research undertaken in China was to establish food patterns then evaluate the association between patterns of diet with high pressure of the blood risks for Chinese people of age 45-60 years. The cross-sectional investigation included 2560 respondents who completed a valid food- frequency questionnaire

to report their eating habits. Traditional Chinese, animal food, high salt habits and western fast food were found and classified as the four main dietary patterns. Animal foods and high salt diets were found to be associated to elevated incidence of high blood pressure, whereas traditional Chinese as well as western fast-food diets weren't (Zheng et al., 2016).

The goal of a study undertaken in Korea was to see if there was an association between vegetable and fruit consumption with probability of developing high blood pressure in mid- aged as well as older-Korean individuals. A semi-quantitative food frequency survey was used to examine consumption of vegetable and fruits. There was a total of 4257 participants (2085 males, 2172 females) who did not have high blood pressure at the start of the study. Those who ate four servings of fruit each day had a 56% lower probability of incident high pressure of the blood compared with men eating less than four servings each day. Females who ate a lot of fruit had a 67% lower chance of developing high blood pressure than those who ate it infrequently. It was concluded that fruit consumption was associated to a decreased incidence of incident high pressure of the blood in middle aged together with older Korean individuals, regardless of gender (Kim & Kim, 2018).

The studied show that there is an association between body mass index and hypertension despite some studies showing no association between and individuals body mass index and hypertension

2.3 Theoretical framework

The health belief model

Health Belief Model is a psychological model that analyzes as well as predicts health behaviors by focusing on individual attitudes and beliefs. In reaction to failed free tuberculosis (TB) program for health screening, social psychologists Kegels and Hochbaum, Rosenstock, of the United States Public Health Service established the Health Belief Model in 1950s. Health Belief Model now has been altered when investigating wide range of short-term and long-term health behaviors.

This model has eight main integrated constructs pertaining to hypertension prevention interventions.

i. **Perceived susceptibility:**

This is a person's belief, or perception, that they are at risk of a significant health problem. The thought that one can develop hypertension or maybe knowing those at risk can aid improve the health behavior of those who are at risk of developing hypertension, therefore lowering the probability of getting the condition.

ii. **Perceived seriousness or severity:**

It’s when someone realizes how terrible hypertension is. It’s feasible having a positive attitude toward improved health-practices that help prevent hypertension if properly talked about impact or effects of hypertension for one's life.

iii. **Cues to Action:**

Are things serving as reminders or persuade people to perform a recommended health action. They include: a family member's illness or death from hypertension, information from electronic and print media (television, books, radio, journals, magazines, as well as newspapers), together with advice from influential individuals regarding seriousness, the cause, as well as prevention of hypertension.

iv. **Perceived threat:**

A person's belief, or view that hypertension can lead to death or even cause negative health impacts may lead them believing there to be a reason for concern about hypertension.

v. **Perceived benefit:**

Value attached to efforts towards mitigating threat. Knowing one's blood pressure by getting tested and behavior change can have benefits that help in hypertension prevention.

vi. **Perceived barriers:**

Environmental, socioeconomic, cultural, literacy level, and religious variables can all prevent people from implementing suggested health actions. Lack of knowledge on hypertension may be a barrier in prevention of the disease.

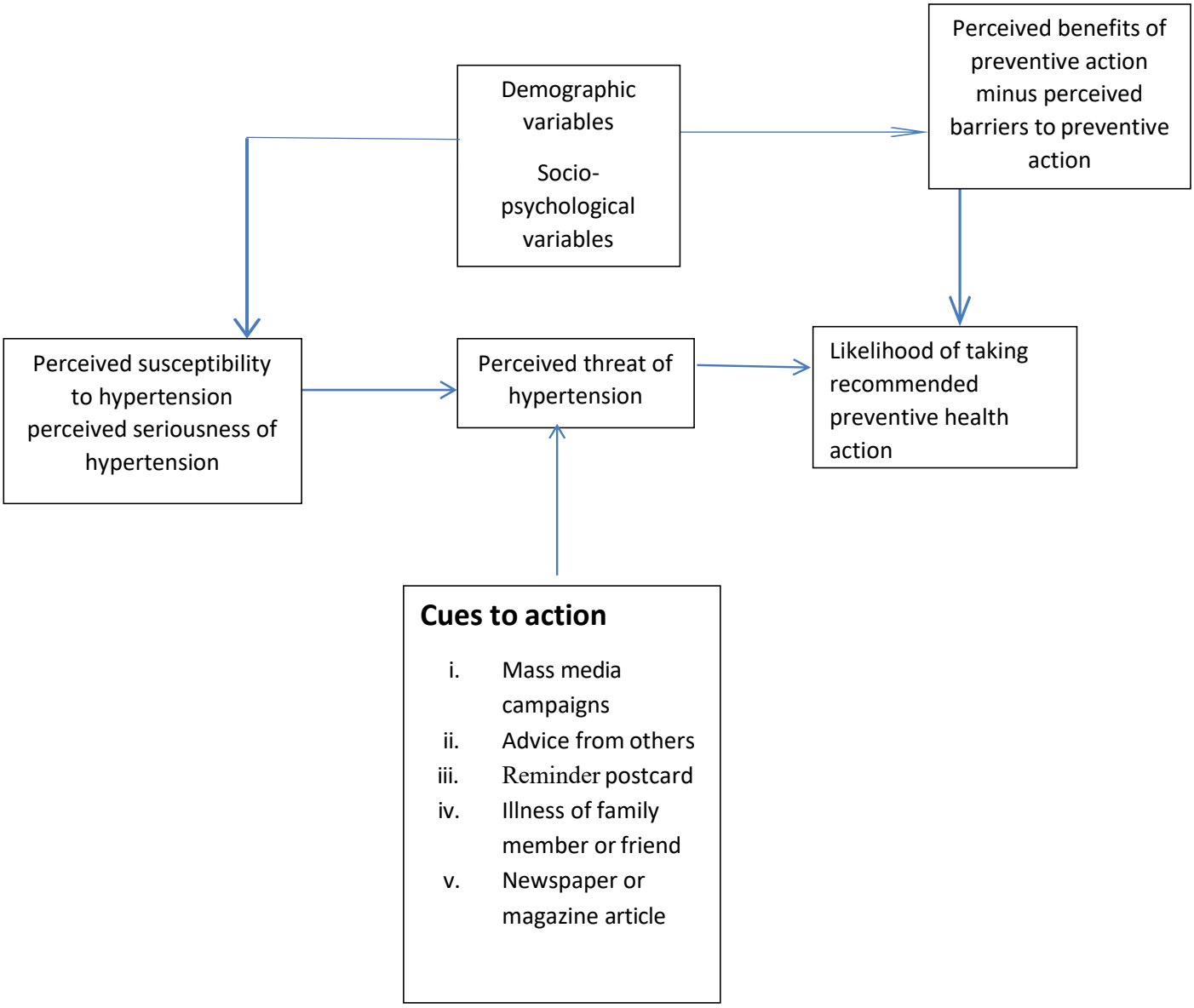
vii. **Likelihood of taking recommended preventive action:**

Based on the knowledge available on hypertension, one might assess the risks of hypertension against the benefits and drawbacks of avoiding risk factors and having blood pressure checked as preventive strategies.

Individual perceptions modifying factors likelihood of action

Figure 2. 1

Theoretical framework



2.4 Conceptual framework

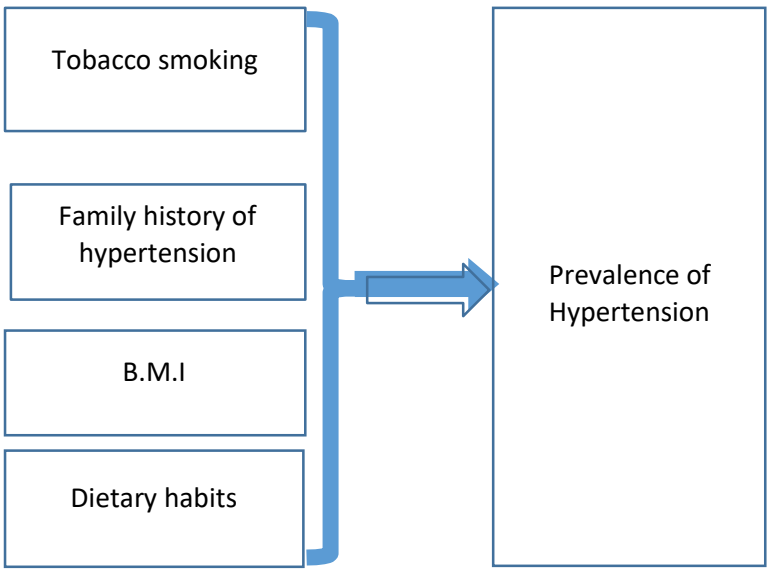
Figure 2.2 is a conceptual framework of the research. Reveals how various variables used interrelate. The independent variables used in the study included the following: tobacco smoking, history of hypertension in the family, dietary habits as well as body mass index. The single independent variable was hypertension. The independent variables are considered to have an impact on the dependent variable which is hypertension. The conceptual framework shows how prevalence of hypertension which is the dependent variable depends on the different independent variables.

Figure 2. 2

Conceptual framework

Independent variable

Dependent Variable



CHAPTER THREE

RESEARCH METHODOLOGY

The chapter discusses different methods used that ensured clear answers to the questions and objectives of the research proposal. The chapter focuses on the research design, sampling procedure, target population, methods of collecting data, reliability, validity, methods of data analysis, together with ethical issues.

3.1 Study design

The study adopted a cross sectional study design which involved collection of data at a given point in time. This research design had the advantage that it was inexpensive and was relatively easy to conduct. Descriptive and analytic data analysis methods. Descriptive analytical method was used to create a summary of the data and point to observed patterns. Data analytics was used to find trends in the information gathered and draw conclusions from the data sets.

3.2 Study area

The research was done at Mbagathi District Hospital (MDH), which is located in Nairobi County's Dagoretti Sub- County. The hospital served a broad population both inside and outside of Nairobi, with the majority of patients being primarily urban poor. Mbagathi Hospital also had outpatient (OPD) clinics including diabetes, hypertension, ophthalmology, maternal and child health, dermatological, TB, HIV and disability assessment clinics. The bustling outpatient section saw around 700 people every day on average.

3.3 Study population

The study population where the study sample was drawn from consisted adult patients who were ≥20 years attending Mbagathi District Hospital outpatient clinic.

3.4 Sample size determination

The needed size of the sample was calculated by use of Fisher formula: $n = z^2 pq / d^2$

Where;

n - Desired size of the sample (assuming overall population is more than ten thousand) z - The normal standard deviation, put at one point nine six, it corresponds to 95% CL

p - Proportion at target population which is estimated to have a certain characteristic. If there isn't reasonable estimate, then use fifty percent (the research used zero point five).

$q = 1.0 – p$

d = Accuracy of degree desired, here put at zero point zero five corresponding to one point nine six.

For substitution, $n = \frac{1.96^2 \times 0.5 \times (1-0.5)}{0.05^2} = 384$

The size of the sample was determined as 384 patients.

3.5 Sampling method

The study participants were chosen via convenience sampling technique. In this form of sampling technique, the respondents chosen were those who were willing and consented to take part in the study. They had to meet the eligibility criteria of being adults ≥20 years and had to sign a consent form to take part in the study.

A patient arriving at the outpatient clinic was first registered in the triage area. They then proceeded to have their blood pressure, weight and height measured by health workers who were assigned in that particular area. From here the patients then proceeded to see the clinician for diagnosis and treatment. At the waiting area the researcher would approach the patients and those who consented and were

eligible to take part in the study were used as study samples.

3.6 Inclusion and exclusion criteria

Adults ≥20 years who were attending Mbagathi outpatient clinic and consented to take part in the study were included while patients who were <20 years or did not consent to take part in the study were excluded.

3.7 Data collection

A questionnaire having both open, and closed ended questions was given to each participant with each being allowed to exercise an informed consent before responding to questions in the questionnaire. Questionnaires administered by an interviewer were drawn from the World Health Organization STEPwise approach to surveillance (STEPS) instrument. The STEPSwise approach to surveillance (STEPS) is a method for collecting information about diseases as well as associated risk factors in a systematic manner. Anthropometric and blood pressure measurements were obtained.

At the triage area there was a sphygmomanometer which was used to measure the blood pressure of the patients before they could proceed to see the clinician. There was also a stadiometer scale was used to measure the height while a weighing scale was used to measure the weight of the patient.

3.8 Data management and analysis

The Statistical Package for Social Sciences (SPSS) software (version 20) was utilized to analyze the data. Means and frequencies were derived as descriptive statistics. Chi-square tests were used to establish association between variables, and graphical data presentation were used when suitable.

3.9 Data quality control (validity and reliability)

The pre-testing activity was carried out to ensure the validity of research instruments. Pre-testing was done in Ngong Hills Hospital in Kajiado North Sub

County. The 20 questionnaires used in the pretest were not included in the analysis of results. After the pre testing the questionnaires were corrected and amended. The reliability coefficient from the reliability test was 0.9. Research assistants were taught and participated in the pre-testing exercise to ensure uniformity of the results collected.

3.10 Ethical considerations

3.10.1 Informed consent

Before being included in the study, each participant was given the opportunity to give their informed consent. The respondent signed this document. The permission form highlighted the study's goal as well as the respondent's right to privacy.

3.10.2 Confidentiality

To make sure confidentiality was maintained, the research respondent's identification on the questionnaire were codes and numerals but no names. The information obtained from research subjects were kept confidential. Researchers only had access to them.

3.10.3 Ethical clearance

The Medical Research and Ethics Committee of Kenya Methodist University granted ethical approval. Through the Nairobi City County, permission to undertake the research was acquired from executive administration in Mbagathi district hospital. Letters that sought approval were written to the Medical Research and Ethics Committee in KeMU with another letter to the Nairobi city county seeking approval to carry out research in Mbagathi Hospital.

3.10.4 Expected output

This study established the prevalence of high blood pressure in adult patients who attended Mbagathi hospital. It also determined the most significant risk factors

associated with high blood pressure in adult patients from Mbagathi hospital. The study established factors associated with high pressure of the blood among adult patients attending Mbagathi hospital.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter gives analysis, interpretation as well as discussion of the research findings in line with the objectives. The analysis was done using SPSS v20. The results are presented using tables and figures.

The study achieved a response rate of 96.09% (369 out of the calculated sample of 384). The response rate of 50% is deemed adequate, 60% while above is good, and above 70% very good (Mugenda & Mugenda, 2003), thus, a rate of response of 96.09%, cognizant of the sensitive nature of the study, is very good.

4.2 Demographic Distribution of the Study Population

Demographic information of patients in this study is presented in Table 4.1 below. The information presented includes age, gender, level of education marital status and occupation of the respondents.

Table 4. 1

Demographic Characteristics of Patients

		n	[%]
Age	20 - 29 years	128	[35.9]
	30 - 39 years	122	[34.2]
	40 – 49 years	72	[20.2]
	50 – 59 years	28	[7.80]
	60 - 70 years	7	[1.80]
Gender of the	Male	117	[31.8]
respondents	Female	251	[68.2]
Marital Status	Single	106	[29.3]
	Married	235	[64.9]
	Divorced	13	[3.60]
	Widowed	8	[2.20]
Level of Education	Primary	120	[33.0]
	Secondary	160	[44.0]
	College/University	80	[22.0]
	None	4	[1.10]
Occupation	No response	65	[17.6]
	Employed	138	[37.4]
	Self employed	91	[24.7]
	Unemployed	75	[20.3]

Majority of the respondents (70.1%) were aged below 40 years with those above the age of 50 years making a small fraction of the respondents (9.6%). Those above 40 years were (29.8%). Female respondents comprised the majority (68.2%) compared to the male respondents (31.8%). More than half (64.9%) of the respondents were married, with (29.3%) of them being single. The least number of them reported that they were widowed (2.20%).

The study determined the highest education level for respondents. Majority of them (77%) had either secondary or primary level of education with the remaining (22.0%) having college/university level of education A few (1.10%) indicated having no education. Majority of respondents (37.4%) were employed while (20.3%) were unemployed.

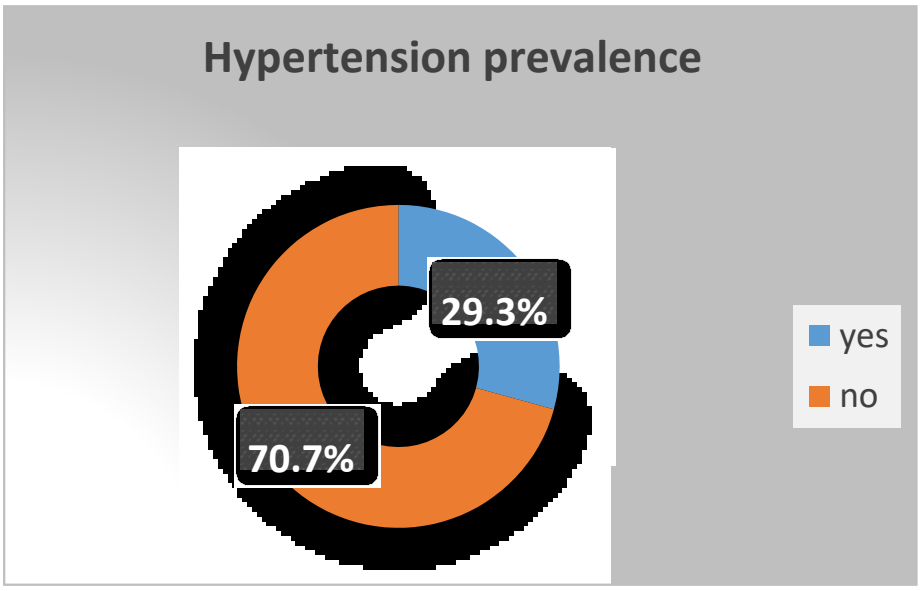
This study differed form a study by Kulasekharam et al. (2017) the women were less than males. Males were 60% while the females made up 40% of the participants. This study was done in a tertiary-care center. Age of the majority of the participants was the same as in research by Asresahegn et al. (2017) here most participants were aged below the age of 40 years. In this study 58.5% of the participants were aged below the age of 34 years. Social demographic variable on marital status for this study was the same as in research by Logaraj et al., (2014) which revealed that participants who were married were the majority. According to this study the married participants consisted of 64.9% with those who were single being 29.3%.

4.3 Prevalence of Hypertension among Patients attending Mbagathi Hospital (Out-Patient)

Blood pressure was recorded for all the respondents in the study, and out of the 369 respondents, (29.3%) were hypertensive. The prevalence of hypertension is presented in pie chart presented, figure 4.1. below.

Figure 4. 1

Prevalence of hypertension



The prevalence of hypertension obtained in the study was slightly higher when compared to that in a study done by Kulasekharam et al. (2017) who found a prevalence of 22.3% in patients who attended outpatient clinic at tertiary center in India. One main reason for the difference in prevalence could be that the number of male respondents in the study by Kulasekharam et al. (2017) was higher (60%) with the females being (40%) of the respondents. In this study the males were 31.8% with the females making up a majority of 68.2% of the study participants. Singh (2014) obtained a much lower prevalence in a study, where 13% of the patients attending outpatient department were hypertensive. According to the Department of Non-Communicable Diseases the hypertension prevalence of 20-

30% among adults in the Kenyan population which was in line with the hypertension prevalence results of 29.3% that was obtained from the study. The hypertension prevalence is seen to be high in this study due to the urban setting which was also noted in a study conducted in Kolkata which was done in a setting that was urban. However, the Hypertension prevalence noted was much lower there, than the prevalence in Africa as a whole which is 46% of persons aged 25 and more. The reason for this could be that we may be witnessing the beginning of an epidemic, especially with increase in urbanization in the East Africa region (Stuart & Francesc, 2017).

Table 4. 2

Diagnosed with Hypertension * Gender Cross Tabulation

			Gender			Chi Square (λ)	P-value
			Male	**Female**	**Total**		
Diagnosed with hypertension	Yes	N	36	67	103	0.873	0.350
		%	32.4%	27.6%	29.1%		
	No	N	75	176	251		
		%	67.6%	72.4%	70.9%		
Total		**N**	**111**	**243**	**354**		
		%	**100%**	**100%**	**100.0%**		

Table 4.2 shows that a higher percentage of males (32.4%) than females (27.6%) were diagnosed with hypertension. Though the number of male respondents was lower, the results showed that a higher percent of the males than the females had hypertension. These findings of this study contradicted those of Singh (2014), who found that the prevalence in high blood pressure was somewhat greater for females than males in the outpatient- department of an Urban Health Training Centre in India. The statistical chi-square test of association revealed that there was no significant association between gender and high pressure of the blood (P>0.05).

Table 4. 3

Blood pressure awareness

		n	[%]
Ever been checked (measured) blood pressure by a doctor or other health worker	Yes	328	[88.9]
	No	41	[11.1]
Previously informed of raised blood pressure or hypertension by a doctor or other health worker	Yes	64	[17.4]
	No	304	[82.6]
Currently taking any blood pressure drugs (medication) prescribed by a doctor or other health worker	Yes	27	[7.40]
	No	340	[92.6]
Taken drugs (medication) for blood pressure in the last two weeks prescribed by a doctor or other health worker in the past two weeks	Yes	25	[6.80]
	No	340	[93.2]

The results showed that (88.9%) of the respondents said they had measured their blood pressure before while (17.4%) had previously been informed of having high blood pressure. About (7.7%) were on a doctor's prescription for blood pressure medication.

4.4 Tobacco Smoking and Prevalence of Hypertension

This section presents the responses on tobacco smoking among the respondents at Mbagathi Hospital. Respondents were asked to answer to questions on whether they smoked at that time, effort to quit smoking and previous smoking frequency. The results are presented in the below figures.

Figure 4. 2

Respondents who had ever smoked

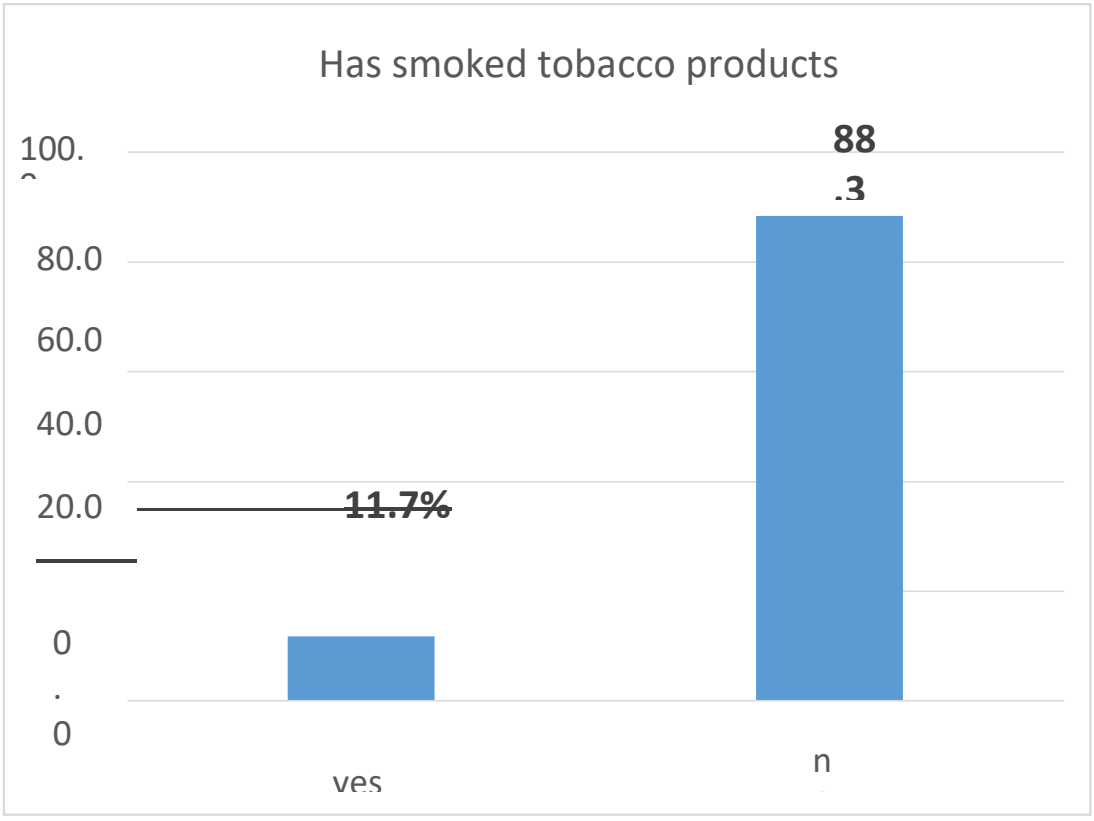


Figure 4.2 shows that only 11.7% of the respondents had ever smoked tobacco while a large number of 88.3% had never smoked.

Figure 4. 3

Respondents who smoked at that time

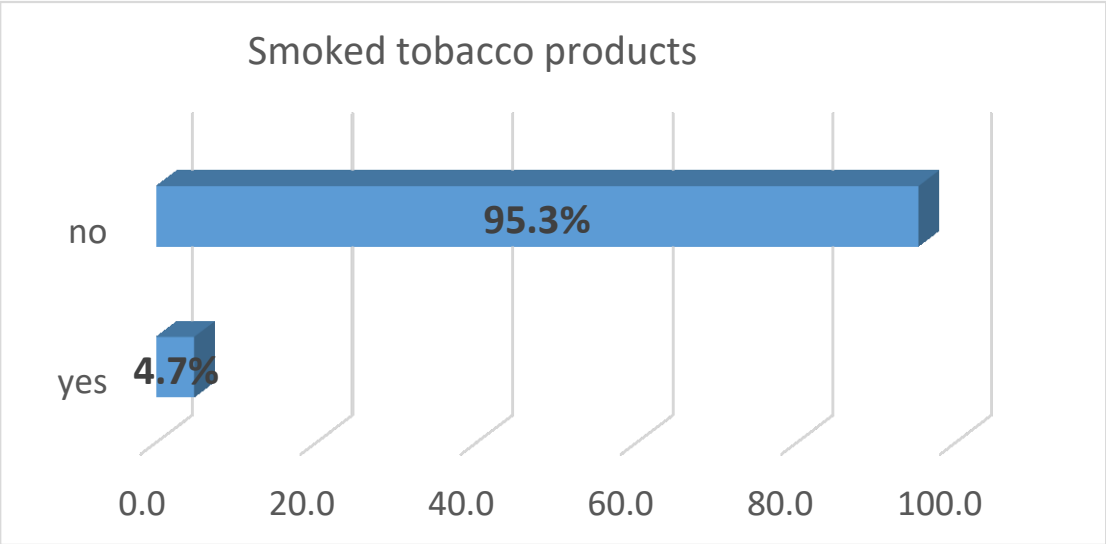


Figure 4.3 revealed that majority of the respondents 95.3% reported not to be smoking at that time with only 4.7% reporting to be smoking at that time.

Figure 4. 4

How often respondents smoked

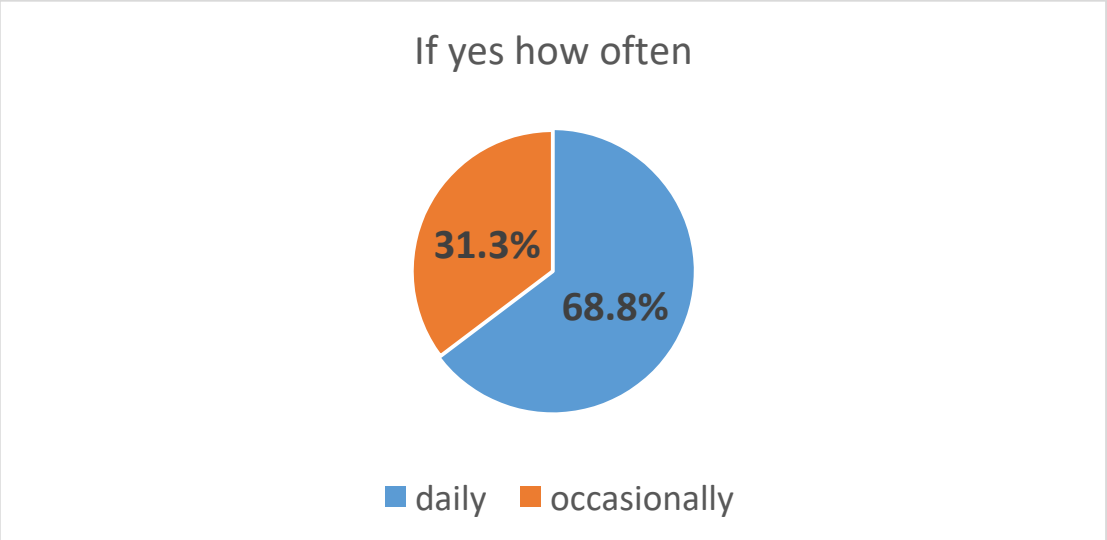


Figure 4.4 showed that out of those respondents who smoke, 68.8% smoke daily while 31.3% smoked occasionally

Figure 4. 5

Respondents who have tried to stop smoking

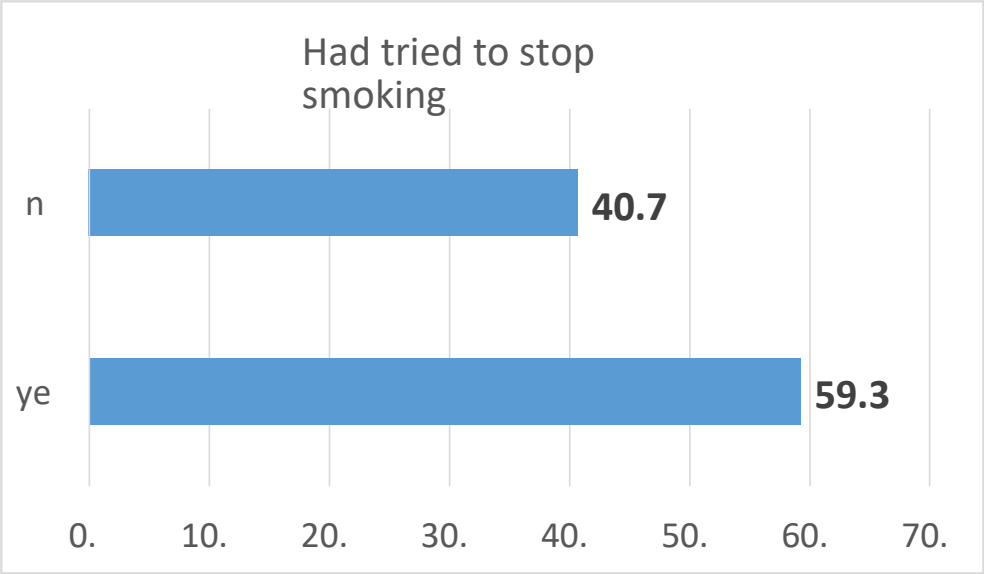


Figure 4.5 shows that out of the respondents who reported to be smoking, 59.3% had tried to stop smoking while 40.7% had not tried to stop.

Figure 4. 6

Respondents who had been advised by a doctor to quit smoking

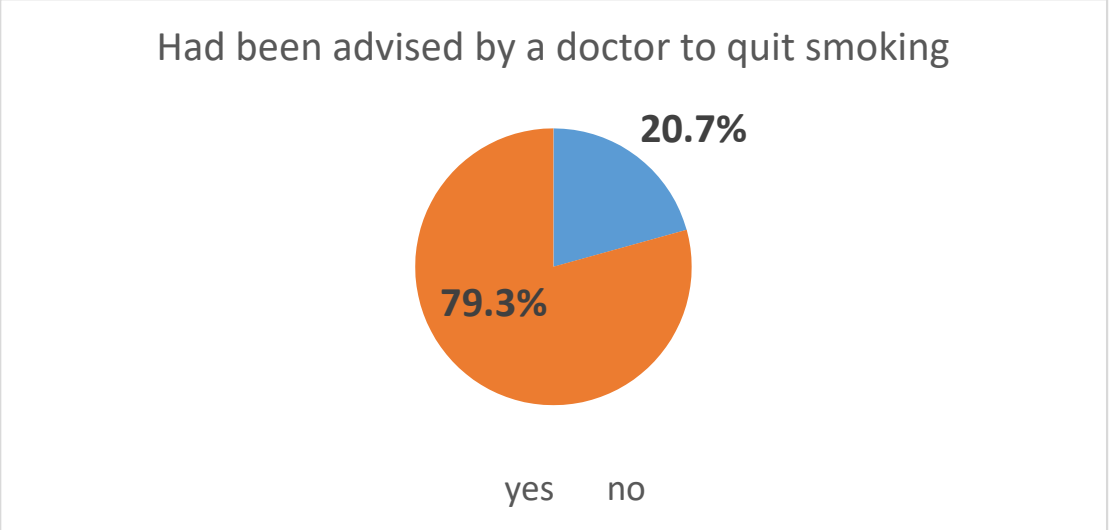


Figure 4.6 revealed that out of those who smoke, 79.3% had been advised by a doctor to stop smoking while 20.7% had not been advised to stop smoking by a doctor.

Table 4. 4

Tobacco smoking assessment and Prevalence of Hypertension

		n	[%]	Chi Square (λ)	P-value
Had smoked tobacco products	Yes	40	[11.7]	0.353	0.553
	No	301	[88.3]		
Current smokes tobacco products daily	Yes	16	[4.70]		
	No	323	[95.3]		
If yes how often	Daily	11	[68.8]		
	Occasionally	5	[31.3]		
Tried to stop smoking	Yes	16	[59.3]		
	No	11	[40.7]		
Advised to quit smoking	Yes	6	[20.7]		
	No	23	[79.3]		
Previously smoked daily	Yes	17	[53.1]	0.057	0.811
	No	15	[46.9]		

Table 4.4 with regards to whether the respondents were smoking any tobacco products such as cigarette, cigar, majority (88.3%) indicated they were not smoking, (4.70%) indicated they smoked daily, (59.3%) indicated they tried to stop smoking, Smoking was not associated with prevalence of hypertension of the patient as presented in the Table 4.4 [x^2=0.353, p>0.05]. As presented in Table 4.4, majority (n = 23; 79.3%) indicated that they were encouraged to stop smoking tobacco while on a visit to a health worker or doctor the past twelve months. Presentation of tobacco smoking habit of the respondents is vital in management of high pressure of blood prevalence.

In different research by Hamadeh et al. (2016), a much higher smoking prevalence of 30.2% among the adult patients with severe and persistent mental disorder was obtained. This increased prevalence in the study could be because the participants in the study were patients suffering from severe and persistent mental disorder. The statistical test done showed there was no association between tobacco smoking with high blood pressure ($p>0.05$). Similar research to this was done by (Saraswati, 2014) which gave a statistically significant association between hypertension and smoking where smokers were 33.61 times likely in developing high blood pressure. The reason for results showing that tobacco smoking was not associated with hypertension could be that most participants were female. Most participants reported that they did not smoke while most of those who had ever smoked had stopped smoking. A good number of the smokers (20.7%) were advised physician to stop smoking.

The result findings on the prevalence of tobacco smoking of the study participants were much lower than a study by Adeloye et al. (2019) carried out in Nigeria. It was determined that in Nigeria, current smokers accounted for 10.4% of the population, whereas ever smokers accounted for 17.7%. In both categories, this was higher among males than among women. The results were also seen to be same as research by Sharifi et al. (2017) which determined that cigarette use that is current was 10.6% overall, 20.9% in males, and 2.2% in females. In this study non-institutionalized residents of Tehran over the age of 18 were the target group.

The results matched research done by Sohn (2018) on the fixed-effects models that revealed that there was no association between high blood pressure and smoking. The Indonesian Family Life Survey was used in the study, which followed 15-year-old men. Smoking was not associated to hypertension in the cohort due to the null relationship. From the research findings, smoking was not associated to hypertension in this cohort due to the null relationship which matched results in Mbagathi Hospital.

4.5 Family History and Hypertension among Patients attending Mbagathi Hospital (Out- Patient)

This section analyses high blood pressure family history as well as its effect on occurrence of hypertension among patients at Mbagathi Hospital outpatient department. Information was sought whether different family members had history of hypertension. The results are given Table 4.5.

Table 4. 5

Family history and Prevalence of Hypertension cross tabulation

		n	[%]	Chi Square (λ)	P-value
Immediate family member suffers from hypertension	Yes	110	[30.1]	11.848	0.01
	No	256	[69.1]		
If yes, type of relationship	Father	27	[24.8]	4.707	0.582
	Mother	46	[42.2]		
	Brother	4	[3.70]		
	Sister	13	[11.9]		
	Grand father	4	[3.7]		
	Grand mother	4	[3.7]		
	Others	11	[10.1]		

Assessing whether any of the respondents (immediate) family suffered from hypertension, it was evident that majority [256, 69.1%, x^2=11.848, p<0.05] of the respondents indicated that they did not have an immediate family member suffering from hypertension; however [110, 30.1%], indicated that they had an immediate family suffering from hypertension. From the results it was noted that the prevalence of high blood pressure in the history of the among participants was 30.1%.

The results obtained in this study were slightly lower as compared to the prevalence in research by Ranasinghe et al. (2015) where it was shown that family history prevalence of high pressure of the blood was 43%. The was a survey that was cross sectional in five thousand adults who were Sri Lankan. Presence of history in the family elevated the hypertension probability considerably. Patients having high blood pressure family history had considerably increased prevalence of hypertension as compared to other adults". Other studies done observed much higher prevalence values. Such studies include a study by Marwiro (2012) where the prevalence of family history of hypertension was 68.8%. An analytical cross-sectional study with 322 individuals was conducted utilizing systematic random sampling from employment registrations. Being over 40 years old and having history in the family of high pressure of the blood were both high pressure of the blood risk factors that were independent. Saraswati (2014) also observed a much higher prevalence of 74percentage among the patients while only 39% of the controls had history in the family of high blood pressure. The research was carried out at Pokhara's Western Regional Hospital. More than (29.2%) of the cases and controls were between the ages of 51 and 60.

Figure 4. 7

Respondents' relative with hypertension

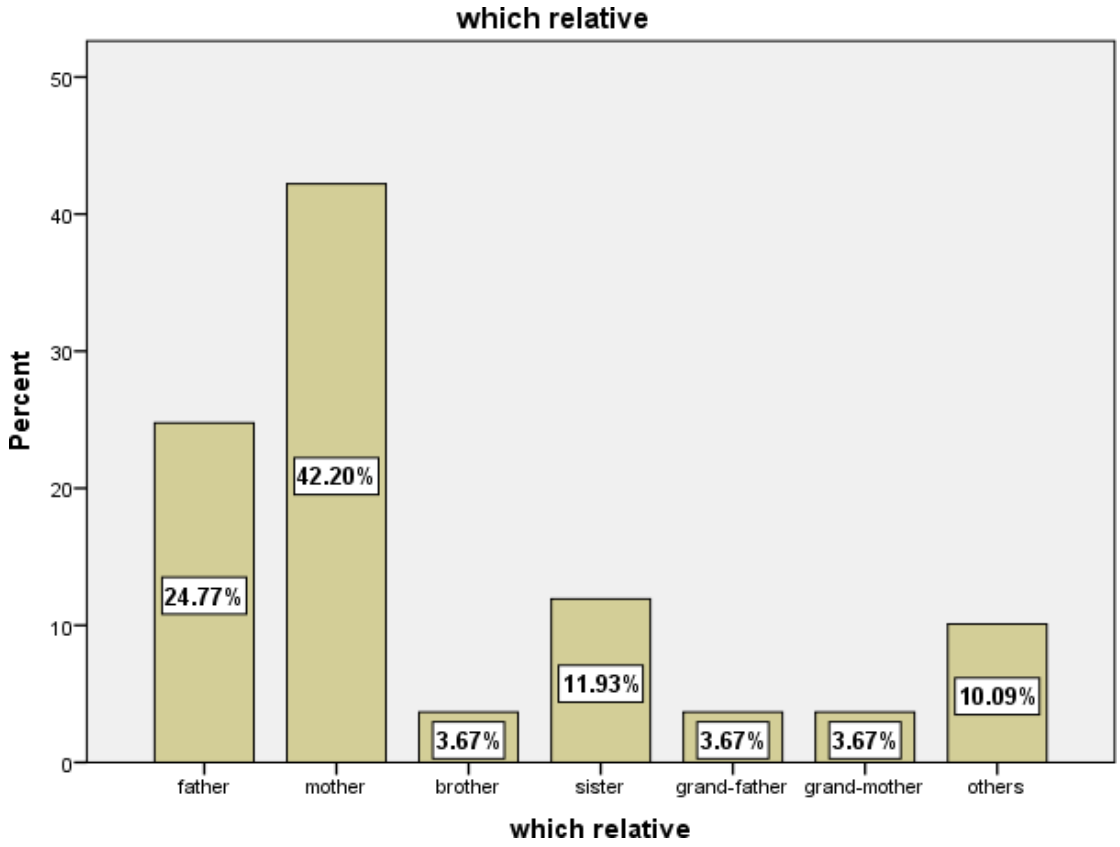


Figure 4.7 shows the relative or family member reported to have hypertension among those who said they had a relative with hypertension. Respondents who reported their brother, grandmother having hypertension each had a prevalence of 3.67%. Only 11.93% of the respondents reported they had a sister with hypertension while 24.77% reported that their father had hypertension. The high pressure of the blood prevalence was most (42.2%) in patients of hypertensive mother.

The chi square test done testing association between family history with hypertension gave a $p<0.05$ which showed positive relationship between family history with hypertension. Results of the research were in agreement with other studies done earlier. The studies include a study by Saraswati (2014) which revealed

that hypertension had a statistically significant relationship to high said they had a relative with hypertension. Respondents who reported their brother, grandmother or pressure of the blood history in the family compared to no high pressure of the blood family history. Another research that supported the results is a cross-sectional investigation by Mahmood et al. (2013) found that hypertension was considerably greater in people having high blood pressure family history in a study with 244 women (15-45 years) at Amtalab Raichure. This study result contradicted the null hypothesis which stated that there isn't an association between high blood pressure and history of the family. It was observed that an increase in prevalence of patients HPT is highly significant among respondents with high pressure of the blood history in the family.

A study that was also in line with the findings was done by Ranasinghe et al. (2015) who explored the impact of history of the family to the prevalence of hypertension together with metabolic risk variables that are associated with a big cohort having South Asia individuals drawn from a representing sample of nationally in Sri Lanka. Patients having a high blood pressure history in the family had a substantially greater prevalence in hypertension as compared to those not having (24.4%). The existence of high blood pressure history in the family in grand-parents, parents as well as siblings were associated to substantially increased risk to acquiring high blood pressure in all individuals. It was seen that high blood pressure prevalence was substantially increased for people with high blood pressure history of the family, according to our findings.

4.6 BMI and Prevalence of Hypertension among Patients attending Mbagathi Hospital (Out- Patient)

This section analyses association between BMI with high blood pressure prevalence among patients at Mbagathi Hospital outpatient department. The findings shown in Table 4.6

Table 4. 6

BMI and Prevalence of Hypertension

		n	[%]	Chi Square (λ)	P-value
Height	Between 101-130	10	[3.10]	4.984	0.03
	Between 131 - 160	265	[79.9]		
	Between 161 - 191	57	[17.0]		
Weight	Between 41 - 60	11	[3.40]		
	Between 61 - 80	124	[37.5]		
	Between 81 - 100	196	[59.1]		
BMI	Underweight	19	[5.70]		
	Normal	155	[46.7]		
	Overweight	94	[28.3]		
	Obese	64	[19.3]		

As presented in the Table 4.6, the majority (n = 265; 79.9%) of the respondents' height were between 131 – 160cm, Further, on their average weight, the study found that majority (n = 196; 59.1%) weighed between 81 – 100 kilograms while 124(37.5% weighed between 61 – 80 kilograms.

Figure 4. 8

Distribution of Respondents by BMI

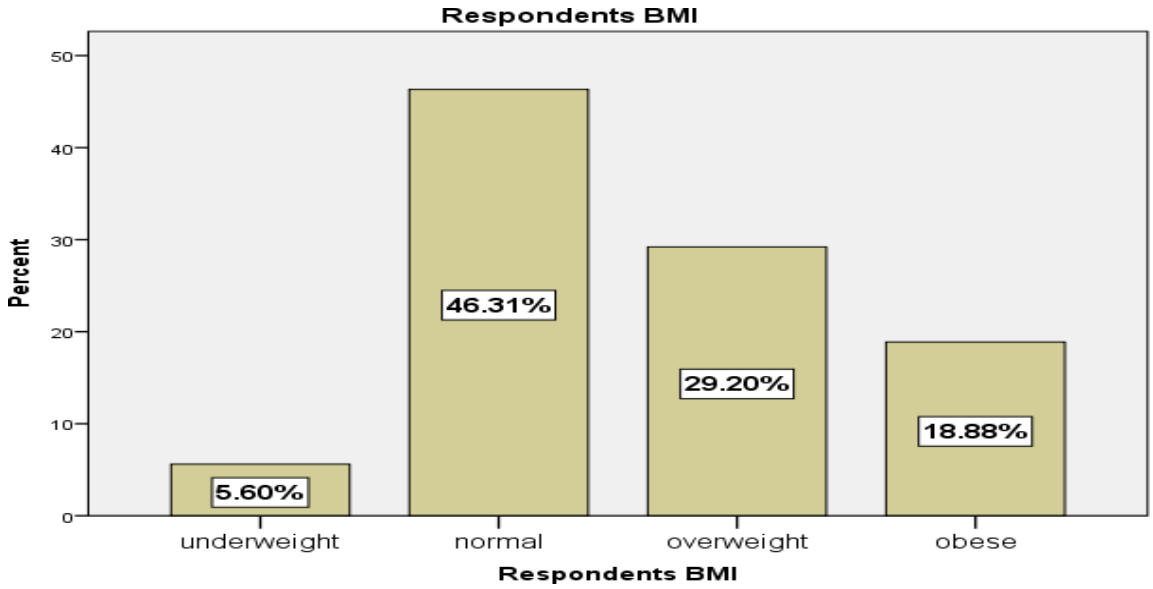


Figure 4.8 reveals, that nearly 50% respondents were found to be overweight and obese [29.20% and 18.88% respectively] by the BMI classification [Weight in Kg / Height in M^2]. A small proportion [5.70%] were found to be underweight. Majority 155(46.31%) had normal BMIs, 94 (29.2%) were overweight while 64(18.88%) were obese. This study's prevalence was slightly lower as compared to results obtained in research by Logaraj et al. (2014), who found out that more than 50% of the population was obese or overweight. In this study almost half and a third of males were obese or overweight. Another research by Amole et al. (2013) it was noted that the overall prevalence for obesity was 14.75% (8.9% for males and 19.5% females.) in a survey of 400 adult patients in a Nigerian medical center. The obesity prevalence 14.7% obtained in the study done in a Nigeria medical center was slightly lower than the 18.88% prevalence obtained in the study conducted among patients of Mbagathi .

Table 4. 7

BMI and hypertension crosstabs

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4.984[a]	3	.173
Likelihood Ratio	5.185	3	.159
Linear-by-Linear Association	4.269	1	.039
N of Valid Cases	332		

Table 4.7 shows the chi-square crosstabs between BMI and hypertension. It reveals there is not a substantial association between BMI with high pressure of the blood. (P>005) reveals association between BMI with hypertension is not significant. Other studies done revealed an association between BMI with high blood pressure. Such studies include a study done by Saraswati (2014) who revealed that obesity was statistically connected with hypertension with the p-value being .030. Kotsis et al. (2005) showed body mass index being factor that contributes to office pressure in the blood. The research population was composed of 3,216 outpatient participants (53% males and 47% females) visiting the high blood pressure center in Greece, Athens from January 1,996 till January 2,004. They had previously never had anti-hypertensive treatment or medications or were not using other medication. The study results supported the study's null hypothesis that stated that there is no significant association of BMI and Hypertension.

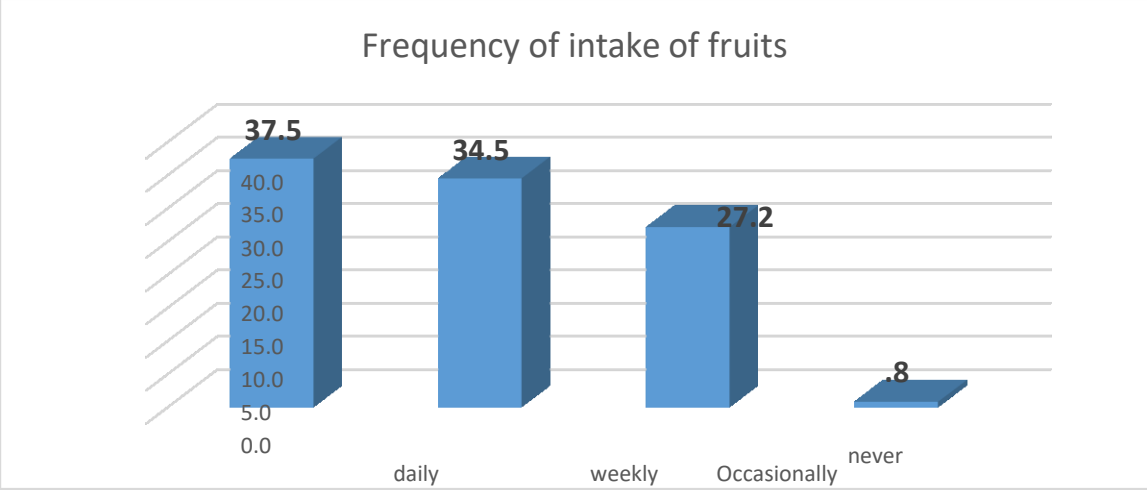
These findings suggested there is a strong association between high pressure of the blood with body mass index, especially in elderly individuals. Tarnoki et al. (2013) also found out that obese people had higher blood pressure than non-obese

people. When hereditary factors were taken into account, BMI was found to be substantially associated with arterial pressure (mean), brachial diastolic as well as systolic pressure of the blood, and aortic SBP. Hossain et al. (2019) also showed from research findings that the association between high pressures of the blood with BMI is higher for populations from South Asian, even in lower overweight and obese cut-off points.

4.7 Dietary Habits and Prevalence of Hypertension among Patients attending Mbagathi Hospital (Out-Patient)

Figure 4. 9

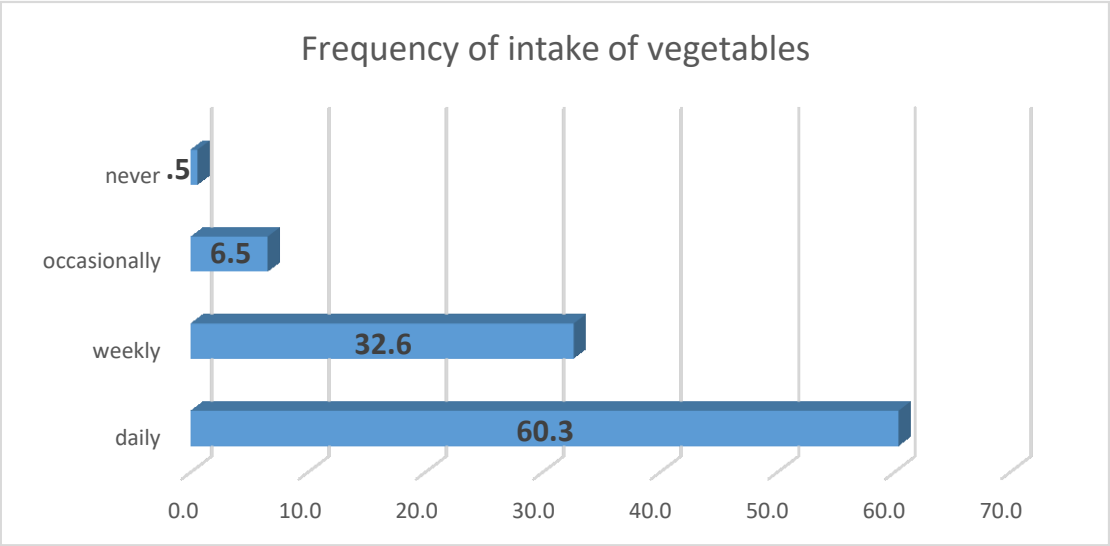
Respondents' frequency on intake of fruits



From the dietary of respondents in this research, most 132 (37.3%) of the participants indicated that in a typical week they ate fruits daily, 121 (34.2%) indicated weekly while 98(27.7%) indicated that they ate fruits occasionally. Eating fruits was not related ($p > 0.05$) with hypertension prevalence.

Figure 4. 10

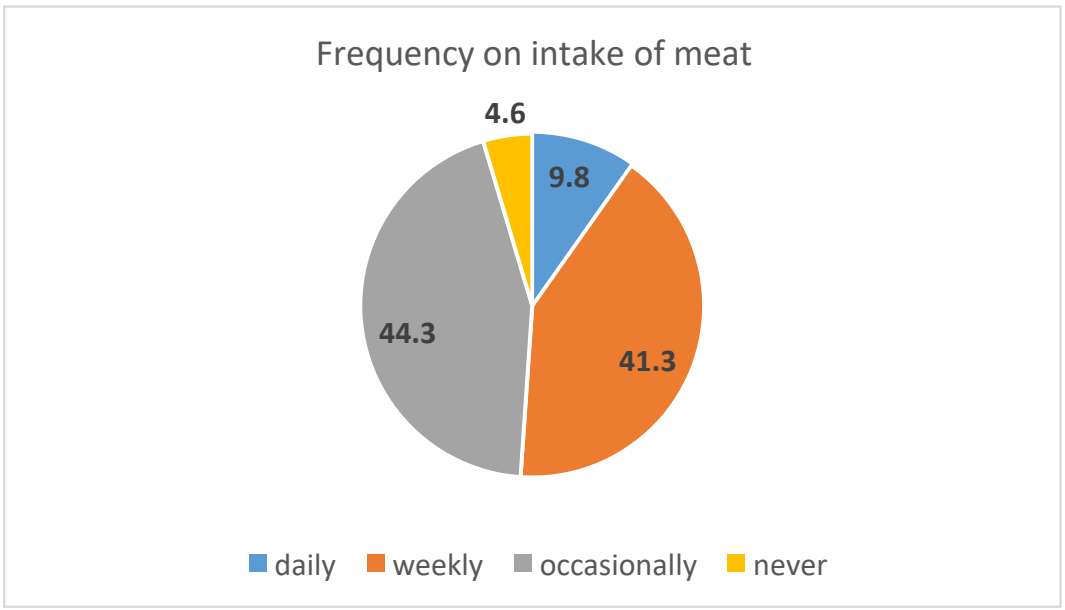
Respondents' frequency on intake of vegetables



Regarding how often the respondents ate vegetables, majority (n= 214; 60.5%) indicated daily, 114 (32.2%) indicated weekly, 24(6.80%) indicated occasionally and 2(0.60) indicated never. Eating vegetables was seen to be insignificant p >0.05 with high blood pressure prevalence.

Figure 4. 11

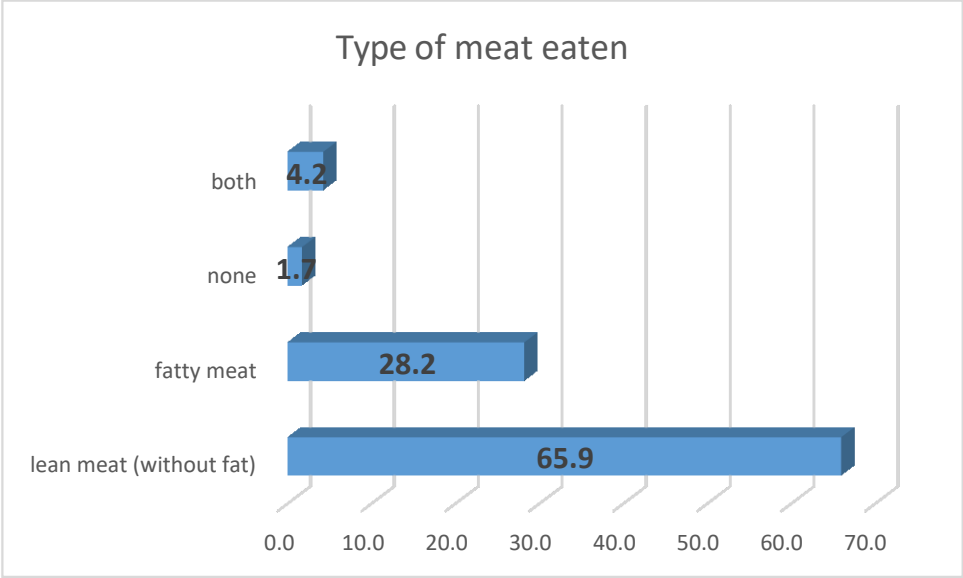
Respondents' frequency on intake of meat



Regarding how often the respondents ate meat, majority (n= 157; 44.4%) indicated occasionally, 144 (40.7%) indicated weekly, 36(10.2%) indicated daily while 17(4.80%) indicated never ate meat. Eating meat was revealed being statistically insignificant $p > 0.05$ with prevalence in hypertension.

Figure 4. 12

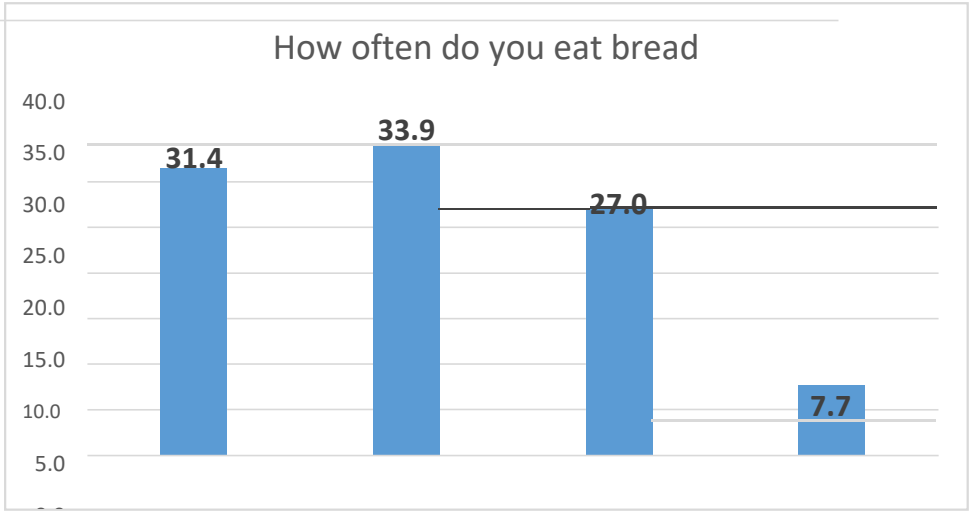
Respondents type of meat eaten



Majority (n= 231; 67.7%) ate lean meat without fat, 89(26.1%) indicated they ate fatty meat, 15(4.4%) indicated they ate both lean meat and fatty meat. Type of eaten meat was shown to be statistically insignificant $p > 0.05$ with prevalence in hypertension

Figure 4. 13

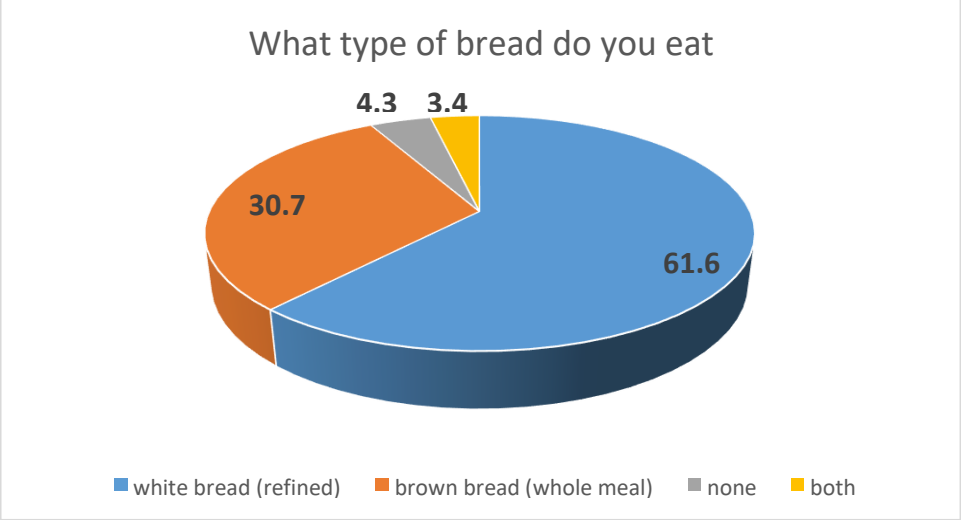
Respondents' frequency on intake of bread



Concerning how often the respondents ate bread, 119(38.3%) indicated weekly, 110(31.3%) indicated daily, 96(27.3%) indicated occasionally while a few 27(7.70%) indicated they did not eat bread. Eating bread was shown to be insignificantly associated $p > 0.05$ with prevalence in hypertension.

Figure 4. 14

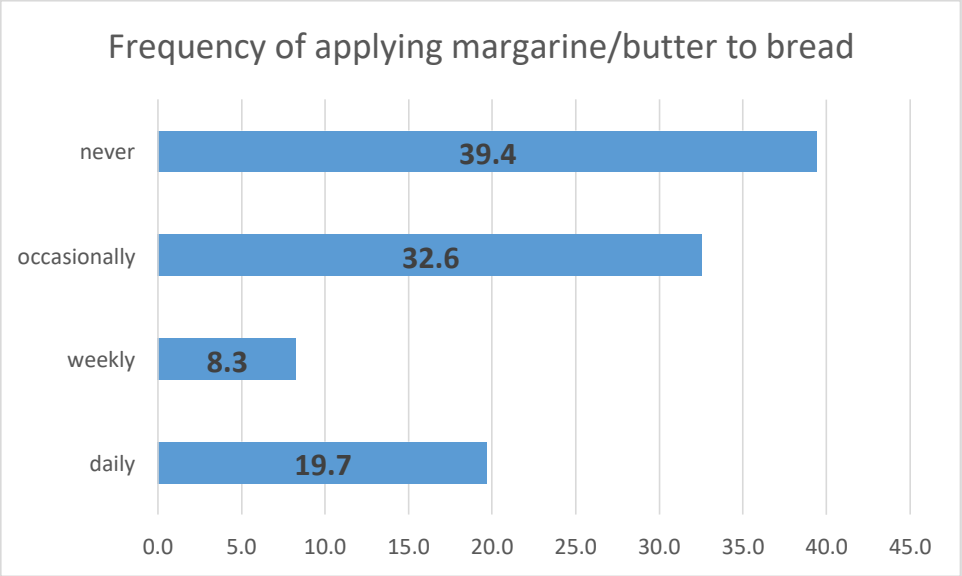
Respondents type of bread eaten



The respondents were asked to report the type of bread they ate, majority (n = 207; 61.8%) indicated they ate refined white bread, (n = 102; 30.4%) indicated Brown bread (whole meal) while a few (n = 14; 4.20%) indicated they did not eat bread. It was established that type of bread eaten was insignificantly associated $p > 0.05$ with prevalence in hypertension.

Figure 4. 15

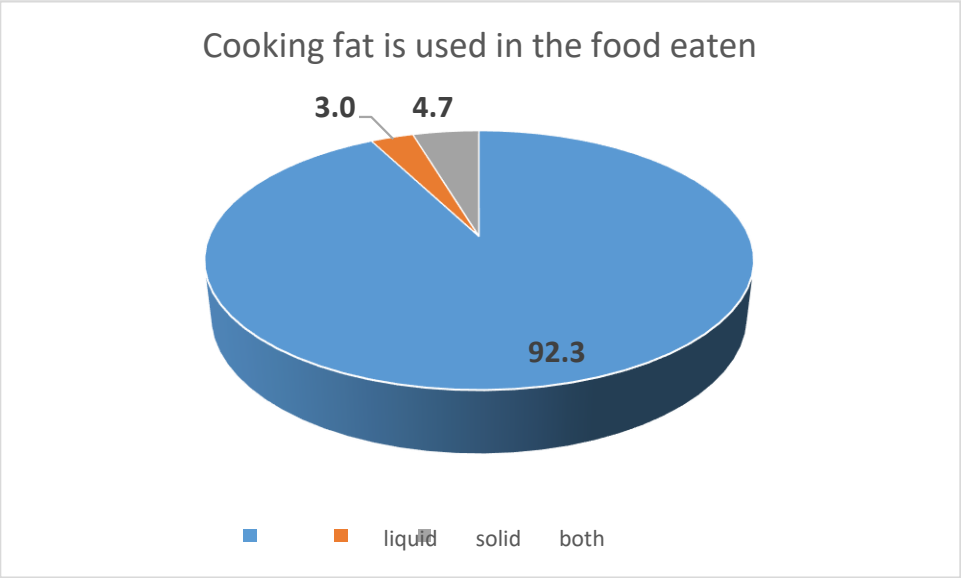
Respondents' frequency of applying butter to bread



Regarding how often the respondents applied margarine/butter to bread, 130(38.7%) of the respondents indicated they never applied margarine/butter to bread, 113(33.6%) indicated they applied occasionally, 110(31.3%) indicated daily. Applying margarine/butter to bread was seen to be insignificant $p > 0.05$ with prevalence for hypertension.

Figure 4. 16

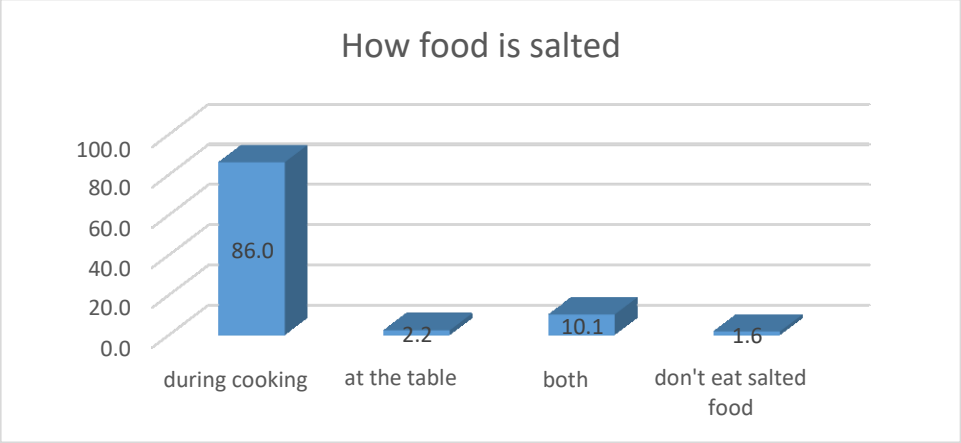
Respondents type of cooking fat used for cooking



Concerning, the type of cooking fat used in the food the respondents ate, majority (n= 325; 92.6%) indicated liquid while a few (n = 11, 3.10%) indicated solid. Type of cooking fat was not significantly associated $p > 0.05$ with prevalence for hypertension.

Figure 4. 17

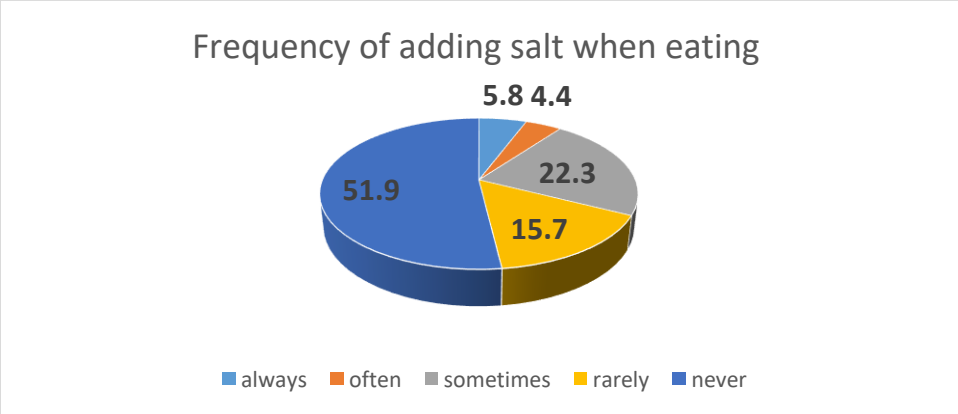
Respondents' method of salting food



The respondents were asked how the food they ate was salted, majority (n = 301; 85.8%) indicated that the food was salted during cooking, 8(2.3%) indicated at the table while a few 6(1.70%) indicated they did not take salted food. How food was salted was shown to be insignificant $p > 0.05$ with prevalence in hypertension.

Figure 4. 18

Respondents' frequency of adding salt



Regarding how often the respondents added salt as they ate, majority (n = 183; 52.1%) indicated never, 80(22.8%) indicated sometimes while a few (n = 15; 4.30%) indicated often. It was established that adding salt while eating was statistically insignificant $p > 0.05$ with prevalence of hypertension.

Table 4. 8

Dietary Habits and Prevalence of Hypertension

		n	[%]	Chi Square (λ)	P-value
In a typical week, on how many days do you **eat fruit**?	Daily	132	[37.3]	1.869	0.600
	Weekly	121	[34.2]		
	Occasionally	98	[27.7]		
	Never	3	[0.80]		
How often do you eat vegetables?	Daily	214	[60.5]	1.749	0.626
	Weekly	114	[32.2]		
	Occasionally	24	[6.80]		
	Never	2	[0.60]		
How often do you eat meat	Daily	36	[10.2]	3.995	0.262
	Weekly	144	[40.7]		
	Occasionally	157	[44.4]		
	Never	17	[4.80]		
What type of meat do you eat	Lean meat without (Without fat)	231	[67.7]	5.431	0.143
	Fatty meat	89	[26.1]		
	Both lean meat and fatty meat	15	[4.4]		
	None	6	[1.80]		
How often do you eat bread?	Daily	110	[31.3]	2.814	0.421
	Weekly	119	[38.3]		
	Occasionally	96	[27.3]		
	Never	27	[7.70]		
Type of bread	White bread (refined)	207	[61.8]	0.665	0.881
	Brown bread (whole meal)	102	[30.4]		
	Both	12	[3.60]		
	None	14	[4.20]		
How often do you apply margarine/butter to bread?	Daily	66	[19.6]	6.066	0.108
	Weekly	27	[8.00]		
	Occasionally	113	[33.6]		

	Never	130	[38.7]		
Which cooking fat is used in the food you eat?	Liquid	325	[92.6]	0.363	0.834
	Solid	11	[3.10]		
	Both	15	[4.30]		
How is the food you eat salted	During cooking	301	[85.8]	1.869	0.600
	At the table	8	[2.3]		
	Both	36	[10.3]		
	Don't eat salted food	6	[1.70]		
How often do you add salt as you are eating?	Always	19	[5.40]	1.869	0.600
	Often	15	[4.30]		
	Sometimes	80	[22.8]		
	Rarely	54	[15.40]		
	Never	183	52.1		

Table 4.8 shows the summary of the dietary habits assessment as reported by the respondents.

Research findings were almost same as those from a study by Arnarson et al. (2012) that found out that dietary factors were not correlated with blood pressure. Only long-chain omega-3 fatty acids intake was associated with blood pressure. The study was done among elderly Icelanders with an aim to find the association between dietary habits and hypertension. In another study by Safdar et al. (2015) there was found to be significant associations for patterns of diet. The results suggested, some patterns of diet could be associated to high blood pressure in low-income adults from urban areas in Pakistani. Information on diet was taken using a 33-item frequency of food questionnaire as well as three unique patterns of diet which included; sweet as well as fat, vegetable as well as fruit, and yogurt as well as patterns in yogurt together with seafood were drawn by use of factor analyses principal component. This study concluded that certain patterns of diet could be associated to high pressure of the blood for Pakistani urban adults having low

income.

Results from the study contradicted a study that was done by Qin et al. (2014) that observed that the blood pressure goes higher with salt intake. Intake of diet was analyzed among 2,518 adults by a 3, 24 hours recall as well as a questionnaire on food frequency. Oil together with salt consumption in this study was analyzed by records of weights. A typical food pattern was associated to elevated pressure of the blood for the Jiangsu Province population, attributed to high salt intake. The study results were in line with the null hypothesis that showed there isn't a association between dietary habits with high blood pressure. This result showing no association could be due to the fact that other studies used different methods in collecting the dietary habits data. Such methods included assessing dietary habits using weighing records. There is need to carry out further research on the association between other dietary habits that were not included in the study and hypertension.

4.8 Multinomial Logistic Regression Equation

When the dependent and independent variables' values are collected using rating scales, Multinomial Logistic Regression explains the correlation between them. A multinomial logistic-regression was performed for modeling, relationship between predictors with their effect on hypertension prevalence among adult patients. For all tests, the usual 5% (.05) statistical significance criterion was used. The study will only interpret results that are significant $p<0.05$. The findings of the research are shown in Table 4.9.

Table 4. 9

Multinomial Logistic Regression Equation

		B	S.E.	Wald	Sig.	Exp(B)
Step 1[a]	Age			.661	.999	
	Age [Ref: More than 55 years]	**-17.456**	**3586.138**	**0**	**0.036*ef**	**2.623**
	25-34 years	19.604	40191.207	.000	1.000	326524465.550
	35-44years	19.374	40191.207	.000	1.000	259444218.305
	45-55 years	19.427	40191.207	.000	1.000	273570347.497
	Gender [Ref: Male]	**.303**	**.376**	**.650**	**.420**	**.738**
	Marital [Ref: Widowed]	**1.238**	**1.243**	**0.991**	**0.019***	**3.447**
	Single	-1.017	1.132	.807	.369	.362
	Married	-.461	1.069	.186	.666	.631
	Divorced	-2.159	1.502	2.066	.151	.115
	Education [Ref: No education]	**0.204**	**0.492**	**0.172**	**0.019***	**0.815**
	Primary	1.162	1.541	.569	.451	3.196
	Secondary	.829	1.525	.295	.587	2.290
	College/University	.181	1.560	.013	.908	1.199
	Occupation [Ref: Unemployed]	**1.016**	**.463**	**4.813**	**.028**	**2.761**
	Employed	-.642	.514	1.555	.212	.526
	Self-employed	.726	.537	1.830	.176	2.067
	Family history [Re: Yes])	**1.033**	**.325**	**10.101**	**.001**	**2.811**
	Smoked [Ref: Yes]	**.007**	**.389**	**.000**	**.986**	**.993**
	Fruits [Ref: Daily]	**-16.533**	**2030.894**	**0.000**	**0.044***	**1.6607**
	Weekly	38.478	28893.399	.000	.999	51390720188852256.000

Occasionally	38.933	28893.399	.000	.999	80996206266878832.000
Never	38.654	28893.399	.000	.999	61241049833853640.000
Vegetables [Ref: Daily]	**-17.147**	**0.419**	**1675.568**	**0.000***	**2.798**
Weekly	-19.586	20430.787	.000	.99	.000
Occasionally	-19.635	20430.787	.000	.999	.000
Never	-20.206	20430.787	.000	.999	.000
Meat [Ref: Daily]	**0.285**	**0.484**	**0.347**	**0.05***	**1.752**
Weekly	.955	.946	1.018	.313	2.598
Occasionally	.410	.857	.229	.632	1.507
Never	.354	.844	.176	.675	1.425
Meat_type [None]	**17.147**	**0.419**	**1675.568**	**0.000***	**27987068**
Lean meat without fat	-.752	.735	1.049	.306	.471
None	-.754	.751	1.007	.316	.471
Both	-.628	1.568	.160	.689	.534
Bread			4.580	.205	
Bread(1)	-1.222	.961	1.617	.204	.295
Bread(2)	-1.276	.926	1.897	.168	.279
Bread(3)	-1.869	.987	3.582	.058	.154
Bread_type			4.225	.238	
Bread_type(1)	-.157	.759	.043	.836	.854
Bread_type(2)	.118	.782	.023	.880	1.125
Bread_type(3)	-2.566	1.548	2.748	.097	.077
Margarine			3.396	.335	
Margarine(1)	.223	.430	.269	.604	1.250
Margarine(2)	-1.055	.659	2.567	.109	.348
Margarine(3)	-.007	.372	.000	.985	.993
Cooking_fat			.504	.777	
Cooking_fat(1)	.199	.856	.054	.816	1.220
Cooking_fat(2)	.727	1.141	.406	.524	2.069
Food salted			.059	.996	
Food_salted(1)	-.280	1.155	.059	.809	.756

Food_salted(2)	-20.250	12967.173	.000	.999	.000
Food_salted(3)	-20.080	6117.422	.000	.997	.000
BMI [Ref: Obese]	**0.353**	**0.344**	**1.052**	**0.005***	**1.423**
Underweight	1.095	.687	2.543	.111	2.990
Normal	.146	.467	.098	.754	1.158
Overweight	1.021	.471	4.697	.030	2.775
Constant	-39.008	45085.589	.000	.999	.000

Table 4.9, illustrates the risk factors associated with hypertension, age, marital status, education, family history, smoking habits and dietary habits. Hypertension became more likely as people became older. Participants over the age of 50 were roughly 2.6 times more likely [OR = 2.623; p- value 0] than those under 50. .05] Participants aged 20-29, 30-39, and 40-49 were more at risk of hypertension than those aged 20-29, 30-39, and 40-49. The results of this research were in line with a study by Mahmood et al. (2013) done among adults attending the outpatient department of an urban health training center in India. Hypertension was found to be prevalent among the participants and association between hypertension increased with increase in age High blood pressure was used as the dependent variable, while risk factors based on socio demographic characteristics were used as being independent variables for multiple-logistic regression analysis. In the study population, the age of the respondents was shown to be a substantial predictor of high blood pressure.

For logistics model for Marital status, Widowed respondents were 3.4 times more at risk of hypertension as compared to single, married or divorced participants [OR

= 3.447; p-value < 0.05]. These study results contradicted results in a study by Shafi and Shafi (2017) where Adjusted and Unadjusted odds ratios with statistically relevant factors associated to high blood pressure diagnosis were included for a multivariate logistic regression. A diagnosis of hypertension was associated to only family history of high blood pressure, BMI and age. Male sex as well as working status were found inversely related to a diagnosis of hypertension. The results of the study showed that being widowed increased chances of an individual being hypertensive.

Regarding the education level of the respondents, participants with no education were 0.8 times more probable to have high blood pressure as compared with respondents with primary, secondary and college/university education [OR = 0.815; p-value < 0.05]. Occupation was positively associated to hypertension. Participants who were considered unemployed had relatively higher odds of high blood pressure as compared to with their partners who are employed and self-employed [OR = 2.761; p-value < 0.05].

With a high blood pressure history in the family, the chances of developing high blood pressure rose. Participants with family history concerning hypertension were approximately 3 times [OR = 2.811; p-value < 0.05] more at risk of having hypertension as compared to participants without hypertension history in their family.

A study that supported this was by Ranasinghe et al. (2015) who conducted a study to explore the impact of history of the family on the prevalence of hypertension as well as associated metabolic risk variables for a big cohort having South Asian people drawn from a representative sample of nationally from Sri Lanka. Patients having a history of the family of high blood pressure which

possessed substantially greater prevalence on hypertension (29.3%, n = 572 over 1951) than those without (24.4% n= 616 over 2530) (p 0.001). The existence of family history of hypertension in parents (OR: 1.28 ;), grandparents (OR: 1.34 ;), and siblings (OR: 1.27 ;) was associated to a considerably increased probability of acquiring high blood pressure for all individuals. It was seen that high blood pressure prevalence was much higher for those having a history in the family of high blood pressure, according to our findings.

Eating fruits daily was associated with decreased hypertension. Eating fruits daily decreased the odds of hypertension by [OR = 1.6607; p-value < 0.05] compared to having fruits weekly, occasionally or never. The results of this study contradicted an Asian population study done to see if there was an association between hypertension and fruit consumption. There were 9791 people in all (3819 men and 5972 women) (Song et al., 2014). Only non-obese women had a negative association with high pressure of the blood as well as intake of fruit. There was not an association between high pressure of the blood with fruit consumption males or obese women for the given study.

Eating vegetables daily was associated with decreased hypertension. Eating vegetables daily decreased the odds of hypertension by [OR = 2.798; p-value < 0.05] compared to eating vegetables weekly, occasionally or never. This study findings were supported by a study on the correlations of vegetable and fruit eating as well as micronutrients that are related with the lowering in high blood pressure. In a general population of Ohasama, Japan, 1,569 people who reside there aged 35 and up took, home blood pressure. After controlling possible confounding variables, the highest tertial consumption of fruits, potassium, vitamin C and vegetables, was associated to considerably decreased incidence of

high blood pressure (Utsugi et al., 2008). Concluding, the cross-sectional research revealed that eating a lot of vitamin C, fruits and vegetables was associated to a lower probability of high blood pressure.

Likelihood of hypertension rose with eating meat. Participants who ate meat were approximately 2times [OR = 1.752; p-value < 0.05] more at risk of high blood pressure as compared to respondents who never ate meat, who ate weekly or occasionally. These results were in line with a study on relationship between consumption of unprocessed and red meat that was processed as well as incident high blood pressure. Females eating five servings of red meat that was processed every week (fifty grams = one serving) showed 17 percent greater hypertension than women who ate 1 serving per week (Lajous et al., 2014). There was association between red meat that was processed and consumption and high pressure of the blood, according to research. There was seen to be no association between eating unprocessed red meat and having high blood pressure.

Being obese and overweight was associated with hypertension. Being obese and overweight significantly increased the odds of hypertension by [OR = 1.423; p-value < 0.05] and [OR = 2.775; p-value < 0.05] compared to having normal or underweight BMI. The study results were in line with research by Hossain et al., (2019) who revealed showing the association between body mass index with hypertension is higher in South Asian populations, even at lower overweight and obese cut-off points. In Bangladesh, India, and Nepal, the odds ratios for high blood pressure were one point seven nine (ninety five percent CI: one point six five to one point nine three), one point five nine (ninety five percent CI: one point five eight to one point six one), and two point zero three (ninety five percent CI: one point nine to two point one six) for each five kg/m2 rise in BMI. In

Bangladesh, the high blood pressure prevalence ranged from 17.4% in 35-44 years to 34.9% in 55 years; in India, it ranged from 4.6% in 18-24 years to 28.6% in 45 to 54 years; and in Nepal, it ranged from 3.8% in 18-24 years to 39.2% in 55 years. The study findings showed that the association between high blood pressure and BMI is higher in populations in South Asian populations, even in lower overweight and obese cut-off points.

These findings supported the results that BMI is associated with hypertension.

In the model, bread, bread type, margarine, cooking fat and salted food were not significantly associated with hypertension.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter discusses findings, summary, conclusions, recommendations as well as areas where further studies can be done.

5.2 Summary

The general objective of this research was to assess prevalence and factors contributing to hypertension among adult patients attending Mbagathi Hospital. The specific objectives were to determine the prevalence of high blood pressure among adult patients attending Mbagathi Hospital, to investigate the association between tobacco smoking and high blood pressure in adult patients attending Mbagathi hospital, to analyze the relationship between family history and hypertension among adult patients attending Mbagathi hospital, to determine relationship between body mass index and hypertension among adult patients attending Mbagathi hospital and to identify the relationship between dietary habits and hypertension among adult patients attending Mbagathi hospital.

The null hypothesis stated was that there is no relationship associating tobacco, family history, BMI, and dietary habits to hypertension among adult patients attending Mbagathi hospital. This study was justified by the basis that Hypertension is a top cause of death among the cardiovascular diseases worldwide and addressing the risk factors can prevent it yet data on hypertension risk factors in Africa are still sparse. Information on hypertension prevalence and associated factors is critical for focusing on and improving hypertension prevention and control.

Cross sectional study design was adopted in the study where data was collected using self- administered questionnaires. Consent letter and Ethical Review letter was sought from NACOSTI Board before undertaking actual data collection. Data analysis was conducted using descriptive statistics that included frequencies and percentages. Multivariable logistic regression analysis was carried out to determine factors significantly associated with hypertension. Cross-sectional study design which involved collection of data at a point in time and descriptive and analytic data analysis methods.

It was noted that female respondents comprised the majority at [251, 68.2%]. The study determined that more than half of the respondents were married [235, 64.9%], while that majority of them [280, 77%] had either secondary or primary level of education [160, 44.0% and 120,33.0% respectively]. Analysis that was done to check the effect of selected sociodemographic variables showed that age was significantly associated with hypertension (p 0.00).

5.2.1 Prevalence of Hypertension among Patients attending Mbagathi Hospital (Out-Patient)

Assessing from the results it was evident that 279 [29.3%] were hypertensive
The results showed that [328, 88.9%] of the participants showed they had ever been measured their blood pressure while [64, 17.4%] had previously been informed of having high blood pressure. A low of [27, 7.7%] were currently on blood pressure drugs prescribed by a doctor. Analysis was done and only the respondents who had previously been informed of raised blood pressure were likely to have hypertension as compared to the others. Having been previously being informed of having raised blood pressure was revealed to be significantly associated with hypertension.

5.2.2 Tobacco Smoking and Prevalence of Hypertension

The results indicated that majority (n = 301; 88.3%) indicated they were not smoking, 16(4.70%) indicated they smoked daily. 16(59.3%) indicated they tried to stop smoking, Smoking was not significantly associated to the prevalence of hypertension of the patient [x^2=0.353, p>0.05]. Majority of the respondents (n = 23; 79.3%) indicated that they were encouraged to stop the smoking of tobacco when visiting a physician or any other health worker within the past twelve months.

5.2.3 Family History and Hypertension among Patients attending Mbagathi Hospital (Out- Patient)

Assessing whether any of the respondents (immediate) family suffered from hypertension, it was evident that majority [256, 69.1%, x^2=11.848, p<0.05] of the respondents indicated that they did not have an immediate family member suffering from hypertension; however [110, 30.1%], indicated that they had an immediate family suffering from hypertension,

Patients with hypertensive mother had the highest frequency of hypertension (42.2%). This study found that among mothers with hypertension, an increase in the prevalence of patient HPT is significantly significant.

5.2.4 BMI and Prevalence of Hypertension among Patients attending Mbagathi Hospital (Out-Patient)

Nearly 50% of the respondents were found to be overweight and obese [29.20% and 18.88% respectively] by the BMI classification [Weight in Kg / Height in M^2]. A small proportion [5.70%] were found to be underweight.

Majority (n = 265; 79.9%) of the respondents' height were between 131 – 160cm, Further, on their average weight, the study found that majority (n = 196; 59.1%)

weighed between 81 – 100 kilograms while 124(37.5% weighed between 61 – 80 kilograms.

5.2.5 Dietary Habits and Prevalence of Hypertension among Patients attending Mbagathi Hospital (Out-Patient)

The majority 132 (37.3%) of the respondents indicated that in a typical week they ate fruits daily, 121 (34.2%) indicated weekly while 98(27.7%) indicated that they ate fruits occasionally. Eating fruits was shown to have and inverse association $p > 0.05$ with hypertension prevalence.

Regarding how often the respondents ate vegetables, majority (n= 214; 60.5%) indicated daily, 114 (32.2%) indicated weekly, 24(6.80%) indicated occasionally and 2(0.60) indicated never. Eating vegetables was found to be inversely associated $p > 0.05$ with high blood pressure. Regarding how often the respondents ate meat, majority (n= 157; 44.4%) indicated occasionally, 144 (40.7%) indicated weekly, 36(10.2%) indicated daily while 17(4.80%) indicated never ate meat. Eating meat was found to be negatively associated $p > 0.05$ with high blood pressure prevalence. Majority (n= 231; 67.7%) ate lean meat without fat, 89(26.1%) indicated they ate fatty meat, 15(4.4%) indicated they ate both lean meat and fatty meat. Type of eaten meat was found to be inversely associated $p > 0.05$ with high blood pressure prevalence. Concerning how often the respondents ate bread, 119(38.3%) indicated weekly, 110(31.3%) indicated daily, 96(27.3%) indicated occasionally while a few 27(7.70%) indicated they did not eat bread. Eating bread was found to be negatively associated $p > 0.05$ with hypertension prevalence.

The participants were asked to record the type of bread they ate, majority (n = 207; 61.8%) indicated they ate refined white bread, (n = 102; 30.4%) indicated Brown

bread (whole meal) while a few (n = 14; 4.20%) indicated they did not eat bread. It was established that type of bread eaten was found to be inversely associated p > 0.05 with hypertension prevalence.

Regarding how often the respondents applied margarine/butter to bread, 130(38.7%) of the respondents indicated they never applied margarine/butter to bread, 113(33.6%) indicated they applied occasionally, 110(31.3%) indicated daily. Applying margarine/butter to bread was found to be statistically insignificant p > 0.05 with prevalence of hypertension. Concerning, the type of cooking fat used in the food the respondents ate, majority (n= 325; 92.6%) indicated liquid while a few (n = 11, 3.10%) indicated solid. Type of cooking fat was found to be inversely associated p >

0.05 with high blood pressure prevalence.

The respondents were asked how the food they ate was salted, majority (n = 301; 85.8%) indicated that the food was salted during cooking, 8(2.3%) indicated at the table while a few 6(1.70%) indicated they did not take salted food. How food was salted was found to be inversely associated p > 0.05 with high blood pressure prevalence. Regarding how often the respondents added salt as they ate, majority (n = 183; 52.1%) indicated never, 80(22.8%) indicated sometimes while a few (n = 15; 4.30%) indicated often. It was established that adding salt while eating was inversely associated p > 0.05 with hypertension prevalence.

5.3 Conclusions

5.3.1 Prevalence of Hypertension among Patients attending Mbagathi Hospital (Out-Patient)

The research showed that high blood pressure prevalence was 29.3% for adult patients attending Mbagathi Hospital. A Higher proportion of males than of

females was diagnosed with hypertension while the statistical test done showed that gender is not associated hypertension.

Most participants had had the pressure of their blood measured before. Out of those who had been previously been informed of having high blood pressure, less than half of them were currently using anti-hypertensive drugs prescribed by a doctor.

5.3.2 Tobacco Smoking and Prevalence of Hypertension

Majority of the respondents were not smoking, while very few of them smoked daily. The results from the statistical analysis done showed that smoking was not associated to the prevalence of hypertension among the patients.

5.3.3 Family History and Hypertension among Patients attending Mbagathi Hospital (Out- Patient)

Majority of the respondents did not have an immediate family member suffering from hypertension. Those who reported to have a hypertensive mother had a relatively high prevalence of hypertension compared to those who reported to have another family member being hypertensive. A significant association between family history and hypertension was found using a statistical chi-square test.

5.3.4 BMI and Prevalence of Hypertension among Patients attending Mbagathi Hospital (Out-Patient)

Majority of the respondents in the study were found to be either overweight by the BMI classification [Weight in Kg / Height in M^2]. A small proportion were found to be underweight. Most of the respondents' height was between 131cm – 160cm. The study found that majority of the respondents weighed between 81 – 100 kilograms while a smaller number weighed between 61 – 80 kilograms. The statistical test of significance between BMI and hypertension showed no

significant relationship.

5.3.5 Dietary Habits and Prevalence of Hypertension among Patients attending Mbagathi Hospital (Out-Patient)

Most the respondents ate fruits daily, followed by a lower number who ate fruits weekly while slightly fewer respondents ate fruits occasionally. Eating fruits was shown to be negatively associated to prevalence of high blood pressure.

Majority of the respondents ate vegetables daily, with a slightly number eating weekly while a small figure ate occasionally. Eating vegetables was found to be negatively associated with prevalence of high blood pressure for the patients. Majority of the respondents ate meat weekly with a small number eating meat on a daily basis while a small number never ate meat. Eating meat was inversely associated with prevalence of hypertension.

Majority of them eat lean meat without fat, with few of them eating both lean meat and fatty meat. Type of eaten meat was found to be statistically insignificant with prevalence of hypertension.

Most of the respondents eat bread weekly, with a slightly lower number eating daily. A few did not eat bread at all. There was found to be no association between eating bread and hypertension.

Majority of the respondents ate refined white bread, with half that figure eating Brown bread (whole meal). A few never ate bread. Bread eaten was inversely associated with the prevalence of hypertension.

A majority of the respondents applied margarine/butter to bread, with a lower number of the respondents never applying margarine/butter. Applying margarine/butter to bread was found to be statistically insignificant with prevalence

of hypertension.

A huge majority of the respondents use liquid cooking fat to prepare their meals with very few of them using solid oil. The type of cooking fat is inversely associated with prevalence of hypertension.

Majority of the respondents salt their food during cooking, with a very small number of them adding salt at the table. The least number do not take salted food. How food is salted was is statistically insignificant with prevalence of hypertension.

Most of the respondents add salt to the food as they eat, while the least of them salt to food often. Adding salt while eating was found to be inversely associate with hypertension.

The findings of this study should provide researchers with a platform for further research studies and policy makers with information on planning programs for prevention, of hypertension and its risk factors. There is need for further research on other factors that were not included in the study that may contribute to hypertension. There is also need to do a study among a various cohort in the population.

5.4 Recommendations

The County government of Nairobi needs to put more emphasis on intervention programs for hypertension and prioritize on factors contributing to hypertension in particular family history and age in order to improve outcomes of the interventions in the population. Such programs may include organizing medical camps to test the blood pressure. They should target to test the blood pressure of individuals whose family members have had hypertension and those who are older

in order to identify hypertension cases early.

The Ministry of health should institute public health awareness and sensitization on the factors contributing to hypertension in the population. Large prospective cohort studies should be done to find prevalence as well as the factors that contribute to hypertension in different populations in the country.

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APPENDICES

Work plan

Thesis Activity Schedule 2017-2021												
Year	2017-2018									2019	2019-2021	
Months	O	N	D	J	F	M	A	M-D		J-F	M-D-M	
Supervisor Meeting												
Topic research												
Finalizing Topic												
Establish Hypothesis/Objectives												
Literature Review												
Methodology												
Questionnaire Design												
Ethics committee approval												
Data Collection												
Data Interpretation and Analysis												
Conclusions												
Thesis write up												
Manuscript preparation and Publication												
Submission and Defense												

Budget

Activity / Purchased Item	Quantity	Charge @ Kshs	Total Amount
Printing	**360**	**10.00**	**3,600.00**
Photocopy	**3,000**	**3.00**	**9,000.00**
Binding	**40**	**50.00**	**2,000.00**
Research assistant Fare	**40**	**200.00**	**8,000.00**
Lunch	**40**	**100.00**	**4,000.00**
Nairobi county research approval fee	**1**	**10,000.00**	**10,000.00**
NACOSTI Research fees	**1**	**2,500.00**	**2,500.00**
TOTAL			**39,100.00**

Consent form

Informant consent

Title of study: Prevalence and factors contributing to hypertension among adult patients in Nairobi, a case study of Mbagathi hospital

Dear respondent,

I am Moseti Oirere, a Master of Public Health (MPH) student in the Public Health department undertaking a study on the Prevalence and factors contributing to hypertension among adult patients in Nairobi, a case study of Mbagathi hospital. This study is beneficial since it will help provide vital information which will be helpful both to the participants and will help determine the factors contributing to hypertension among the adult patients in the in Mbagathi hospital. I hereby ask you to participate in a research study which involves answering questions on a questionnaire and taking various anthropometric tests which include blood pressure and height and weight. Participation in the study is optional and you are free to opt out from the study. No names will be written on the questionnaire and the information you will give will be confidential.

Respondent

I consent participate in the study.

_____ _____

Signature of the participant Date

Investigator

I certify that the respondent or participant has read and understood about the study. He / she has voluntarily agreed to participate in the study.

_____ _____

Signature of the investigator Date

Questionnaire

Thank you for accepting to participate in this study. Below is a list of questions we would like you to respond to. They will take about 15 minutes to complete, Tick  the box provided according to what applies to you. Please do not write your name on this paper. Thank you.

A. Demographic Data

Gender	Male Female
Date of birth	Day/Moth/Year
Age	20-29 years 30-39 years 40-49 years 50-59 years 60-70 years
Marital status	Single Married Divorced Widowed
Highest Level of education	Primary Secondary College/university None

A. Structural Data

Family history of hypertension

Any of your (immediate) family suffers from hypertension?	Yes No
If yes, which relative	Father Mother Brother/sister Grandfather Grandfather Grandmother Others
Have you ever had your blood pressure measured by a doctor or other health worker?	Yes No
Have you ever been told by a doctor or other health worker that you have raised blood pressure or hypertension?	Yes No
Were you first told in the past 12 months?	Yes No
Are you taking any drugs (medication) for raised blood pressure prescribed by a doctor or other health worker?	Yes No
In the past two weeks, have you taken any drugs (medication) for raised blood pressure prescribed by a doctor or other health worker?	Yes No

B. Tobacco smoking history

Do you currently smoke any tobacco products e.g. cigarette, cigar	Yes No
Do you currently smoke tobacco products daily?	Yes No
How old were you when you started smoking?	Age ……years
Do you remember how long ago it was?	In Years …… Or Months……... Or Weeks……. No
During the past 12 months, have you tried to stop smoking?	Yes No
During any visit to a doctor or other health worker in the past 12 months, were you advised to quit smoking tobacco?	Yes No No visit during the past 12 months
In the past have you ever smoked any tobacco products?	Yes No
In the past, did you ever smoke daily?	Yes No

E. BMI

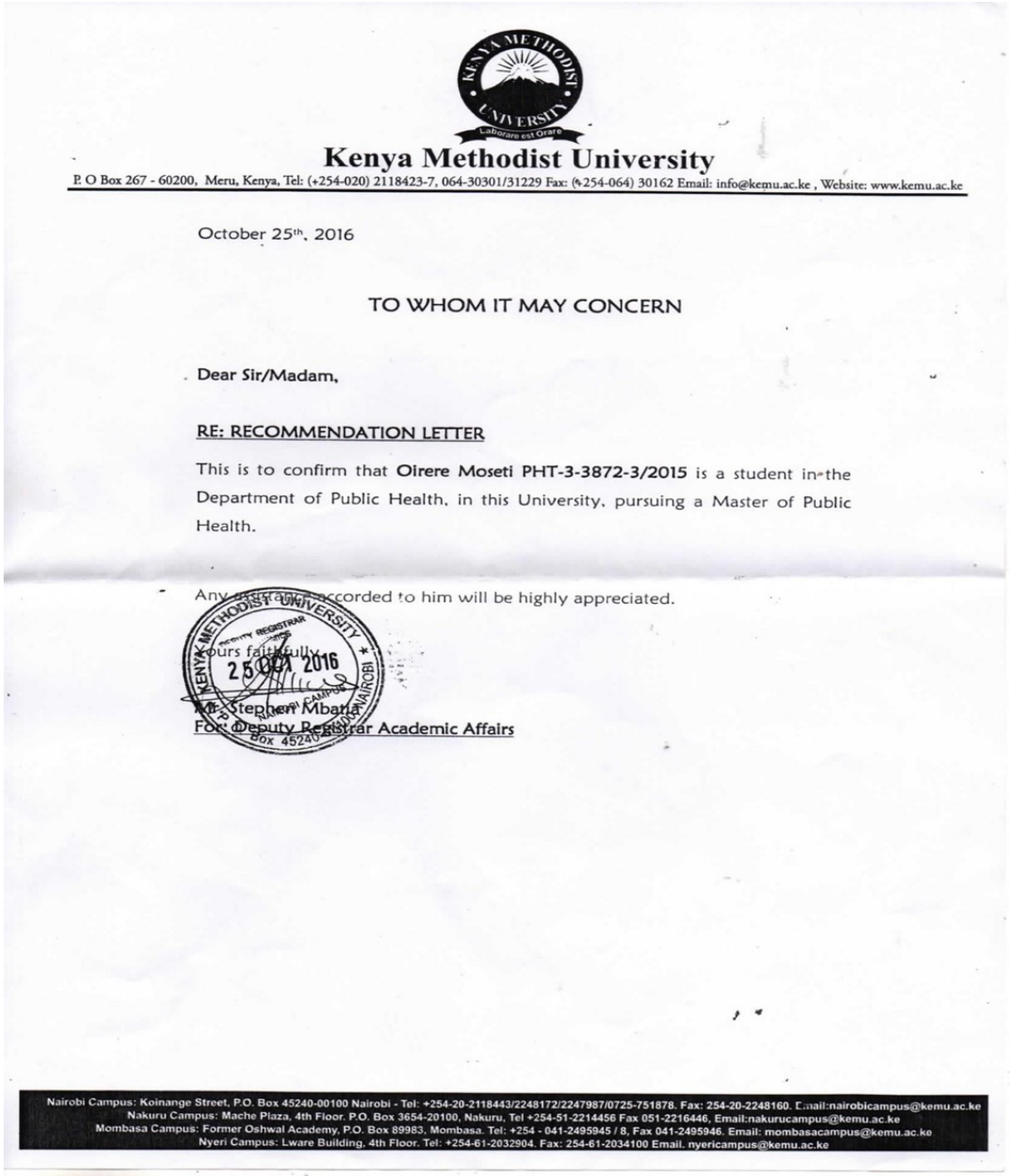
Height	……in centimeters (cm)
Weight	……in kilograms (kg)
BMI	……. kg/m2

F. DIETATRY HABITS

In a typical week, on how many days do you **eat fruit**?	Number of days Don't know
How many servings of fruit do you eat on one of those days?	Number of servings Don't know
In a typical week, on how many days do you **eat vegetables**?	Number of days Don't know
How many servings of vegetables do you eat on one of those days? (USE SHOWCARD)	Number of servings Don't know
How is the food you eat salted	During cooking At the table Both Don't eat salted food
How often do you **add salt** right before you eat it or as you are eating it?	Always Often Sometimes Rarely Never

	Don’t know
How often is **salt added** in cooking or preparing foods in your household?	Always Often Sometimes Rarely Never Don’t know
How often do you eat **processed food high in salt**? By processed food high in salt, I mean foods that have been altered from their natural state, such as packaged salty snacks, canned salty food including pickles and preserves, salty food prepared at a fast-food restaurant, cheese, bacon and processed meat	Always Often Sometimes Rarely Never Don’t know
How much salt do you think you consume?	Far too much Too much Just the right amount Too little Far too little Don’t know

Recommendation letter



Kenya Methodist University

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October 25th, 2016

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: RECOMMENDATION LETTER

This is to confirm that **Oirere Moseti PHT-3-3872-3/2015** is a student in the Department of Public Health, in this University, pursuing a Master of Public Health.

Any assistance accorded to him will be highly appreciated.

Yours faithfully,

25 OCT 2016

Mr. Stephen Mbaria
For: Deputy Registrar Academic Affairs

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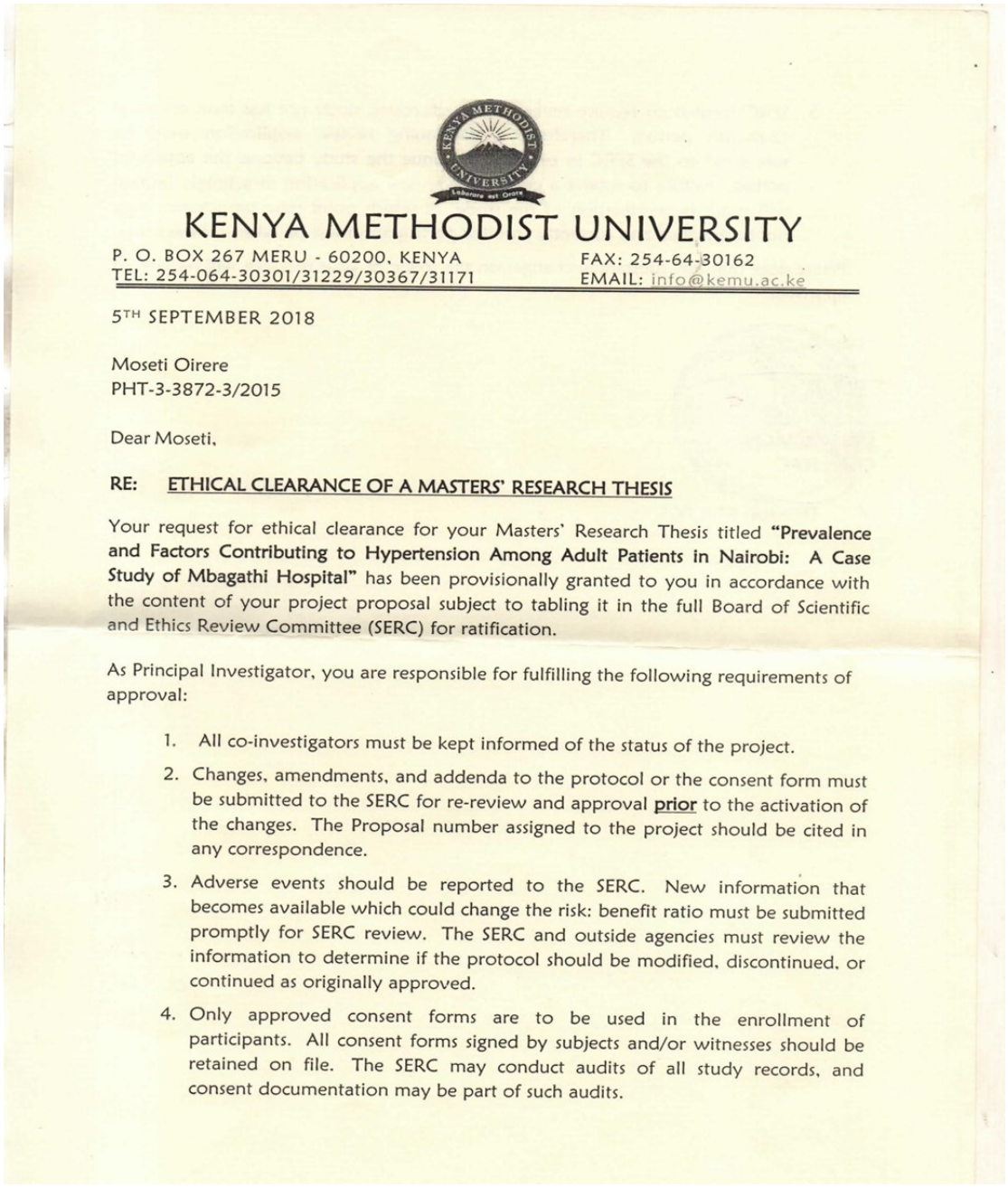
Ethical clearance letter



KENYA METHODIST UNIVERSITY

P. O. BOX 267 MERU - 60200, KENYA
TEL: 254-064-30301/31229/30367/31171
FAX: 254-64-30162
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5TH SEPTEMBER 2018

Moseti Oirere
PHT-3-3872-3/2015

Dear Moseti,

RE: ETHICAL CLEARANCE OF A MASTERS' RESEARCH THESIS

Your request for ethical clearance for your Masters' Research Thesis titled **"Prevalence and Factors Contributing to Hypertension Among Adult Patients in Nairobi: A Case Study of Mbagathi Hospital"** has been provisionally granted to you in accordance with the content of your project proposal subject to tabling it in the full Board of Scientific and Ethics Review Committee (SERC) for ratification.

As Principal Investigator, you are responsible for fulfilling the following requirements of approval:

1. All co-investigators must be kept informed of the status of the project.
2. Changes, amendments, and addenda to the protocol or the consent form must be submitted to the SERC for re-review and approval **prior** to the activation of the changes. The Proposal number assigned to the project should be cited in any correspondence.
3. Adverse events should be reported to the SERC. New information that becomes available which could change the risk: benefit ratio must be submitted promptly for SERC review. The SERC and outside agencies must review the information to determine if the protocol should be modified, discontinued, or continued as originally approved.
4. Only approved consent forms are to be used in the enrollment of participants. All consent forms signed by subjects and/or witnesses should be retained on file. The SERC may conduct audits of all study records, and consent documentation may be part of such audits.

5. SERC regulations require review of an approved study not less than once per 12-month period. **Therefore, a continuing review application must be submitted to the SERC in order to continue the study beyond the approved period.** Failure to submit a continuing review application in a timely fashion will result in termination of the study, at which point new participants may not be enrolled and currently enrolled participants must be taken off the study.

Please note that any substantial changes on the scope of your research will require an approval.

Yours sincerely

DR. WAMACHI
Chair, SERC

cc: Director, RI & PGS

Nacosti permit

THIS IS TO CERTIFY THAT:
MR. MOSETI OIRERE
of KENYA METHODIST UNIVERSITY,
13246-100 NAIROBI,has been permitted
to conduct research in *Nairobi County*

on the topic: *PREVALENCE AND FACTORS CONTRIBUTING TO HYPERTENSION AMONG ADULT PATIENTS IN NAIROBI: A CASE STUDY OF MBAGATHI HOSPITAL*

for the period ending:
19th December,2019

Permit No : NACOSTI/P/18/44681/26874
Date Of Issue : 19th December,2018
Fee Recieved :Ksh 1000

.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation