RISK FACTORS ASSOCIATED WITH HYPERTENSION AMONG ADULTS ATTENDING OUT PATIENTS CLINIC IN MASAKA REGIONAL REFERRAL HOSPITAL

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DECLARATION

I Nanono Victor, declare that this is my original work and has never been presented to any other institution for the purpose of any academic award. I confirm that this study has been prepared by me specifically for the partial fulfillment for the Bachelor's degree in nursing science of International Health Sciences University.

Signature**:** ………………………………………….

NANONO VICTOR

Date……………...………………………

APPROVAL

This is to certify that this research entitled Risk factors associated with hypertension among adults attending out patients' clinic in Masaka Regional Referral Hospital has been submitted for examination with my approval as a University Supervisor.

Signature**:…………………………………..**

MR AFAYO ROBERT

Date **…………………………………………...**

DEDICATION

I dedicate this work to my dear parents for without them I wouldn't be. To my son Katongole John Joseph Mbidde, you brought such wonderful joy in our lives and to my brothers and sisters for always rendering your support.

Special dedication goes to my husband Katongole Joseph Mbidde for being such a loving and caring husband. You always supported me and raised me up in times when I was down, gave me courage and counsel when I lost hope and everything seemed impossible. May the almighty God bless you exceedingly and abundantly.

I also dedicate this work to my Aunt Kanakulya Gertrude for being there for me especially in the critical time when everything was at a standstill.

May the almighty God bless you all.

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OPD: Out Patients Department

WHO: World Health Organisation

ABSTRACT

The study was entitled "risk factors associated with hypertension among adults attending outpatient clinic in Masaka regional referral hospital". According to the World Health Organization (WHO, 2009), 13% of all deaths globally to high blood pressure making it an area of prime importance for public health in both developing and developed nations. Based on the objectives of examining the socio-demographic risk factors, establishing the individual risk factors as well as identifying the lifestyle risk factors associated with hypertension among patients attending OPD at Masaka Regional Referral hospital, the study aimed at determining the risk factors associated with hypertension among adults attending OPD in Masaka regional referral hospital. Existing literature for different authors was reviewed to identify disagreements and disagreements therein.

This was a case control study on 282 participants. To obtain the required sample of respondents, techniques of consecutive sampling technique where patients who met the required selection criteria were chosen consecutively until the required number of respondents was obtained. The required information was obtained by administering an interview rate questionnaire. Thereafter, the data was edited, sorted, coded and tabulated using SPSS version 20 to derive frequency tables, graphs and percentages.

The findings from the study indicated that age, employment status and monthly income were statistically significantly associated with the occurrence of hypertension among the respondents. Furthermore, the study revealed that family history, stress, chronic illnesses, obesity and diabetes were all statistically significant individual risk factors for hypertension. However, the study did not find a thyroid disease as a significant risk factor. Moreover, alcohol consumption as well as excessive weight gain were also found out to be the most cited life style risk factors for hypertension among patients.

Based on the study findings, the researcher proposed that health workers should create awareness among communities about the risk factors for hypertension; government should regulate alcohol consumption, health-educating people on the importance of eating balanced diets, physical exercises and discourage living a sedentary lifestyle. Government through the ministry of health should ensure that health facilities are well equipped with well-trained health workers who are able to diagnose and treat hypertensive patients.

CHAPTER ONE

1.1 Background to the study

Hypertension is a major public health problem worldwide (World Health Organization, 2013) with statistics indicating that the number of people with uncontrolled hypertension has increased to around 1 billion worldwide in the past three decades. In fact, the World Health Organization (WHO) in 2009 attributed 13% of all deaths globally to high blood pressure making it an area of prime importance for public health in both developing and developed nations (WHO, 2009). Historically, hypertension literature was first documented in 1733 with the development of appropriate techniques for measuring blood pressure in which Reverend Stephen Hales of England is generally credited as being the first person to measure arterial pressure, direct intra-arterial pressure in the horse (Booth, 1977).Whereas its invention has existed for centuries, statistics indicate that around 30% of people have high blood pressure within Europe alone but many don't know it, something that explains the increasing risks to heart attack or stroke (Kotchen, 2011) which different academia have inclined to the lifestyles and low motivation among people to access health services (Parati, 2010).

In North and South America, USA is said to be the focal point of treating hypertension. It is indicated that the hypertension treatment only raised serious concern in the mid-1960s following the death of President Franklin D. Roosevelt dying of a cerebral hemorrhage that occurred in 1945 (Black, 1962). Initially, many people were not bothered to take medications not until they were not feeling well. However, the prevalence is high within this region with about 77.9 million adults having hypertension within USA. In 2009, about 61,762 people deaths were reported with hypertension suggested as the primary cause while in 348,102 deaths; hypertension was one of the contributing causes (American Heart Association, 2013). The causes of the prevalence are partly attributed to lifestyles associated with smoking, alcohol and limited physical activity have contributed to the trend that the country is facing.

In Africa, until recently, hypertension has been given low priority (Adeloye&Basquill, 2014). The condition is now being widely reported in many parts of Africa and is the most common cause of cardiovascular disease on the continent (Reddy & Yusuf, 1998).It is also indicated that about 9.2% of the total mortality (WHO, 2002) is caused by hypertension in Africa. However, prevalence studies have revealed variances in Africa ranging from 7.5% in Sudan

(Elbagir & Ahmed 1990 cited in Addo*et al.*, 2007, to as high as 37.7% in Tanzania (Edwards *et al.,* 2000). This trend according to Kearney *et al.*, (2005), by 2025 about 75% of the world hypertensive population will be in Africa if something is not done about its minimization. It is indicated that genetics, age, stress among others are major contributing factors variances in the statistical figures.

In Uganda, a literature search on the prevalence and/ or determinants of hypertension in Uganda reveal scanty information on this problem in the past few decades. Published community-based studies to estimate the prevalence of hypertension in Uganda were conducted before the 1960s. The first was conducted in the then Teso District in 1941, which showed a prevalence of hypertension of 2.9% among adults aged 21–50 years(Williams, 1941). Recent statistics indicate that more than 55% of the deaths of Ugandans are caused by high blood pressure and other heart diseases, (Ayebazibwe, 2012).

Masaka is not an exception either. Notably among the projects to that the Local Government of Masaka has suggested is improvement of health related issues especially HIV and Hypertension (Kalungi, 2011). However, recent studies conducted in the district by the Ministry of Health revealed that the trends in hypertension were on the increase with prevalence rates of 29.3% in 2012, 34.1% in 2013 and 33.4% in 2014-recorded (Ministry of Health Reports, 2012-2014). Yet limited studies to explain the prevalence of this non-communicable disease have been carried out within the area. Prompted by this relatively high prevalence of hypertension among outpatients, combined with the fact that currently there is limited information on the determinants of hypertension in Masaka, a study has been deemed inevitable by the researcher. Therefore, aim of this study is to determine factors associated with the prevalence of hypertension among adults in Masaka hospital.

1.2 Problem statement

Globally, hypertension is a major public health problem (World Health Organization Report, 2013). Recent reports have indicated that around 1 billion people die every year of a non-communicable disease of which hypertension is a leading factor. Majority of these deaths occurring in Sub Saharan Africa (Adeloye&Basquill, 2014). In Masaka Regional Referral hospital, hypertension among patients attending OPD has continuously increased with statistics of 29.3%, 34.1% and 33.4% recorded from 2012 to 2014 (Ministry of Health Reports, 2012-2014). Despite the ministry of health program to promote health through sensitization and education and arguing people to eat healthy foods, avoid tobacco use and

harmful use of alcohol, regularly check your blood pressure, the number of hypertensive patients has increased within the area (Sensasi, 2013). Hypertension is a danger as its prevalence could have very serious complications especially causing damage to the heart and coronary arteries, including heart attack, heart disease, congestive heart failure, aortic dissection and atherosclerosis, stroke, kidney damage, vision loss, erectile dysfunction, memory loss, fluid in the lungs, angina, peripheral artery disease whose consistence is death. Prompted by this relatively high prevalence of hypertension and the limited information to explain that prevalence serves a basis for this study

1.3 General objective

The study aimed at determining the risk factors associated with hypertension among adults attending OPD in Masaka regional referral hospital.

1.4 Specific objectives

i.) To examine the socio-demographic risk factors associated with hypertension among adults attending OPD at Masaka Regional referral hospital

ii.) To establish the individual risk factors contributing to hypertension among adults attending ODP at Masaka regional referral hospital

iii.) To identify the lifestyle risk factors associated with hypertension among patients attending OPD at Masaka Regional Referral hospital

1.5 Research questions

i.) What are the individual risk factors contributing to hypertension among adults attending ODP at Masaka regional referral hospital?

ii.) What are the socio-demographic risk factors associated with hypertension among adults attending OPD at Masaka Regional referral hospital?

iii.) What are the lifestyle risk factors associated with the hypertension among adults attending OPD at Masaka Regional Referral hospital?

1.6 Significance of the study

This study will be significant to a number of parties; To the community members, who are the main clients accessing the services of Masaka regional referral hospital, this study act as a sensitizing research as it will bring to attention the risks associated with development of hypertension.

To the management of Masaka regional referral hospital, this study will bring to the attention the major contributing factors to the prevalence of hypertension among patients that they

serve. This will enable the hospital to come up with a more customized sensitization campaign rather than the general sensitization programs that may not necessarily address the problems of hypertension.

This study will also be important as it will clearly indicate to the government and non-governmental organization the extent to which the tenets studied hereunder have contributed to the high prevalence of hypertension within the study area. This will enable concerned parties to come up with a solution that is purely customized to handle the areas problem than adopting general strategies that could not be important to the communities within the area.

Lastly but not least, this study will act as a source of reference as it will set a basis for comparison by other researchers while ascertaining the prevalence rate within the same area. Besides, the content presented in this report will also be referred to in subsequent studies that will be carried out in other areas.

1.7 Conceptual framework

Figure 1: Risk factors associated with hypertension among adults attending OPD in Masaka regional referral hospital.

LIFESTYLE RISK FACTORS
- Smoking
- Alcohol consumption
- Diet
- Drug abuse
- Salt intake
- Exercise/physical activity

SOCIO-DEMOGRAPHIC FACTORS
- Age
- Sex
- Occupation
- Education level
- Employment status
- Monthly income
- Marital status

HYPERTENSION

CONSEQUENCES
- Increased morbidity
- Increased mortality
- Increased cost of treatment
- Lost productivity

INDIVIDUAL FACTORS
- Genetics/family history
- Thyroid disorders
- Chronic illness
- Stress
- Obesity (BMI)

From the above conceptual framework, it is indicated that the independent variables were lifestyle risk factors, individual risk factors and health risk factors while the dependent variable was prevalence of hypertension. According to Musaiger and Al-Manni, (2007), hypertension among older aged people is dependent on factors such as smoking, unhealthy diet, alcohol consumption, stress obesity, age, inadequate physicals, the genetics, thyroid disorders and chronic illnesses. The researcher categorized these ones in terms of individual risk factors, health risk factors and lifestyle risk factors respectively.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter presents a review of literature based on the study objectives of identifying the individual risk factors, socio-demographic risk factors as well as lifestyle risk factors associated with hypertension among adults a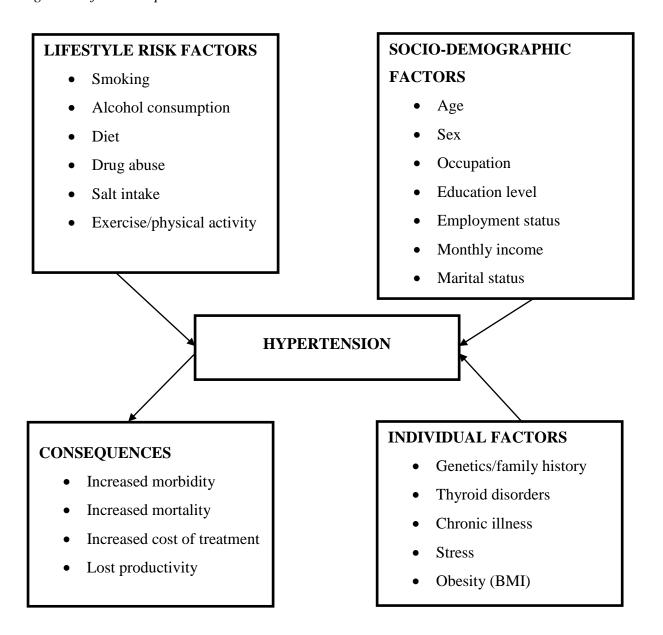ttending OPD at Masaka Regional Referral hospital in order to identify the gaps therein the literatures of different academia.

2.1 Individual risk factors contributing hypertension

Individual risk factors have recently gained close attention from different researchers especially in the context of genetics/family history, thyroid disorders, chronic illness and stress with a lot of mixed reactions arising from different researchers. According to Gasperin*et al.*, (2009), stressful situations could contribute to blood pressure. On the contrary, in a case control study involving 56 patients and 54 control cases in India, stress was not cited as a major factor for hypertension in 42 (75%) of the participants for the study (Pattussi, 2010). The study revealed that there was no documented literature suggesting that stress alone could affect an individual to hypertension. However, many suggestions to this effect have been proposed with some authors noting that instead, it may be that the hormones produced when people are emotionally stressed that may damage arteries, leading to heart disease. Others have suggested that it may also be that being depressed may cause self-destructive behaviour, such as neglecting to take your medications to control high blood pressure or other heart conditions such as anxiety, depression, and isolation.

On the other hand, in a case control study by Klein and Ojamaa (2001) in Ethiopia, with a sample size of 102 respondents, indicated a 72% incidence rate of hypertension due to thyroid disorders suggesting that thyroid disorders directly affect the cardiovascular system exposing people to hypertension. In addition, it has been indicated that people with thyroid disorders produce changes in cardiac inotropism and chronotropism more rapidly than would be expected from regulation of gene expression, which usually take minutes to hours to be phenotypically and functionally appreciable. This calls into question the involvement of nongenomic mechanisms (Osman, Franklyn & Holder *et al.*, 2007).

Some evidence indicates that thyroid disorders promotes the acute phosphorylation of phospholamban and that this action attenuates the inhibitory effect of phospholamban on sarcoplasmic reticulum calcium-activated ATPase (Ojamaa*et al.*, 2002). These findings are

consistent with a cohort study carried out by Klein and Danzi, (2007) among 86 participants in Djibouti that indicated a 65% prevalence of hypertension linked to thyroid disorder. In addition, it was revealed that thyroid disorder has important effects on cardiac muscle, the peripheral circulation, and the sympathetic nervous system that alter cardiovascular hemodynamics in a predictable way in patients with hyperthyroidism. The main changes include increases in heart rate, cardiac contractility, systolic and mean pulmonary artery pressure, cardiac output, diastolic relaxation, and myocardial oxygen consumption as well as reductions in systemic vascular resistance and diastolic pressure.

Many academia have also correlated high blood pressure to the family background. According to Goldstein, Shapiro and Weiss (2008), blood relatives tend to have many of the same genes that can predispose a person to high blood pressure, heart disease, or stroke. In a related case control study in Tamilnadu, India, 100 known hypertensive patients aged ≥40 years were taken as cases, and another 100 age and sex matched non-hypertensive patients from the same OPD were taken as controls. The results indicated that family history of hypertension (OR=2.614, p-value=0.002) and Obesity (OR=1.833, p-value=0.040) were the major risk factors for hypertension (Devadason*et al.*, 2014).

The study further revealed that of the 62 patients who had family history of hypertension, 41 (66.2%) were in the cases group and 21 (33.8%) were in the control group and this difference was statistically significant [Odds Ratio 2.62 (1.40 − 4.88), p - Value 0.002]. From this observation, it was concluded that having family history of hypertension was 2.62 times more risky for developing hypertension as compared to those not having the history of hypertension (Devadason*et al.*, 2014). In the same manner, of those 74 obese (BMI > 25) patients, 44 (59.5%) were in the cases group and 30 (40.5%) were in the control group and this difference was statistically significant [Odds Ratio 1.82 (1.03 − 3.28), p - Value 0.04]. Thus, having BMI > 25 was 2.62 times more risky for developing hypertension as compared to those not having BMI <25. Other factors like having the history of smoking; high salt intake and non-vegetarian diet preference were more in the cases group as compared to control group. However, these differences were not statistically significant.

Within the same context, Zhou *et al.*, (2008), also pointed out that often relatives may also share some of the same habits such as diet, exercise, and smoking that can affect risk which may expose a number of people to a risk of hypertension. Therefore, a family history of high

blood pressure is a risk factor for developing high blood pressure. A family history of high blood pressure has been linked to other risk factors for heart disease and stroke. These factors include high cholesterol, high body fat, and being more sensitive to the effects of salt on raising blood pressure. These risk factors can put you at risk for future heart disease and stroke, even though you may not have high blood pressure yourself.

The other individual risk factor influencing the prevalence of hypertension is physical inactivity (Abed & Abu-Haddaf, 2013). In a case control study using a systematic random sample of 120 cases matched with sex, and locality to 120 controls were chosen. Results from the study showed that the most common modifiable risk factors of hypertension were physical inactivity (76.7% versus 15.9%), obesity (67.5% versus 29.2%), diabetes mellitus (19.2% versus 7.5%), and ex-smoking (15.5% versus 1%). This is in agreement with many national and international studies, which showed that hypertension was higher among participants with one or more of these risk factors.

2.2 Socio-demographic risk factors associated with hypertension

According to Kalule, *et al.,* (2014), inequalities in socio-demographics status underlies many health disparities in the world. The socio-demographics factors include a number of attributes including education, income, sex, age, and ethnicity. According to Patnaik (2005), occupation of people increases their risk to becoming hypertensive. It is indicated that some jobs are tasking with hard objectives to achieve. Consistently working in this kind of working condition exposes one to acquire hypertension in the long run. In regard to the income, Regassa, (2011) pointed out that one's income determines so many things in someone's life. It is further indicated that the current income of the individual offers the possibility of a direct appreciation of life conditions, healthy habits and behaviour in undertaking regular medical checkups to determine their blood pressure.

In a case control study of 164 respondents in Mwanza province of Kenya, it was revealed that low socioeconomic status was associated with the occurrence of the hypertension (Kayima*et al.*, 2013). In fact, the study showed highest risk of hypertension among subjects with highest poverty rate with 75.8% among cases compared to 34.2% among controls with statistical significant differences [OR = 7.15 (3.59–14.39)]. In addition, the prevalence of hypertension was higher in low educational level with 61.7% among cases and only 26.6% among controls. The difference between low and high education is statistically significant with OR = 5.93 (3.0–11.82). Unemployed subject was 83.3% among cases and 50% among controls

with OR = 5 (2.64–9.35). However, the burden of hypertension was insignificantly lower among married subjects that could be referred to age variation.

As indicated by Nygren, Gong and Hammarstrom (2015), socioeconomic differences of people in various countries lead to major changes in behaviour towards sedentary lifestyle and increase the incidence and morbidity of hypertension. For example, in a case control study conducted in Al-Azhar University hospital, Cairo, Egypt involving 193 cases and 200 controls aged 41-63 years, it was observed that the risk of hypertension increased with increase in age, male gender and family income (Kasim*et al.*, 2007). Furthermore, the socio-demographic adjusted risk of primary hypertension was significantly increased among smoker (OR= 1.75; 95% CI= 1.01-2.97), particularly among heavy smokers reported more than 20 pack years of smoking (OR= 1.90; 95% CI= 1.00-3.77), sedentary life subjects (OR= 1.90; 95% CI= 1.15-3.02), and among those drinking more than 3 glasses of black tea/day. These results suggest that increased age, male gender and family income, smoking, sedentary life and black tea drinking are risk factors of primary hypertension.

In another related study in Edo state of Nigeria with 64 cases and 75 controls, hypertension was significantly associated with low socio economic status, education, and employment. The most common non-modifiable risk factors were old age, and family history (85.8% versus 71.7%), education level (66.1% versus 64.5%) and employment status (45.3% versus 38.4%) respectively (Devadason*et al.*, 2014). From the foregoing observation, it can be concluded that an individual's age, level of education and employment status are important predictors of hypertension.

Similarly, Carrin, *et al.*, (2008) indicated that people limited with finances find it hard to have a balanced diet. Therefore, foods such as fruits, vegetables, whole grains, low-fat dairy products and dietary fibre, while being low in dietary sodium, cholesterol and saturated fat (Khan, *et al.* 2007) cannot easily be afforded. A cross-sectional survey carried out by Musinguzi and Nuwaha (2013) among 320 respondents in Tanzania and Uganda, enrolling households using multistage sampling with five strata per country (one municipality, two towns, two rural areas)revealed that the level of income among individual was a predictor in the prevalence of hypertension among individuals. Furthermore, the study found out that people living in rural areas were more likely to be affected by hypertension than those in towns because most urban residents are economically better off than rural areas. In relation to age, a study conducted by Patnaik*et al.*, (2005), in an urban slum of Orissa found that

hypertension was significantly higher in persons of more than 40 years age. A study conducted by Zachariah *et al.*, (2003) in a middle-aged urban population in Kerala in 2003 was consistent with Patnaik*et al.*, (2005) as it equally found out that prevalence of hypertension was more in older age.

On the other hand, Kearney, *et al.*, (2004) indicated that socio-demographic of education and incomes are likely to increase the risk of hypertension. From literature, education and income complement each other. Persons with higher level of education but with a lower income are likely to have hypertension while those who have a higher income but had a lower level of education are less likely to have both diseases alone. Indeed, a case control study involving 50 cases and 100 controls in a tertiary care hospital of Visakhapatnam, India revealed that low levels of education was a significant predictor for the prevalence of hypertension with results of 37(74%) among cases and 73(73%) among controls (Guduri*et al.*, 2014). On the contrary, a study conducted by Shahid and Mujawar*et al.*, (2013) reported that illiteracy as a risk factor was not found to be strongly associated with occurrence of hypertension among pregnant women (OR<1).

In relation to unemployment, there is growing evidence to suggest that unemployment has a role in the development and incidence of hypertension among patients (Nygren, Gong &Hammarstrom, 2015). According to this line of argument, breaks in employment are a risk factor in the development of hypertension. Similarly, there is a large body of research exploring the connection between working life and health, including the examination of employment status and level of unemployment on health and mortality among patients (Geleijnse, Grobbee&Kok, 2005) because of people's lifestyles. In many studies, unemployment is closely associated to limited awareness and low economic status, which affects the nutritional as well as overall health status of individuals indirectly. More than individual earnings, the family income is considered more important as it is one of the significant social-economic factor contributing to poor maternal and fetal outcomes. Thus, people with no proper jobs are more at risk for developing hypertension (WHO, 2013).Similarly, Wolf-Maier *et al.*, (2003) noted that personal characteristics increase risk for developing hypertension, including concurrent diagnoses of diabetes mellitus and the presence of obesity.

On the contrary, Fields *et al.*, (2004) indicated that prevalence rates of hypertension increase with age, but this change is affected by both sex and race. For example, in the United States nearly one out of every three adults has high blood pressure (Fields *et al.*, 2004). Estimates of high blood pressure are even higher in some other industrialized countries. For example, in Germany, Finland, and Spain roughly 44 percent of the adult population can be diagnosed with hypertension (Wolf-Maier *et al.*, 2003), and in Japan the estimated prevalence of high blood pressure is as high as 73 percent among older adults (Curry, 2013).

2.3 Lifestyle risk factors associated with hypertension

Many dietary and lifestyle factors have been implicated in the aetiology of hypertension with different studies showing that diet and people's lifestyles have a substantial impact on the prevalence of hypertension among individuals, societies and populations (WHO, 2013). Notable risk factors including overweight, physical inactivity, high salt intake and low potassium intake have all been pointed out as the major contributors to hypertension both in the developed and developing countries. In a case control study, with a sample of 194 hypertensive cases and 201 controls from Dongwu County, China, respondents' lifestyles were associated with an 84.6% for cases and 72.3% of controls of hypertension occurrence (Dalai *et al.*, 2014). These results suggest that dietary history and habits have the most important influence on the development of essential hypertension among patients affected by the disease burden. However, an understanding of their relative significance in the general population is lacking much as many medical scholars have studied the association of people's lifestyle and prevalence of high blood pressure or hypertension.

According to Critchley and Capewell (2004), one out of every person is affected by high blood pressure because of their style of life, something that has raised a lot of concerns among different health organizations intervention. Modern lifestyles of limited sleep, financial issues, family problems, sitting in traffic have often been pointed out as leading causes although different researchers have suggested a couple of other factors (Barnes, Vernon, *et al.*, 2015). In a population-based cross-sectional study with a sample of 220 respondents, in Tanzania, lifestyle behaviours related to limited sleep, poor diet in take as well as financial stress was sighted as the major contributors of hypertension among 150 of the respondents (Musinguzi&Nuwaha, 2013). In addition, hypertension prevalence was higher in rural than urban areas, which is in line with some studies conducted on hypertension. This is consistent with the high prevalence of some non-communicable diseases (NCD) risk factors in rural areas and suggests that life style and dietary changes are

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increasingly affecting rural areas in Sub-Saharan Africa. However, these investigations have been largely cross-sectional in design and are more vulnerable to biases, including reverse causation.

As indicated by Reaven, (2015), eating a diet high in processed carbohydrates can lead to high blood pressure. In a survey carried out among Americans showed that insulin resistance and high triglycerides are more common in those with high blood pressure than the normal population therefore cautioning people to avoid this intake. This is in line with National Heart Foundation of Australia (2008) which indicated that because few people do not eat basing one the Dietary Approach to Stop Hypertension (DASH) diet, in addition to reduced salt intake, many have suffered from hypertension. The DASH diet emphasizes fruits, vegetables, whole grains, low-fat dairy products and dietary fibre, while being low in dietary sodium, cholesterol and saturated fat (Khan, *et al.,* 2007).

On the other hand, Tochikubo, Osama, *et.al,* (2015) observed that most people have poor quality of sleep, as well, without realizing it something that puts many at the danger of high blood pressure. Most people do not have enough sleep as they sleep for four to six hours and need to wake up throughout the night to go to the bathroom affecting the entire body system which in the long run increases blood pressure. This is in line with Khan, *et al,* (2007) who indicated that not having quality sleep and inefficient sleep could expose majority to raised blood pressure. However, National Heart Foundation of Australia(2008) pointed out many people do not get active especially through engaging in exercises, something that is emphasized as one of the leading causes of high blood pressure. It is indicated that the lack of body exercises puts people to risk of obesity and loss of body fitness, which attract high blood pressure in the long run.

In the same context, Kelley, (2012) noted that the importance of body exercises cannot be definitely underestimated in helping us control our blood pressure. Engaging in physical activity is an important part of creating a healthy lifestyle. According to meta-analysis, exercise can lower both systolic and diastolic blood pressure (A Meta-Analysis of Randomized Controlled Trials, 2012). Also, Fagard (2007) noted that regular physical activity has an independent cardio protective effect. Regular exercise is associated with an increase in high-density lipoprotein cholesterol and with reductions in body weight, waist circumference, percentage body fat, insulin resistance, systemic vascular resistance, and plasma nor adrenaline and plasma rennin activity. In a study conducted in Australia by

National Heart Foundation of Australia (2008), indicated that it is clear that physical activity lowers resting and day time ambulatory blood pressure. In clinical trials of people with hypertension, regular aerobic activity reduced systolic blood pressure by an average of 6.9 mmHg and diastolic blood pressure by 4.9 mmHg.

Evidence mounting the effect of alcoholism and hypertension is also intense. It has indicated that too much consumption of alcohol increase blood pressure (Mancia, De Backer, Dominiczak, Cifkova, Fagard&Germano, 2007). According to them (Mancia, *et al.* 2007), moderate drinking can increase blood pressure, while binge drinking appears to increase the risk of hypertension. Similarly, the practice of smoking has been indicated as one of the leading cause of hypertension because it subjects people to risk factor for cardio vascular disease (Critchley &Capewell, 2004).Although smoking is known to increase the risk of developing hypertension, thereis currently no evidence that smoking cessation directly reduces blood pressure in people with hypertension (Mancia*, et al.,* 2007). For He and MacGregor (2004), high dietary sodium intake among communities has also increased the risk of stroke and increased risk of death due to coronary heart disease or cardiovascular disease. This is in line with National Heart Foundation of Australia, (2008) which indicated that reducing dietary sodium reduces hypertension by approximately 1700 mg per day while lowering systolic blood pressure by 4–5 mmHg in hypertensive individuals and 2 mmHg in norm ostensive individuals reducing the need for antihypertensive drugs.

In a study of 240 male hypertensive, in Kisumu, 48 subjects were selected as case by systemic random sampling. By adopting the same process, 45 female subjects were identified as case, making a total of 93 respondents. Hypertension was significantly higher in subjects who were prone to lifestyles of ex-smoking, among those exposed to smoking and physically inactive persons (Hendriks *et al.*, 2012). These findings suggest that smoking as a lifestyle, is a significant predictor of hypertension among patients. Moreover, physical inactivity was much higher among cases (76.7%) compared to controls (15.9%) with statistically significant level (OR = 17.47). Since physical activity could be influenced by age, logistic regression is used to control for age, and the relation between physical inactivity and hypertension kept constant and statistically significant. Most contrastingly, hypertension was negatively associated with the current smoking status where the prevalence of smoking among cases (8.3%) was lower compared to controls (16.7%). This could be explained by cessation of smoking among the diseased persons. The study also revealed that there was a positive and statistical significant association between hypertension and passive smoke (OR = 3.32).

CHAPTER THREE METHODOLOGY

3.0 Introduction

This section presents the methodology that was used in the study. It includes the research design, study methods, data collection instruments, validity and reliability of instruments, data processing, study population, sample size and selection, sampling techniques and procedure, type of data and data collection and analysis as well as measurement of variables explaining how each was used in the study.

3.1 Research Design

The study was a hospital based Case Control study. A case control study design is a type of observatory study in which two existing groups differing in outcome are identified and compared on the basis of some supposed causal attribute. Under this study, cases constituted adults who were newly diagnosed with hypertension within a period of three months while controls constituted all adult who did not have hypertension but they were attending OPD with infectious conditions like malaria, and upper respiratory tract infections at Masaka regional referral hospital. The hospital case control design was been selected because it helped investigate the risk factors associated with the increasing trends of hypertension within Masaka hospital. In addition, this method was easy, quick and required few study subjects. Moreover, since case-control studies start with people known to have the outcome (rather than starting with a population free of disease and waiting to see who develops it), it was possible to enrol a sufficient number of patients with a rare disease.

3.2 Source of data

The study used primary data. Primary data is the first hand data that was collected from the respondents. This data was only obtained using data collection tools or methods of questionnaires, interview guides among others.

3.3 Population

3.3.1 Target population

The study targeted all adults attending OPD in Masaka district.

3.3.2   Accessible population

The study considered all hypertensive clients who were attending OPD at Masaka Regional Referral hospital.

3.3.3   Study population

All patients who met the inclusion criteria formed the study population and participated in the study.

3.4 Sample size determination

The sample size for this study was determined using Schelesselman (1982) formula for case control studies. It is given by the following formula:

$$n = (\frac{r+1}{r})\frac{(\bar{p})(1-\bar{p})(Z_\beta + Z_{\alpha/2})^2}{(p_1 - p_2)^2}$$

Where; n = sample size to be determined

r = ratio of controls to cases (r=1 since the study used equal number of cases and

controls)

$\bar{p}$ = measure of dispersion

$(p_1 - p_2)$ = effect size (the difference in means)

Z_β = desired power (which is 0.84 for 80% power)

$Z_{\alpha/2}$ = level of statistical significance (which is 0.05 at 95% level of significance)

p_1 = Proportion of cases exposed

p_2 = Proportion of controls exposed (which was 33.8% according to Devadason $et\ al.$, 2014)

OR = Odds ratio; the study will predict an odds ratio of 2.62 (Devadason $et\ al.$, 2014).

Also, $p_{caseexp} = \dfrac{ORp_{controlsexp}}{p_{controlsexp}(OR-1)+1}$ $p_{caseexp} = \dfrac{2.62(.338)}{(.338)(2.62-1)+1} = \dfrac{.88556}{1.54756} = .57222983$

Therefore, average proportion exposed = $\bar{p} = \dfrac{.57222983+.338}{2} = .45511492$

By substitution, $n = 2\dfrac{(.45511492)(1-.45511492)(.84+1.96)^2}{(.45511492-.338)^2} = 141$

Therefore, the sample size comprised of 141 cases and 141 controls totalling to 282

3.5 Eligibility criteria

3.5.1 Inclusion criteria

All patients aged 18 years or more attending OPD, diagnosed with hypertension, and consented to participate in the study were included.

3.5.2 Exclusion criteria

Mentally disturbed, deaf patients and those with other debilitating conditions like diabetes mellitus, chronic heart conditions and cancer were not be allowed to participate in the study.

3.6 Sampling technique

The study adopted a consecutive sampling technique where patients who meet the inclusion criteria were enrolled consecutively until the required number of respondents in both the control and cases was obtained at the OPD. This technique was selected because it was not easy to apply probability-sampling method in OPD where it is difficult to determine sampling frame.

3.7 Study variables

The study concentrated on the risk factors associated with hypertension among adults attending OPD in Masaka regional referral hospital. Thus, the risk factors associated with hypertension formed the independent variable while hypertension formed the dependent variable. Furthermore, the independent variables were studied in terms of lifestyle risk factors, individual risk factors and health risk factors respectively. Lifestyle risk factors were studied in terms of smoking, alcohol consumption, diet, drug abuse, salt intake and exercise/physical activity. Furthermore, socio demographic factors were studied in terms of age, sex, occupation, education level, employment status, monthly income as well as marital status. On the other hand, individual factors were studied in terms of genetics/family history, thyroid disorders, chronic illness, stress and obesity (BMI).

3.8 Data collection methods

In this study, only a structured questionnaire was used in data collection. The reasons for adopting a questionnaire was because it was cheap and easy to administer, preserved confidentiality of respondents, permitted respondents to complete the filling at their convenience and was administered in a standard manner. In addition, this questionnaire had both closed ended and open-ended questions that allowed the respondents express their opinions in explaining their opinions. Similarly, the researcher personally distributed the questionnaire to ensure that accuracy of information was achieved. To ensure consistency, the questionnaire was pretested on 10 patients from Kitovu hospital.

3.9 Data collection procedure

The researcher first received an introduction letter from International Health Sciences University, introducing her to the hospital authorities at the study area. Thereafter, she

approached the hospital director who granted her permission to carry out any sort of research in the study area. With the help of OPD departmental head, and selecting patients consecutively, the researcher moved from patient to patient until the required number of 282 respondents for cases and control was obtained.

3.10 Data management

The researcher personally participated in the data collection exercise to ensure that views got from respondents were kept confidential. After the data collection process, filled questionnaires were checked for completeness and accuracy before entering in SPSS for further analysis.

3.11 Data processing and analysis

From the field, data was cleaned, edited, coded and computed using SPSS from which frequency tables and graphs, percentages as well descriptive values of mean and standard deviation was derived to provide a basis for the analysis of results.

3.12 Dissemination plan

The results were presented to the International Health Sciences University for approval and shared with Masaka regional referral hospital to help in analyzing the risk factors associated with hypertension among adults attending OPD at Masaka.

3.13 Quality control of data

To ensure that the results are valid and reliable, a content validity index and Cronbach alpha coefficient were used. Content Validity Index was used to access whether each question within the data collection instruments measured the construct in question and captured the issues to be measured. In addition, the researcher adopted an expert judgment technique where instruments were adjusted based on the experts' views until a final instrument to be taken to the field was obtained. According to Amin (2005), a content validity index of 0.7 qualifies the questionnaire a valid instrument and adopted for use. (CVI = K/N Where, CVI= Content Validity Index, K =Number of items considered relevant/suitable and N = Number of items considered in the instruments). On the other hand, using a Cronbach Alpha Coefficient, the study was able to test the reliability of the questions and the respondent's consistency. According to Cronbach, (1951) a result of at least 0.7 obtained from data collection instruments is reliable for generalization.

3.14 Ethical consideration

This research was purely for academic purposes. To build the confidence of the respondents, the researcher obtained an introduction letter from the supervisor, which was submitted to the management of Masaka Regional Referral hospital to be granted permission to carry out the study. After permission was granted, the researcher then requested for a meeting with all the staffs within OPD to inform them of the researcher's intentions at the hospital facility. The participation in this study was absolutely voluntary. Members who were willing to participate were required to fill a consent form. In addition, the researcher ensured that the questionnaires did not have an option for the name to increase confidentiality of participants. Furthermore, the researcher erected different collection points where each of the respondents dropped their responses to avoid suspicion from their colleagues about their participation. Some of the target group of the researcher were not literate. The researcher ensured that she explained whatever was in the data collection instruments before they participated in filling those questionnaires.

CHAPTER FOUR DATA ANALYSIS

4.0 Introduction

Under this section, the research results are presented in line with the objectives of the study. These were: examining the socio-demographic risk factors associated with hypertension, establishing the individual risk factors contributing to hypertension, identifying the lifestyle risk factors associated with hypertension among patients attending OPD at Masaka Regional Referral hospital. The chapter begins by analyzing the socio-demographic characteristics of the respondents.

Table 1: Socio-demographic characteristics adults at Masaka hospital

Variable	Category	Frequency	Percent
Gender			
	Male	137	48.6
	Female	145	51.4
Age (years)			
	18-25	48	17.0
	26-34	60	21.3
	35-44	82	29.1
	≥ 45	92	32.6
Education level			
	None	63	22.2
	Primary	61	21.5
	Secondary	74	26.1
	Tertiary	84	29.8
Religion			
	Christian	158	55.6
	Muslim	110	38.7
	Others	16	5.6
Marital status			
	Single	41	14.4
	Married	166	58.5
	Divorced	28	9.9
	Widowed	49	17.3
Occupation			
	Peasant	57	20.1
	Public servant	43	15.1
	Self-employed	84	29.6
	Private	25	8.8
	Unemployed	75	26.4
Employment status			
	Yes	101	35.9
	No	180	64.1
Monthly income			
	$\leq$ Sh. 100,000	126	47.5
	> Sh. 100,000	139	52.5

Source: Primary data

From Table 1 above, results indicated that females participated more than their counterparts represented by 51.4% of the total respondents. In relation to education level, the study has revealed that the majority of respondents had completed tertiary level of education with a contribution of 29.8%. Besides, the study also revealed respondents in the age group of 45 years and more had the biggest participation in comparison to other age groups. Furthermore, the study revealed that the majority of respondents (52.5%) were earning more than UGX 100,000.

Table 2: Socio-demographic factors influencing Hypertension among adults at Masaka hospital

Variable	Case	Control	χ^2	p-value
Gender				
Male	63(45.0)	74(51.4)	1.160	0.281
Female	77(55.0)	70(48.6)		
Age (years)				
18-25	14(10.0)	34(23.6)	42.246	<0.001
26-34	15(10.7)	45(31.2)		
35-44	43(30.7)	39(27.1)		
≥45	68(48.6)	26(18.1)		
Education level				
None	29(20.7)	34(23.6)	5.679	0.128
Primary	23(16.4)	38(26.4)		
Secondary	40(28.6)	34(23.6)		
Tertiary	48(34.3)	38(26.4)		
Religion				
Christian	75(53.6)	83(57.6)	4.495	0.106
Muslim	53(37.9)	57(39.6)		
Others	12(8.6)	4(2.8)		
Marital status				
Single	16(11.4)	25(17.4)	2.597	0.458
Married	82(58.6)	84(58.3)		
Divorced	15(10.7)	13(9.0)		
Widowed	27(19.3)	22(15.3)		
Employment status				
Yes	58(42.0)	43(30.1)	4.362	0.037
No	80(58.0)	100(69.9)		
Monthly income				
≤Sh. 100,000	49(40.5)	77(53.5)	4.439	0.035
>Sh. 100,000	72(59.5)	67(46.5)	P<0.05	

Source: Primary data

From Table 2 above, the researcher tested the various socio demographic attributes of the respondents. As per the results, it is indicated that among socio demographic factors, the study found out that age (χ^2 =42.246, P<0.001), employment status (χ^2 =4.362, P=0.037) and monthly income (χ^2 =4.439, P=0.035) had statistically significantly association with

occurrence of hypertension as shown in table 2. The other socio-demographic factors did not have a statistical significance as regards the risk factors for hypertension among adults with Masaka regional referral hospital.

Table 3: Individual risk factors contributing to hypertension among adults at Masaka hospital

Variable	Case	Control	χ^2	p-value
Family history				
Yes	64(64.0)	49(36.0)	18.066	<0.001
No	36(36.0)	87(64.0)		
Thyroid disease				
Yes	9(6.4)	4(2.8)	2.166	0.1410
No	131(93.6)	140(97.2)		
Stress				
Yes	67(47.9)	40(27.8)	12.189	<0.001
No	73(52.1)	104(72.2)		
Chronic illness				
Yes	18(13.1)	0	20.215	<0.001
No	119(86.9)	144(100)		
Obesity				
Yes	20(14.4)	4(2.8)	12.285	<0.001
No	119(85.6)	140(97.2)		
Diabetes				
Yes	24(17.3)	0	27.167	<0.001
No	115(82.7)	144(100)		

Source: Primary data

The results from Table 3 indicates that all individual risk factors were statistically significant risk factors influencing occurrence of hypertension except thyroid disease (χ^2 =2.166, P=0.1410).

Table 4: Lifestyle risk factors associated with hypertension among adults at Masaka hospital

Variable	Case	Control	χ^2	p-value
Weight (Kg)				
<50	2(1.4)	3(2.1)	14.070	0.003
50-59	9(6.4)	27(18.8)		
60-69	65(46.4)	72(50.0)		
≥70	64(45.7)	42(29.2)		
Smoke				
Yes	42(30.0)	38(26.6)	0.410	0.522
No	98(70.0)	105(73.4)		
Add table salt				
Yes	133(95.0)	141(97.9)	1.778	0.182
No	7(5.0)	3(2.1)		
Consume alcohol				
Never consumed	61(43.6)	58(40.3)	17.973	<0.001
Current consumer	46(32.9)	75(52.1)		
Past consumer	33(23.6)	11(7.6)		
Exercises				
Yes	4(2.9)	8(5.6)	1.277	0.258
No	136(97.1)	136(94.4)		
Abuse drugs				
Yes	5(3.6)	2(1.4)	1.407	0.236
No	135(96.4)	142(98.6)		

Source: Primary data

The results from Table 4 indicated that weight of respondents (χ^2=14.070, P=0.003) and consumption of alcohol (χ^2=17.973, P<0.001) were the lifestyle risk factors associated with hypertension among adults within Masaka regional referral hospital.

Table 5: Factors associated with occurrence of Hypertension among adults at Masaka hospital

Variable	N (%)	OR(95%CI)	p-value
Age (years)			
18-25	48(16.9)	1	
26-34	60(21.1)	3.55(1.30-9.72)	0.013
35-44	82(28.9)	9.51(3.22-28.07)	<0.001
≥45	94(33.1)	3.68(1.40-9.65)	0.008
Employment status			
Yes	101(35.9)	1	
No	180(64.1)	0.43(0.20-0.96)	0.039
Family history			
Yes	113(47.9)	1	
No	123(52.1)	0.45(0.22-0.93)	0.030
Obesity			
Yes	24(8.5)	1	
No	259(91.5)	0.22(0.06-0.85)	0.029
Consume alcohol			
Never consumed	119(41.9)	1	
Current consumer	121(42.6)	7.58(2.69-21.37)	0.036
Past consumer	44(15.5)	3.03(1.07-8.55)	

Source: Primary data

Table 5 indicates that respondents who were aged 26 and above old were found to have a higher risk of developing hypertension than those aged lower than 26 years of age. Participants who were not employed those without family history of hypertension and respondents who were not obese had a lower risk of developing hypertension. In addition, respondents who are currently consuming alcohol and those with past history of alcohol consumption were found to have a higher risk of developing hypertension than those who have never consumed alcohol as shown in table 5.

CHAPTER FIVEDISCUSSION OF FINDINGS

5.0 Introduction

This chapter presents that discussion of findings based on the objectives of the study. It compares and contrasts research findings with those of previous authors to identify the agreements and disagreements thereof.

5.1 Discussion of findings

Under this section, research findings are compared with the existing literature for the studies conducted earlier in an objective-by-objective manner.

5.2 Socio-demographic risk factors associated with hypertension among adults attending OPD

Under this section, the study has revealed that socio-demographic factors such as age and employment status are statistically significantly associated with hypertension among respondents. The study revealed that respondents aged 26 and above were more likely to develop hypertension than their counterparts who were younger in age. This finding is consistent with Potnaik (2005) who had earlier noted that people who are employed are at a higher risk of developing hypertension, because some type of jobs can expose one to acquiring hypertension.

In relation to employment status, Kayima*et al.*, (2013), also observed that they are employed and are subjected to sedentary lifestyle and eating fatty foods thus leading to excessive weight gain. Furthermore, various studies have linked low socio economic status with occurrence of hypertension (Kayima*et al.*, 2013) where the highest risk of hypertension is common among subjects with highest poverty rate with compared to those with adequate incomes.

According to Devadason*et al*., (2014), found that old age is a common non-modifiable risk factor, education level and employment status. Therefore, from the observation, it can be concluded that age and employment status can contribute to occurrence of hypertension.

There's a big implication of people aged 26 and more standing a higher risk of developing hypertension because clinically, the number of cases will increase and the bed occupancy rate will increase as well. Publically, there will be low productivity and this will affect the country's economy.

The non-significant factors for my study were gender, education level, religion, marital status and monthly income may be because the study was conducted in a regional referral hospital.

5.3 Individual risk factors contributing to hypertension among adults attending OPD

Individual risk factors associated with hypertension were family history and obesity according to my study. In comparison to Devadason*et al.*, (2014), he found that family history is a common non-modifiable risk factor of hypertension. Other non-significant factors for my study were stress and chronic illnesses may be because of the research method used. However, there's no documented literature suggesting that stress alone could affect an individual to develop hypertension (Pattusi 2010).

5.4 Lifestyle risk factors contributing to hypertension among adults attending OPD

Lifestyle risk factors associated with hypertension according to my study found that excessive consumption of alcohol can lead to occurrence of hypertension because alcohol can cause atherosclerosis thus leading to hypertension.

In comparison to Mancia*et al.*, (2007), it is indicated that too much consumption of alcohol increases blood pressure. My study found statistically significant lifestyle risk factor which can lead to occurrence of hypertension is alcohol consumption. However, other factors were also significant like high salt consumption, smoking, excessive weight gain and drug use.

According to existing literature, other scholars for example Kelley, (2012) and Fagard (2007) noted that physical activity has an independent cardio protective effect thus reducing the occurrence of hypertension. Therefore according to my study and other scholars, it is very important to carry out physical activity in order to prevent the occurrence of hypertension.

CHAPTER SIX: LIMITATIONS

6.0 Introduction

Methodological issues; factors that influenced the study were not differentiated. The study should not have included Essential hypertension because this could have affected the results.

Selection bias in that cases and controls were not comparable because the patients and controls were got from the out patients department in Masaka regional referral hospital. This resulted into either over estimation or under estimation of the odds ratio (effect measures).

Recall bias could have occurred where cases were probably more likely to associate their disease status with the risk factors studied than the controls resulting into over estimation of effect measures (odds ratio)

The results of this study may only be generalised to hypertensive patients who attended out patients department at Masaka regional referral hospital hence external validity may not be achieved.

Time limitation because besides the research work, there were other course units to cover which were also time demanding in terms of reading, course works and class presentations.

Financial constraints were another limitation since it required much money for typing, printing, internet search and photocopying.

Language barrier especially for those who may not know how to read and write and require extra time for translation of the questions that will be in an English language

6.1 Conclusions

Under socio-demographic factors occurrence of hypertension was found to be associated with patients aged 26 years or more and those who are employed.

Individual risk factors; this study found that those with family history of hypertension and those who were obese were found to be associated with the occurrence of hypertension.

Lifestyle risk factors; current consumers and past consumers of alcohol were found to be at risk of developing hypertension.

6.2 Recommendations

- Health workers should create awareness and carry out community out reaches in the hard to reach areas.
- The government should regulate alcohol consumption
- Encourage people especially at the community level to routinely go for medical check-ups

- Health educating people on the importance of eating health and balanced diet and encourage them to stop adding raw salt in their meals and avoiding fatty foods.
- Health educate people on the importance of physical exercises and discouraging them from living sedentary lifestyles
- Government officials should ensure that all health units are well equipped with health workers who are well trained to diagnose hypertension and making sure that they are fully stocked with essential drugs that help in management of hypertension.

REFERENCES

A Meta-Analysis of Randomized Controlled Trials.*Hypertension* 2012.Retrieved on January16, 2015.

Aaron KJ, Sanders PW. *Role of dietary salt and potassium intake in cardiovascular health and disease: a review of the evidence. Mayo Clin Proc*. 2013; **88**:987-95.

Abed Y. and Abu-Haddaf S. (2013): Risk Factors of Hypertension at UNRWA Primary Health Care Centers in Gaza Governorates. Received 4 January 2013; Accepted 30 January 2013

Addo J, Smeeth L, Leon DA, (2007). Hypertension: Review Hypertension in Sub-Saharan Africa: a systematic review. 50(6):1012-8.

Adeloye D and Basquill C., (2014). Estimating the Prevalence and Awareness Rates of Hypertension in Africa: A Systematic Analysis. PLoS ONE 9(8): e104300. doi:10.1371/journal.pone.0104300

Agatha Ayebazibwe, (2012). 'One in three adults has high blood pressure', daily monitor, posted May 22 2012. Retrieved from: http://mobile.monitor.co.ug/News/One-in-three-adults-has-high-blood-pressure/-/691252/1410902/-/format/xhtml/-/9ugd6m/-/index.html, on May 23 2015.

Al-Said, J. (2005), "The prevalence of hypertension in Persian Gulf countries and its correlation with demographic and socio-economic factors", Journal of Hypertensions, Vol. 23 No. 6, pp. 1275-2777.

American Heart Association, (2013). High Blood Pressure - 2013 Statistical Fact Sheet

Barnes, Vernon, et.al., (2015). Impact of Transcendental Meditation on Ambulatory Blood Pressure in African-American Adolescents.*American Journal of Hypertension* 2012.

Benjamin Sensasi, (2013) Uganda commemorates World Health Day 2013, Health Promotion Advisor, WHO Country Office

Black J.W, Stephenson J.S, (1962). Pharmacology of a new adrenergic beta-receptor blocking compound.*Lancet* 1962; 2:311-315

Booth J, (1977). *A short history of blood pressure measurement.Proc Royal Soc Med. 1977; 70: 793–799*

Critchley J, Capewell S. Smoking cessation for thesecondary prevention of coronary heart disease. Cochrane Database Syst Rev 2004:CD003041.

Curry, T. B. (2013). Hypertension: is it more than just a numbers game?.*The Journal of physiology*, *591*(Pt 23), 5805.

Dalai N., Cui H., Yan M., Rile G., Li S., Su X. (2014): Risk factors for the development of essential hypertension in a Mongolian population of China: a case-control study. Genet Mol Res. 2014 Apr 29;13(2):3283-91. doi: 10.4238/2014. April.29.6.

Devadason P., Sabarinath M., Dass R. R., Sameena A., Fathima S. S., Mathiarasu A. M., (2014): Risk Factors for Hypertension and its Complications – A Hospital Based Case Control Study. International Journal of Interdisciplinary and Multidisciplinary Studies (IJIMS), 2014, Vol 1, No.4, 160-163. ISSN: 2348 – 0343

Edwards R, Unwin N, Mugusi F, Whiting D, Rashid S, Kissima J, AsprayTJ, AlbertiK.G, (2000). Hypertension prevalence and care in an urban and rural area of Tanzania. 18(2):145-52.

Fagard RH, *Cornelissen VA (2007).Effect of exercise on bloodpressure control in hypertensive patients*. Eur J CardiovascPrevRehabil 2007;14:12-7.

Fields, L. E., Burt, V. L., Cutler, J. A., Hughes, J., Roccella, E. J., &Sorlie, P. (2004). The burden of adult hypertension in the United States 1999 to 2000 a rising tide. *Hypertension*, *44*(4), 398-404.

Gasperin, D., Netuveli, G., Dias-da-Costa, J. S., &Pattussi, M. P. (2009). Effect of psychological stress on blood pressure increase: a meta-analysis of cohort studies. *Cadernos de SaúdePública*, *25*(4), 715-726.

Geleijnse JM, Grobbee DE and Kok FJ (2005): Impact of dietary and lifestyle factors on the prevalence of hypertension in western populations. Journal of Human Hypertension (2005) 19, S1–S4

Goldstein, I. B., Shapiro, D., & Weiss, R. E. (2008). How family history and risk factors for hypertension relate to ambulatory blood pressure in healthy adults. *Journal of hypertension*, *26*(2), 276-283.

Guduri GB, Bhimarasetty DM, Sreegiri S, B TN (2014): Socio-demographic determinants for hypertension in pregnancy a case-control study in a tertiary care hospital of Visakhapatnam, Andhra pradesh. Int J Res Health Sci [Internet]. 2015;3(1):93-8. Available from http://www.ijrhs.com/issues.php?val=Volume3&iss=Issue1 ISSN (0): 2321-7251

He FJ& MacGregor GA (2004).Effect of longer-term modest saltreduction on blood pressure. Cochrane Database Syst Rev2004:CD004937

Hendriks ME, Wit FW, Roos MT, Brewster LM, Akande TM, de Beer IH et al.. *Hypertension in Sub-Saharan Africa: cross-sectional surveys in four rural and urban communities. PLoS One*. 2012; **7**: Article ID e32638

Kasim K., Amar M., El-Aziz El Sadak A., (2007): Some socio-demographic and lifestyle factors associated with primary arterial hypertension: A hospital-based case control study.The Egyptian Journal of Community Medicine 01/2007; 2:61-73. Availablefrom:http://www.researchgate.net/publication/215627127_Some_sociodemographic _and_lifestyle_factors_associated_with_primary_arterial_hypertension_A_hospital-based_case_control_study [accessed Sep 2, 2015].

Kayima J, Wanyenze RK, Katamba A, Leontsini E, Nuwaha F. *Hypertension awareness, treatment and control in Africa: a systematic review. BMC Cardiovasc Disord*.2013; **13**:1-11.

Kearney PM, Whelton M, Reynolds K, Muntner P, WheltonPK, He J. (2005). Global burden of hypertension: analysis of worldwide data. Lancet.2005;365:217–223.

Kearney, P.M., Whelton, M., Reynolds, K., Whelton, P., & He, J. (2004). Worldwide prevalence of hypertension: a systematic review. *Journal of Hypertension*, vol. 22, pp. 11–19, 2004.

Kelley, G. (2012). Progressive Resistance Exercise and Resting Blood Pressure

Khan NA, Hemmelgarn B, Padwal R, Larochelle P, Mahon JL,LewanczukRZ, et al (2007). The 2007 *Canadian HypertensionEducation Program recommendations for the managementof hypertension*: Part 2 therapy. Can J Cardiol 2007;23:539-50.

Klein I, Danzi S. Thyroid disease and the heart. Circulation 2007; 116:1725.

Klein I, Ojamaa K 2001 Thyroid hormone and the cardiovascular system. N Engl J Med 344:501–509

Kotchen TA. *Obesity-related hypertension: epidemiology, pathophysiology, and clinical management*. *Am J Hypertens*.2010; **23**:1170-8.

KotchenT.A, (2011). "Historical trends and milestones in hypertension research: a model of the process of translational research". *Hypertension*58 (4): 522–38.

Kotwani P, Kwarisiima D, Clark TD, Kabami J, Geng EH, Jain V et al..*Epidemiology and awareness of hypertension in a rural Ugandan community: a cross-sectional study*. *BMC Public Health*.2013; **13**:1151.

Mancia G, De Backer G, Dominiczak A, Cifkova R, Fagard R,Germano G, et al. (2007)*Guidelines for the Management ofArterial Hypertension. The Task Force for the Managementof Arterial Hypertension of the European Society of Hypertension (ESH) and of the European Society ofCardiology (ESC)*. J Hypertens 2007;25:1105-87.

Musinguzi G, Nuwaha F. Prevalence,awareness and control of hypertension in Uganda. *PLoS One*. 2013; **8**: Article ID e62236

National Heart Foundation of Australia (2008).*Summary ofevidence statement on the relationships between dietaryelectrolytes and cardiovascular disease*. Retrieved from: http://www.heartfoundation.org.au/document/NHF/NHFA_DietaryElectrolytes_CVD_Summ aryofEvidenceSt_2006_FINAL.pdf [cited 2008 Nov 10]

Nygren K., Gong W., Hammarstrom A., (2015): Is hypertension in adult age related to unemployment at a young age? Results from the Northern Swedish Cohort.Scand J Public Health. Feb. 2015 43(1):52-8. doi: 10.1177/1403494814560845. Epub 2014 Nov 27.

Ojamaa K, Kenessey A, Klein I 2002 Thyroid hormone regulation of phospholamban phosphorylation in the rat heart. Endocrinology 141:2139–2144

Osman F, Franklyn JA, Holder RL, et al. Cardiovascular manifestations of hyperthyroidism before and after antithyroid therapy: a matched case-control study. J Am CollCardiol 2007; 49:71.

Parati G., et al. A new solar-powered blood pressure measuring device for low-resource settings. Hypertension,2010, 56; 1047-1053.

Patnaik, N. C. Sahani, T.Sahu*et al* 2005. A Study on Hypertension in Urban Slum of Brahmapur, Orissa, journal of community medicine, Indian association of preventive and social medicine Orissa chapter.

Pattussi, M. P. (2010): Effect of psychological stress on blood pressure increase: a meta-analysis of cohort studies Daniela GasperinGopalakrishnanNetuveli Juvenal Soares Dias-da-Costa.

Reaven, G. (2015). Relationship between Insulin Resistance and Hypertension.*Diabetes Care*.

Reddy K.S and Yusuf S. (1998).Emerging epidemic of cardiovascular disease in developing countries.Circulation.97(6):596–601.

Swales J.D., (1995).Manual of hypertension. Oxford: Blackwell Science. pp. xiii.ISBN 0-86542-861-1

Theodore A K. Hypertensive vascular disease. In: Harrison's Internal Medicine, 17th edition. Mc-Graw Hill; 2008.p 1549.

Tochikubo, Osama, et.al. (2015). Effects of Insufficient Sleep on Blood Pressure Monitored by a New Multibiomedical Recorder." *Hypertension* 1996.

Twagirumukiza M, De Bacquer D, Kips JG, de Backer G, Stichele RV, Van Bortel LM. *Current and projected prevalence of arterial hypertension in sub-Saharan Africa by sex, age and habitat: an estimate from population studies*. *J Hypertens*.2011; **29**:1243-52.

Wamala JF, Karyabakabo Z, Ndungutse D, Guwatudde D (2009): Prevalence factors associated with Hypertension in Rukungiri District, Uganda - A Community-Based Case Control Study. African Health Sciences 2009; 9(3): 153-160

WHO, author. Health expectancy is more important than life expectancy - Message from the WHO Director General on The World Health Report 1998. Geneva, Switzerland: World Health Organization; 2002. pp. v–vi

Williams A. The Blood Pressure of Africans. East Africa Med J. 18:109–117.

Wolf-Maier, K., Cooper, R. S., Banegas, J. R., Giampaoli, S., Hense, H. W., Joffres, M., &Vescio, F. (2003). Hypertension prevalence and blood pressure levels in 6 European countries, Canada, and the United States.*Jama*, *289*(18), 2363-2369.

World Health Organization, (2013).A global brief on Hypertension.Silent killer, global public health crisis.

World Health Organization.A global brief on hypertension.World Health Day 2013. http://apps.who.int/iris/bitstream/10665/79059/1/WHO_DCO_WHD_2013.2_eng.pdf?ua=1. Accessed 29 Oct 2014.

Zachariah M G, Thankappan K R, Alex S C. Prevalence, correlates, awareness, treatment, and control of hypertension in a middle-aged urban population in Kerala. Indian Heart J. 2003 May-Jun; 55(3):245-51

Zhou, L., Chen, Y., Sun, N., & Liu, X. (2008).Family history of hypertension and arterial elasticity characteristics in healthy young people.*Hypertension Research*, *31*(5), 833.

APPENDIX I: CONSENT FORM

RISK FACTORS ASSOCIATED WITH HYPERTENSION AMONG ADULTS ATTENDING OUTPATIENT CLINIC IN MASAKA REGIONAL REFERRAL HOSPITAL

I am conducting a study on risk factors associated with hypertension among adults attending outpatient clinic in Masaka Regional Referral Hospital. I am going to ask you questions about your health behaviour and diet. I will also take health measurements like blood pressure, weight and height. If I find out that your measurements are out of normal range I will refer you to the physician for further management.

 If you are willing to participate, please sign this form.

Patient Signature/ thumbprint: ....

Name:...

Date: ....

Name of witness:……………………………………………………

Signature:……………………………………………………………….

Date:…………………………………………………………………….

Name of person taking consent:…………………………………………………….

Signature:………………………………………….

Date:………………………………………………………….

Thank you very much for agreeing to participate in this research.

APPENDIX II: QUESTIONNAIRE

Dear respondent, my name is Victor Nanono, a student from International Health Sciences University (IHSU) carrying out research on the *riskfactors associated with hypertension among adults attending out patients' clinic in Masaka regional referral hospital.*The investigation is purely for academic research purposes and all the information that will be presented will be kept strictly confidential. You have been identified as a resourceful person to this study. Therefore, your responses are much welcome. Thanks for your participation.

SECTION A: Social demographic aspects of the respondents

Under this section, please tick the option that best describes you.

Q1. Disease status of respondents

   a) Case　( )　　　　b) Control ( )

Q2. Gender

   a) Male　( )　　　　b) Female ( )

Q3**.** Age bracket

   a) 18-25 years( )　b) 26-34 years ( )　c) 35-44 years ( )　d) 45 years & above ( )

Q4**.** Education level

   a) None ( )　b) Primary ( )　c) Secondary　( )　　d) Tertiary ( )

Q5. Religious affiliation

   a) Christian ( )　b) Muslim ( )　c) Others (please specify, …..……………………)

Q6. Marital status

   a) Single ( ) b) Married ( )　　c) Divorced ( ) d) Widowed ( )

Q7**.** Occupation of respondent

   a) Peasant ( )　b) Public servant ( )　c) Self-employed ( ) d)Private sector employee

    e) Unemployed ( )

Q8. Are you employed?

   a) Yes ( )　　b) No ( )

Q9. What is your monthly income?

   a) 100,000/= or less ( )　b) More than UgShs 100,000 ( )

SECTION B: Individual risk factors

Q10. One of my relatives has ever been diagnosed with high blood pressure

   a) Yes ( )　　　　b) No ( )

Q11. If yes, how was it treated?

a) Received treatment from a hospital ( ) b) was never treated ( )

Q12.Have you ever suffered from one or more of the following conditions such as thyroid disease, stress, chronic illness, diabetes, obesity?

    a) Thyroid disorders: Yes ( )   No ( )

    b) Stress: Yes ( )   No ( )

    c) Chronic illness: Yes ( ) No ( )

    d) Obesity: Yes ( )   No ( )

    e) Diabetes: Yes ( )   No ( )

Q13. Indicate your weight in kilograms

    a) Less than 50 kg ( )   b) 50-59 kg ( )   c) 60-69 kg ( ) d) 70 kg & above ( )

Q14. What is your height in meters?

    a) 1 meter & less ( )   b) 1-1.5 meters ( )   c) 1.6 – 2 meters ( )   d) > 2 meters
    ( )

Q15. Compute BMI in Kg/m^2 ……………………………………………………………

SECTION C: Lifestylerisk factors

Q16. Have you ever smoked cigarettes in your life?

    a) Yes ( )   b) No ( )

Q17. Do you usually add more table salt to your meals?

    a) Yes ( )   b) No ( )

Q18. Have you ever consumed alcohol before or not?

    a) Never used before ( )b) Current alcohol consumer ( )   c) Past alcohol user ( )

Q19. Have you been exercising regularly in the last ten years?

    a) Yes ( )   b) No ( )

Q20.Have you ever used drugs such as khat, marijuana, cocaine or heroin in the last ten years?

    a) Yes ( )   b) No ( )

APPENDIX III: INTRODUCTORY LETTER

IHSU INTERNATIONAL HEALTH SCIENCES UNIVERSITY

making a difference in health care

Office of the Dean, School of Nursing

Kampala, 26ᵗʰ October 2015

TO ....
THE HOSPITAL DIRECTOR ....
MASAKA REGIONAL REFERRAL HOSPITAL
P.O. BOX 18 ....

Dear Sir/Madam,

RE: ASSISTANCE FOR RESEARCH

Greetings from International Health Sciences University.

This is to introduce to you **Nanono Victor** Reg No. **2012-BNS-TU-054** who is a student of our University. As part of the requirements for the award of a Bachelors degree in Nursing of our University, the student is required to carry out research in partial fulfillment of her award.

Her topic of research is: **Risk factors associated with hypertension among adults attending Out Patients Clinic in Masaka Regional Referral Hospital**

This therefore is to kindly request you to render the student assistance as may be necessary for her research.

I, and indeed the entire University are grateful in advance for all assistance that will be accorded to our student.

Sincerely Yours,

[Stamp: IHSU 2 6 OCT 2015 SCHOOL OF NURSING Uganda]

Mrs. Wafula Elizabeth
Dean

[Handwritten: To proceed for data collection using the tools and methodologies as presented in the proposal]

[Stamp: MASAKA REGIONAL REFERRAL HOSPITAL 2 4 NOV 2015 MASAKA P.O. BOX 18]

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