KAMUZU COLLEGE OF NURSING

ASSESSMENT OF KNOWLEDGE AND PRACTICES ON HYPERTENSION AMONG ADULT OUTPATIENTS OF UNKNOWN HYPERTENSION STATUS AT NATHENJE HEALTH CENTRE IN LILONGWE, MALAWI

A Thesis Submitted to the Faculty of Nursing in the University of Malawi, Kamuzu College of Nursing, in Partial Fulfilment of the Requirements for the Degree of Master of Science in Adult Health Nursing

PEMPHO CAROL KATANGA

(Bachelor of Science in Nursing, University Certificate in Midwifery)

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Declaration

I, Pempho Carol Katanga, declare that this thesis on "Assessment of knowledge and practices on hypertension among adult outpatients of unknown hypertension status at Nathenje Health Centre in Lilongwe, Malawi", is entirely my own work except for sources which have been specifically acknowledged. I have not presented the thesis for any award at any University within or outside Malawi.

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Signature

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Date

Certificate of Approval

We, the undersigned, hereby certify that this is Pempho Carol Katanga's own work and that it has been submitted with our approval.

Main Supervisor : Ezereth Kabuluzi, PhD

Signature : _____

Date : _____

Co-Supervisor : Mandayachepa Nyando, PhD

Signature : _____

Date : _____

Dedication

This thesis is dedicated to my heavenly Father for he has supported me throughout the whole process; to my two little ones; Adrian and Faith, for persevering during the whole time mummy was busy with her school work; and also to my mother; Hilda, for her untiring support and encouragement.

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Abstract

Introduction: Hypertension is one of the most common non-communicable diseases with a high burden of disease both globally and locally. In Malawi, it is prevalent in about a third of the adult population, and is estimated to be the second leading cause of deaths. It places a great economic burden yet 94.9 % of hypertensive adults are not aware of their state. Adequate hypertension control requires public awareness which facilitates adoption of healthy lifestyles by individuals.

Study objectives: The main objective of the study was to determine knowledge and practices on hypertension among adults of unknown hypertension status in the general outpatient department of Nathenje Health Centre in Lilongwe, Malawi. The specific objectives were to (i) assess knowledge of adults on hypertension, (ii) identify sources of information about hypertension among adults, (iii) describe practices of adults that relate to hypertension, (iv) determine the prevalence of modifiable risk factors for hypertension among adults, and (v) examine the relationship between awareness of hypertension and participants' age, education, marital status, gender and number of health facility visits.

Methods: A quantitative cross sectional study was conducted among 384 adults, aged 18 years and above, at Nathenje Health Centre. Systematic random sampling was used to select participants. Data were collected using a questionnaire and was analysed using SPSS version 20; descriptive statistics and Pearson's Chi square test were used in the analysis.

Results: Among the study participants, 40.6 % had never heard about hypertension. Stress, excess salt intake and diabetes were the most well known risk factors. Only 11.4 % of those who had heard about hypertension were aware of the asymptomatic nature of hypertension, 28.5 % were aware of the lifelong nature of hypertension treatment, 64.9 % were aware that hypertension has complications and 64.5 % knew that hypertension can be prevented. Misconceptions regarding hypertension were present. Association was noted between awareness of hypertension and participants' age ($p = 0.021$) and education level ($p = 0.000$).

Conclusion: The study highlights the presence of knowledge gaps and practices that facilitate hypertension development. Gaps and opportunities in the role of health workers and institutions in hypertension prevention have been highlighted. Prevention strategies for hypertension to include the effective use of information dissemination channels.

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List of Abbreviations and Acronyms

AIDS : Acquired Immune Deficiency Syndrome

BMI : Body Mass Index

DALYs : Disability Adjusted Life Years

DBP : Diastolic Blood Pressure

COMREC : College of Medicine Research and Ethics Committee

CVD : Cardiovascular Diseases

HIV : Human Immune Deficiency Virus

HTN : Hypertension

NCDs : Non-communicable diseases

OPD : Outpatient Department

SBP : Systolic Blood Pressure

SPSS : Statistical Package for the Social Sciences

SSA : Sub-Saharan Africa

Operational Definitions

Awareness of hypertension: Knowledge about the existence of hypertension, a state of ever having heard about hypertension.

Height: Height of a participant standing on a height board without shoes.

Hypertension: Persistent systolic blood pressure of 140 mmHg or more, diastolic blood pressure of 90 mmHg or more, or current use of antihypertensive medication.

Knowledge of hypertension: Knowledge on the individual aspects of hypertension which are the definition, causes, risk factors, diagnosis, treatment, complications, and prevention.

Knowledge sources: Any medium through which an individual has ever learnt about hypertension.

Obesity: A body mass index measure of 30 or more.

Overweight: A body mass index measure from 25 to 29.9.

Physical activity: Any activity that is physically taxing.

Practices that relate to hypertension: Any actions taken by an individual that can either facilitate or hinder the development of hypertension.

Weight: The weight of a participant standing on a digital scale without shoes and without heavy clothing.

Chapter One

Introduction and Background

Introduction

Hypertension is a significant public health problem worldwide and is also the most common non-communicable disease among adults in Malawi. It is defined as a persistent systolic blood pressure (SBP) of 140 mmHg or more, diastolic blood pressure (DBP) of 90 mmHg or more, or current use of antihypertensive medication (Lewis, Dirksen, Heitkemper, & Bucher, 2014). According to a statement by the American Society of Hypertension and the International Society of Hypertension, a diagnosis of hypertension is confirmed if the blood pressure reading is ≥ 140/90 mmHg at an additional clinic visit that is made one to four weeks after the first measurement (Weber et al., 2014).

Hypertension is often called the silent killer because it is usually asymptomatic until it becomes severe and target organ disease occurs. According to Lewis et al. (2014), sustained hypertension affects the cardiovascular, neurologic, and renal systems as it brings about complications such as hypertensive heart disease, cerebrovascular disease, peripheral vascular disease, nephrosclerosis, and retinal damage, all of which have serious consequences on an individual's life and quality of life.

Adequate knowledge of hypertension among the general public has been noted as a pre-requisite to sufficient recognition and control of hypertension (Oladapo, Salako, Soyinka, & Falase, 2013). It has also been noted that most adults engage in unhealthy lifestyles due to

ignorance about hypertension and that enhancing knowledge on hypertension enables health promotion programs to be effective in achieving hypertension prevention (Onyekwere, Okwuchi, and Samuel 2013).

Primary prevention of hypertension is regarded as a cost effective approach; it includes interventions that focus on undertaking lifestyle modifications including facilitating engagement in healthy practices and is intended to prevent or delay the onset of hypertension in people who are at risk (Zafar, Gowani, Irani, & Ishaq, 2008). According to Onyekwere et al. (2013), inability to adequately prevent or manage hypertension can be attributed to inadequate knowledge of adults on the same. Onyekwere et al. further state that identification of adults' knowledge on hypertension is a pre-requisite for the design of effective and appropriate hypertension prevention programs.

Background

Worldwide, hypertension is one of the most common non-communicable diseases (NCDs) and it is estimated to cause 7.1 million premature deaths, 4.5 % of the global disease burden, and 64 million disability adjusted life years (DALYs) (World Health Organization & International Society of Hypertension Writing Group, 2003). It was noted in the Malawi national STEPS survey report that previously NCDs were considered as a significant health problem for developed countries only and were at times referred to as *diseases of "the affluent, the west, or of urbanisation"* (Malawi Ministry of Health & World Health Organisation, 2010). This is deemed to have led to the disregard of NCDs on the priority list of public health problems in developing countries. Consequently, NCDs and their risk factors have become the cause of a high burden of disease and untimely deaths in developing nations.

Hypertension is currently regarded as an important contributor to the rising burden of cardiovascular disease in Sub-Saharan Africa (SSA); this burden is expected to nearly double by the year 2030 (Ataklte et al., 2015). The global burden of disease study conducted in 2001 discovered that 20 % of deaths in SSA were due to NCDs (Lopez, Mathers, Ezzati, Jamison, & Murray, 2006). Ataklte et al. (2015), in a systematic review on the burden of hypertension in sub-Saharan Africa, noted that the hypertension prevalence from the various studies included in the review ranged from 14.7 % to 69.9 %. This is quite high and demonstrates the great burden that hypertension presents upon sub-Saharan Africa. Harries, Jahn, Zachariah, and Enarson (2008) also note that there are challenges in the management and follow up of clients with NCDs, including hypertension in sub-Saharan Africa; highlighting the need for effective preventive services.

Furthermore, hypertension has been implicated as the major cause of sudden cardiac deaths (Rotimi, Fatusi, & Odesanmi, 2004). Rotimi et al. (2004), in Nigeria studied the circumstances of death in cases of sudden deaths through the review of medico-legal autopsy results. They noticed that hypertensive heart disease was the cause of 66 % of the deaths; clearly indicating the dangers associated with unprevented, undetected, and uncontrolled hypertension.

The prevalence of hypertension for Malawi is 32.9 % amongst the adult population (Ministry of Health, 2011). This figure represents about a third of the Malawian adult population and is followed by cardiovascular diseases (CVD) which rank at 8.9 % indicating a difference of 24 % between the most prevalent and the second most prevalent NCD. It has been established that hypertension can complicate to CVD (Oladapo et al., 2013). As such, the high prevalence of hypertension in Malawi may be regarded as also contributing towards the worrisome burden of cardiovascular diseases in Malawi.

The Malawi Ministry of Health and the World Health Organisation (Ministry of Health & World Health Organisation, 2010) describe NCDs as the fourth cause of all DALYs, representing 12 % of all DALYs amongst the Malawian population. Non communicable diseases are further estimated to be the second leading cause of deaths in adults after HIV/AIDS. Apart from contributing towards morbidity and mortality, NCDs present a major setback for health systems that are already overburdened and under-funded. Unwin et al. (2001) note that patients with NCDs, of which hypertension is one, make significant demands on the already limited health care resources in SSA.

One of the major concerns regarding hypertension in Malawi is that 94.9 % of adults who have high blood pressure do not know that they have this condition (Msyamboza et al., 2011). Msyamboza et al. (2011) further note a challenge in hypertension screening at both clinical sites and in the community, which presents a missed opportunity for early detection of hypertension amongst Malawian adults. Consequently, the population is vulnerable to late detection of hypertension and development of related complications, including sudden deaths.

Ataklte et al., (2015) in a systematic review on the burden of undiagnosed hypertension in sub-Saharan Africa noted that Malawi was one of the countries with the lowest level of hypertension awareness (self-report of prior diagnosis of high blood pressure by a health professional) among the sub-Saharan African countries that were included in the review. This lack of awareness can affect adoption of healthy lifestyle practices by an individual which is a barrier to effective prevention and control of hypertension. This can, in turn, facilitate progression to severe and complicated disease which reduces the quality of life for that individual and also increases the cost of caring for them (Zafar et al., 2008). Hypertension, if not well controlled, is likely to contribute to a higher burden of disease associated with NCDs than it currently does

(Ataklte et al., 2015). If the predictions by Ataklte et al. that the burden of cardiovascular diseases is expected to nearly double by the year 2030, the hypertension prevalence for Malawi may be 65.8 % by the year 2030 if appropriate preventive measures are not instituted.

There is paucity of information on knowledge about hypertension in Malawi, especially among the general population. Consequently, no local studies were found on knowledge of the general adult population on hypertension. Several studies (Oladapo et al., 2013; Onyekwere et al., 2013; Azubuike & Kurmi, 2014), however, have been conducted in other countries and among different populations to assess knowledge on hypertension. From the studies that were reviewed, it is evident that the knowledge on hypertension is insufficient to promote the uptake of healthy lifestyles and that there are associated misconceptions which affect individual perception of risk for hypertension development. The varying levels of knowledge and the various differences in results make it difficult to adapt results of studies that were conducted elsewhere to the Malawian context. It is necessary that knowledge gaps for the general adult population in Malawi be identified so that education programs are designed to effectively address the particular needs of the local populace.

Chingatichifwe, Dodge, Chideme-Munodawafa, Mwale, and Bvumbwe (2014) conducted a cross sectional analytic study at Mzuzu Central Hospital in Malawi to explore the adoption of healthy lifestyles for secondary prevention of stroke, diabetes and hypertension among clients with these conditions. They discovered that the participants generally displayed less knowledge with regards to NCDs. Based on the results of this study, it may be assumed that knowledge could be worse among the general public because it is expected that hypertensive individuals are given specific health education about their condition whereas the general public may not have as much a privilege as the hypertensive patients. Since this study was done among patients with

cardiovascular diseases, it is necessary to also assess hypertension knowledge among those who are currently non-hypertensive and those of unknown hypertension status.

There is no current information on adoption of healthy lifestyles by the general adult population in Malawi. Even though the Malawi national STEPS survey conducted in 2009 by Msyamboza et al. (2011) notes the prevalence of risky behaviors for hypertension, practices may have changed following the implementation of activities that are in line with the Malawi NCD action plan objective "to improve public awareness about NCDs and their risk factors by 2016" (Malawi Ministry of Health, 2012b). Identification of current practices will provide information that will guide in the design of effective health education programs aimed at promoting adoption of healthy lifestyle among Malawian adults.

In previous studies, associations have been made between knowledge of hypertension and adoption of healthy lifestyles (Oladapo et al., 2013; Onyekwere et al., 2013; Azubuike & Kurmi, 2014; Chingatichifwe et al., 2014). For instance, the results of the study by Chingatichifwe et al. (2014) established a strong association between health education and participant‘s opinion that they were practicing/living a healthy life style; those who received health education were 10 times more likely to mention that they lived a healthy lifestyle than those who did not receive health education. In addition Onyekwere et al. (2013) note that most adults engage in unhealthy lifestyles due to ignorance about hypertension.

Zafar et al. (2008) suggest that a comprehensive strategy for reduction in mortality and morbidity due to hypertension must include strategies for increased awareness, preventive practices, and early detection of the condition among others. Considering that hypertension detection strategies in Malawi are not yet optimal and that there is a high prevalence of risk factors

for development of hypertension, it is important that the general public be made aware of their chances for developing hypertension, the practices that are necessary for prevention of hypertension, and the problems that may arise in the absence of such practices. Deficits noted in knowledge and practices related to hypertension and its prevention must inform the design of effective strategies to increase public awareness of the condition and promote the adoption of the highly needful lifestyle modifications that will delay the onset of hypertension. This would help to reduce the incidence of cardiovascular diseases which happen to be on the rise in Malawi. It may also help to instill in the general public the demand for and utilisation of hypertension screening services.

Problem Statement

Modifiable risk factors for hypertension among the adult population in Malawi were discovered during a nationwide study on non-communicable diseases conducted by Msyamboza et al. (2011). The risk factors noted include tobacco smoking, excessive alcohol drinking, obesity and physical inactivity. Consequently, non-communicable diseases, which include hypertension, are the second leading cause of deaths among adults in Malawi (Malawi Ministry of Health & World Health Organisation, 2010).

Assmann, Cullen, and Schulte (1998) note that the presence of any individual risk factor can contribute to overall increase in blood pressure and that adequate hypertension control is only possible in the presence of public awareness of risk factors and presenting features. However, the silent presentation of hypertension means that most people, in the absence of early detection strategies, discover that they have the condition when they have already developed complications. This denies such individuals a chance to adopt preventive lifestyle modifications to delay onset of

the condition and prevent the occurrence of its complications which, according to Oladapo et al. (2013), include stroke, heart attack, angina, heart failure, kidney failure, and poor vision.

According to Msyamboza et al. (2012), 32.9 % of Malawian adults have hypertension and 94.9 % of these hypertensive adults do not know that they are hypertensive. Nathenje rural area in Lilongwe district faces challenges in regards to early detection of hypertension due to the absence of hypertension screening programs within the area which places the adults of Nathenje area at risk of illness and untimely deaths from hypertension and its complications.

Significance of the Study

The Malawi National Health Research Agenda (Malawi Ministry of Health, 2012a) recognised a gap in information regarding knowledge and practices of adults in relation to hypertension as it advocates for the conduct of research that facilitates the development of strategies that will increase awareness of cardiovascular disease risk factors and also awareness on the need for hypertension screening. One of the objectives of the Malawi National Action Plan for prevention and management of NCDs is to improve public awareness about NCDs, including cardiovascular diseases and their risk factors by 2016 (Malawi Ministry of Health, 2012b). However, no data have been found regarding how much adults of unknown hypertension status in Malawi know about hypertension, its risk factors, complications and prevention. Neither is there current information on the practices, deliberate and non-deliberate, undertaken by adults that may either facilitate or impede the development of hypertension and resultant cardiovascular disease.

No literature was found regarding the sources of information that people have on hypertension in Malawi. No study has ever been conducted in Nathenje area to identify knowledge and practices of adults in relation to hypertension. It is important, though, that these sources be

identified because they are channels for dissemination of hypertension related information. Identifying sources of knowledge among the general poplation in Malawi will guide the design of educational programs that are directed toward ensuring effective and appropriate use of the current structures for dissemination of hypertension related information while encouraging those sectors which are supposed to take the lead in information dissemination to do as is required of them. This will play a major role in reducing the hypertension associated burden of disease.

This study will, therefore, bring new information because it will look at the knowledge of hypertension and related practices among adults with no prior diagnosis of hypertension in the area. The results of this study will guide the design of effective strategies for promoting awareness of hypertension among adults and will, therefore, promote the uptake of useful preventive practices. This is expected to contribute significantly to the control of hypertension and its sequelae.

Broad Objective

The broad objective of the study was to determine the knowledge and practices on hypertension among adults of unknown hypertension status in the general outpatient department.

Specific Objectives

1. To assess knowledge of adults on hypertension.
2. To identify sources of information about hypertension among adults.
3. To describe practices of adults that relate to hypertension.
4. To determine the prevalence of modifiable risk factors for hypertension among adults.

5. To examine the relationship between awareness of hypertension and participants' age, education, marital status, gender and number of health facility visits.

Chapter Two

Literature Review

Introduction

This chapter presents a review of the literature on the knowledge and practices of adults regarding hypertension. Kothari (2004) categorises the types of literature that may be reviewed into two; conceptual literature which is concerned with concepts and theories while the second category is of empirical literature which consists of earlier studies regarding the area of interest of the present research. This section will present the empirical literature from studies that were done in relation to knowledge and practices of adults on hypertension.

The literature was searched from online databases, namely; JSTOR, CINAHL, Google scholar, Taylor and Francis online, and Pub Med. Other reviewed articles were handpicked from the reference list of articles that were selected for review from the online search. There was no specific time period that was used to limit the search. Only articles published in the English language were included in the review. The search was undertaken using a combination of the terms hypertension, knowledge, awareness, sources, practices, adults, and Malawi. The actual combinations are hypertension AND (knowledge OR awareness); hypertension AND (knowledge OR awareness) AND sources; hypertension AND practices; (knowledge OR awareness) AND practices AND hypertension; (knowledge OR awareness) AND practices AND hypertension AND adults; (knowledge OR awareness) AND practices AND hypertension AND adults AND Malawi; hypertension AND Malawi; hypertension AND (knowledge OR awareness) AND Malawi; hypertension AND practices AND Malawi.

Burns and Grove (2009) suggest that empirical literature should be presented in organising topics. As such, the empirical literature in this section has been presented under the topics knowledge on hypertension; sources of information on hypertension; and practices that relate to hypertension.

Knowledge of Adults on Hypertension

No local studies were found on knowledge of the general adult population on hypertension. Consequently, most of this section of the review is based on studies that were conducted outside Malawi and among varying populations to assess knowledge of adults on hypertension. These countries include Thailand, Pakistan, Poland, Tanzania, Nigeria and the United Arab Emirates.

Aung et al. (2012) conducted a community based cross sectional survey in Thailand to assess the knowledge and awareness of hypertension and its risk factors among adults and noted worryingly low levels of knowledge with only 57.3 % of the participants having ever heard about hypertension and more than 80 % not fully understanding what hypertension is. Poor awareness on hypertension in Asia was also identified by Zafar et al. (2008) among normotensive and hypertensive inpatients in Pakistan.

Oladapo et al. (2013), in a study among rural adults in Nigeria, further identified poor overall knowledge about hypertension and reported that only 1.4 % of the participants knew the blood pressure levels which constitute hypertension. Oladapo et al., though, did not assess the barriers responsible for the low awareness on hypertension. In contrast, Azubuike and Kurmi (2014) in a study among rural Nigerian women reported that 80.6 % of the participants had ever heard about hypertension.

Oladapo et al. (2013) and Azubuike and Kurmi (2014) both conducted studies on knowledge of hypertension among rural adults in Nigeria with an immense heterogeneity of results possibly due to differences in study setting, population, and sampling methods. Azubuike and Kurmi identified much better levels of knowledge than those discovered by Oladapo et al. Noteworthy is the fact that the participants of this study by Azubuike and Kurmi were all literate as the data were collected using self-administered questionnaires. In addition, participants in the study by Azubuike and Kurmi were selected purposively hence they were not a true representation of the population of women in the study setting. Furthermore, Oladapo et al. focused on adults in general while Azubuike and Kurmi focused on adult women only.

Diwe, Enwere, Uwakwe, Duru, and Chineke (2015) and Onyekwere et al. (2013) studied knowledge of hypertension among the general adult population in Owerri state, Nigeria and both identified high knowledge on hypertension. Onyekwere et al. noted that there was high knowledge on the concept of hypertension among a mixture of urban and rural adults. On the other hand, Diwe et al., who assessed hypertension awareness among bank workers noted overall good knowledge on the definition of hypertension in 98 % of the study participants. Apart from these studies conducted in Nigeria, Mlunde (2007) among adults in Tanzania, a neighbouring country to Malawi, also noted a high level of hypertension awareness (66.8 %) among adult residents of Kinondoni municipality.

Overall poor knowledge on risk factors for hypertension has been reported; Cielecka-Piontek, Styszynski, and Wieczorowska-Tobis (2004) in a study among the elderly in Poland noted that 26 % did not know any risk factor and that 37 % mentioned only one risk factor. Similarly, Aung et al. (2012), in Thailand, noted that 77.5 % of the participants were unaware that

hypertension is a non-communicable disease and further note quite poor knowledge on risk factors. In addition, Zafar et al. (2008) identified low knowledge on alcohol, sedentary lifestyle, gender, age, diabetes and smoking as hypertension risk factors. In regards to other risk factors, however, Zafar et al. identified varying levels of awareness with other risk factors being very well known while others were not. The most known risk factor was stress (90.9 %) and the least known risk factor; race, was mentioned by only 4.1 % of the study participants. Similar to Zafar et al., Shaikh et al. (2011) noted poor knowledge on sedentary lifestyle, gender and age as risk factors for hypertension and further noted poor knowledge on family history as well.

Diwe et al. (2015) also reported poor overall knowledge on hypertension risk factors among 80.4 % of their study participants even though they had good knowledge on the definition of hypertension. This was also noted by Oladapo et al. (2013) who reported that 56 % of their study participants were unable to identify a single risk factor. Azubuike and Kurmi (2014) report that 30.6 % of their study participants could not identify a single risk factor. These observations on poor knowledge on risk factors in Nigeria relate to the results of a study by Mlunde (2007) in Tanzania who also noted the same with only 19.5 % of the participants knowing about hypertension risk factors.

In contrast, Onyekwere et al. (2013) identified high knowledge on risk factors among their study participants with a mean knowledge score of 61.7 %. Onyekwere et al. attribute this to the high level of education of the participants and also to exposure of the participants to hypertension related information. In regards to individual risk factors, the results of several previous studies note good knowledge on excess salt intake (Azubuike and Kurmi, 2014; Zafar et al., 2008; Ailinger, 1982; Shaikh et al., 2011), family history (Azubuike and Kurmi), stress (Zafar et al.,

Shaikh et al.), obesity (Zafar et al., Ailinger, Shaikh et al.), and smoking (Shaikh et al.) as risk factors for hypertension.

Aung et al. (2012), in a study conducted in Thailand, note that 95 % of their study participants felt that they were not at risk of hypertension even though the study detected high blood pressure in 27.5 % of the participants. This suggests a low level of knowledge on risk factors which, if present among non-hypertensive individuals, may negatively affect engagement in preventive behavior. It is therefore, quite crucial that knowledge of the general adult population on risk factors for hypertension be identified in order to note existing gaps necessitating corrective measures. There is very little information in Malawi regarding knowledge of adults on risk factors for hypertension owing to the fact that not much research has been done on the subject area.

Low knowledge on the asymptomatic nature of hypertension was noted by Zafar et al. (2008); only 29.5% of their study participants were aware that hypertension can be asymptomatic. Similarly, Oladapo et al. (2013) report that only 5.8 % of their study participants were aware that hypertension is mostly a silent disease. Oladapo et al. further report that only 1.9 % of the participants were aware that the presence of symptoms usually indicates target organ disease or associated clinical condition.

In contrast, Azubuike and Kurmi (2014) identified good knowledge on the asymptomatic nature of hypertension (61.5%). Of concern, though, in the study by Azubuike and Kurmi is that despite this knowledge, only 44.4 % were aware that blood pressure measurement is the most effective way of detecting hypertension. Notably, some of the participants in the study by Azubuike and Kurmi had hypertension related misconceptions as they thought that hypertension would best be detected by various symptoms such as excessive headache, a feeling of internal heat,

and dizziness. Oladapo et al. (2013) also identified misconceptions about hypertension among their study participants but did not specify the actual misconceptions held.

Misconceptions related to hypertension symptoms were also noted by Zafar et al. (2008) in Pakistan who reported that 70.5 % of the participants in their study were unaware that hypertension can be asymptomatic and thus attributed several symptoms including headaches, dizziness and weakness to hypertension. It is quite interesting that there are similarities in the supposed symptoms of hypertension among both Nigerian and Pakistan populations, even though these countries are in different continents.

Prior studies (Aung et al., 2012; Diwe et al., 2015; Oladapo et al., 2013; Zafar et al., 2008) conducted in Asia and Africa have noted evidence of poor knowledge on treatment of hypertension among adults. In the study by Aung et al., 67.4 % of the participants were ignorant about the lifelong nature of hypertension treatment while 50.5 % of the participants in the study by Zafar et al. (2008) mentioned that hypertension was curable. Also, of concern is that only 2.7 % of the participants in the study by Oladapo et al. (2013) knew that hypertension treatment is for life. Poor knowledge on hypertension treatment was also noted by Diwe et al. (2015) in 86.6 % of their study participants.

In regards to hypertension complications, Zafar et al. (2008) reported the highest level of awareness of stroke (84.1%) and heart disease (76.4 %) as hypertension complications among the normotensive participants of their study while other complications were less well known. According to Zafar et al. the results of their study were instrumental in identifying areas of importance that needed to be considered in the design of hypertension awareness programs for Pakistan. This, altogether, highlights the role which studies conducted on knowledge of

hypertension can play in addressing the burden of disease associated with the condition and speaks of the need for a similar study in Malawi to enable the identification of context specific information to guide the design of locally appropriate and relevant hypertension awareness programs.

Oladapo et al. (2013) noted poor overall knowledge on hypertension complications as only 10.5 % of the participants in their study considered hypertension to be a potentially life-threatening condition. Diwe et al. (2015) also reported poor knowledge of hypertension complications among 59.3 % of their study participants. Azubuike and Kurmi (2014), however, noted slightly better awareness of hypertension complications as 55.6 % of the participants in their study were aware that hypertension could lead to other complications. Azubuike and Kurmi, though, did not report on the knowledge of participants on specific complications but point out that knowledge on complications is likely to enhance positive attitude towards compliance to hypertension treatment and early detection programs.

None of the other studies conducted within Africa reported about participants' knowledge on particular complications of hypertension but rather presented general statements reporting poor knowledge on hypertension complications. It has been noted, though, that awareness of complications is crucial to facilitate preventive behavior (Oladapo et al., 2013; Azubuike and Kurmi, 2014; Onyekwere et al., 2013) hence lack of complication awareness can hinder the uptake of preventive behaviour and also hinder avoidance of facilitative behavior for hypertension. This emphasises the cruciality of identifying awareness of hypertension complications among adults so that knowledge gaps can be addressed accordingly.

Onyekwere et al. (2013) noted differences in the level of hypertension knowledge among people with different education levels. Adults with tertiary education possessed a high level of

knowledge while those with secondary, primary, or no education had a moderate level of knowledge. Onyekwere et al. shared an experience that educated adults have a tendency to attend health awareness programs and speculates that this could have contributed to the differences in knowledge. Abdullahi and Amzat (2011) in a study on hypertension knowledge among university staff in Nigeria also suggest that education may have a positive influence on knowledge of risk factors and complications of hypertension.

In Malawi, Chingatichifwe et al. (2014) in a study among adult clients with hypertension, diabetes, and stroke noted that their participants exhibited less knowledge with regards to NCDs. There was poor knowledge on the definition of hypertension among 88.9% of the participants while 65.1 % lacked knowledge about healthy lifestyle for prevention of hypertension, and 85.7 % were unable to mention hypertension complications. These results denote low knowledge on hypertension among affected individuals which suggests that knowledge may be even worse among the general public. This is so because it is expected that hypertensive individuals are given health education about their condition whereas the general public may not have as much a privilege of access to hypertension related information as hypertensive patients supposedly do. Since this study was done among patients with cardiovascular diseases, it is necessary to also study knowledge on hypertension among the general public.

In regards to risk perception, 95.2 % of the participants in the study by Chingatichifwe et al. (2014) did not think that they would ever suffer from hypertension, stroke, or, diabetes while 71.4 % did not perceive themselves to be at risk of developing complications from the condition that they were at that moment suffering from (hypertension, diabetes, or stroke). This further

indicates lack of awareness on hypertension risk and also suggests low complication awareness among the general population.

The paucity of information on knowledge about hypertension in Malawi especially among the general population highlights the need for a local study on the same in order to identify knowledge gaps that can inform the design of context specific hypertension control strategies in Malawi. All of the studies reviewed, both those from Africa and Asia, have identified varying levels of hypertension awareness among adults. It is evident, though, that the level of knowledge is insufficient to promote the uptake of healthy lifestyles and other preventive practices. In addition, there are associated misconceptions that have been noted to affect risk perception among participants of the various studies. Such misconceptions ought to be known and corrected so that adults are equipped with the right information to facilitate good health seeking behaviour. The varying levels of knowledge and the various differences noted in the studies reviewed make it difficult to adapt the results to the Malawian context hence highlighting the need for a local study in order to ensure that education programs are designed to effectively address the needs of the local populace.

Sources of Information on Hypertension

Information sources can be regarded as channels for dissemination of information (Azubuike and Kurmi, 2014) and, therefore, ought to be considered when strategising on how to reach out to the public with hypertension related messages. No literature, however, was found regarding sources of the information which Malawian adults have on hypertension. In addition, very few studies undertaken elsewhere have focused on information sources in regards to hypertension knowledge.

A cross sectional study conducted in India to assess sources of knowledge among hypertensive patients identified that friends/relatives were the most common source of hypertension related information (36.4 %) followed by mass media which was mentioned by 26.7 % of the participants (Patil, Dabhade, Katare, & Ghongane, 2015). Only 30.3 % of the participants mentioned that their knowledge was obtained from medical and paramedical professionals. The results of this study by Patil et al., though conducted among hypertensive patients in Asia, also portrays the challenges that are present in the provision of health information by health profesionals in Malawi (Ministry of Health, 2011). The results further portray the need to ensure that friends and family have the right information in order to control the spread of misconceptions among the public.

The greatest majority of participants in a study by Akter et al. (2014) among entry level university students in the United Arab Emirates identified the internet (82.6%) as the most common source of hypertension information, closely followed by family members (81.4 %) and then health professionals (72 %). Information gain from the internet was probably high among this group because the participants were university students. Akter also noted high use of print media (59 %) for knowledge gain probably due to the high literacy level of the participants but there was very low mention of the role of television and radio as sources of information on hypertension to the participants.

Iyalomhe and Iyalomhe (2010), in Nigeria, uncovered the crucial role of information from friends, relatives and electronic or print media among hypertensive patients. They noted that 11 % of the participants first believed that they were hypertensive based on what they learnt from friends / relatives or electronic and print media. A similar observation was made by Patil et al. (2015) who

emphasise the crucial role that friends/ relatives play in disseminating hypertension related information. This suggests that the information that was received from friends/relatives was instrumental in facilitating preventive behavior because it prompted the individuals to seek hypertension screening services where it was discovered that they were hypertensive; additionally stressing the significant role of the nature of information received and its sources in the prevention of hypertension.

Oladapo et al. (2013), in Nigeria, identified that the family/friend/opinion leaders of trusted groups category constituted the most common source of medical information as they represented 59.9 % of knowledge sources. Next in line was the media which included radio, public enlightenment programs, and newspapers, who represented 24.6 %. At the bottom of the list was the doctor/nurse/health worker category which represented only 9.1% of the information source for the participants. These results portray an existing gap in health service delivery when it comes to provision of health information for hypertension prevention.

Azubuike and Kurmi (2014), however, identified the hospital (44.1 %) as the greatest source of hypertension information among their study participants indicating varying performance of health workers in different contexts. Azubuike and Kurmi highlight the role of information sources as avenues that could provide opportunities for creating awareness on hypertension related issues and further report that the role of other sources in disseminating hypertension related information was not well reported. Knowledge on information sources for hypertension is, therefore, crucial so that their usage may be maximized for increased efficacy of prevention programs.

The differences noted in the results of the studies by Oladapo et al. (2013) and Azubuike and Kurmi (2014) draw attention to the need to identify knowledge sources among adults in Malawi because information dissemination strategies that would work in one context may not be effective in another. Identifying knowledge sources is critical if the gap in hypertension knowledge is to be narrowed since this information is crucial for the design of effective public education programs.

Practices That Relate To Hypertension

Lifestyle choices are significant in the prevention of hypertension as they affect the presence and absence of modifiable risk factors for the development of hypertension (Chingatichifwe et al., 2014). According to Chingatichifwe et al. (2014), unhealthy lifestyle choices such as tobacco use, excessive alcohol intake, unhealthy diet, and physical inactivity significantly increase the risk of developing NCDs including hypertension. Chingatichifwe et al. (2014) further note that avoiding such behaviour is associated with a reduction in the risk of developing NCDs plus developing disability and deaths related to the same. Msyamboza et al. (2011) also note that a risk factor profile for NCDs provides very useful information that is required for planning NCD prevention and control activities.

In a study to assess knowledge, attitudes and practices towards risk factors for hypertension in Tanzania, Mlunde (2007) noted that many people were unaware of the increasing prevalence of hypertension and further reported that this affected their individual efforts to avoid hypertension risk factors. This highlights the importance of making sure that individuals are aware of risk factors as it suggests that awareness of risk factors facilitates prevention.

The prevalence of various modifiable risk factors for hypertension has been identified in varying levels in various studies (Aung et al., 2012; Mlunde, 2007; Diwe et al., 2015; Olack et al., 2015; Jo et al., 2001; Sagare et al., 2011). These include alcohol intake, smoking, obesity, stress, sedentary lifestyle, and excessive salt intake. Noteworthy is that these studies also identified the presence of both preventive and facilitative behavior for hypertension. It is, therefore, imperative that the presence or absence of the same be noted in Malawi so that positive preventive behaviour can be encouraged and facilitative behavior should be noted and addressed accordingly for the effective prevention of hypertension.

Studies conducted in Asia have reported higher prevalence rates of smoking than those conducted in Africa. Aung et al. (2012), in Thailand, discovered high rates of smoking with 67.8 % of participants as current smokers. Sagare, Rajderkar, and Girigosavi (2011) in India and Jo et al. (2001) in Korea reported smoking prevalence rates of 35.5 % and 33.7 % respectively. Sagare et al. further reported a smoking rate of more than 10 cigarettes per day in 54.1 % of the smoking participants. In contrast, studies conducted in Africa by Mlunde et al. (2007), Diwe et al. (2015) and Olack et al. (2015) reported lower rates of smoking prevalence that ranged from 8.3% to 8.5 %. Olack further reported that smoking was higher in males than females, an observation also reported by Jo et al.

Various studies (Jo et al., 2001; Diwe et al., 2015; Sagare et al., 2011) conducted outside Malawi had differing prevalence levels of alcohol intake with the highest (50.8 %) being noted by Jo et al. (2001) in Korea, closely followed by Diwe et al. (2015) in Nigeria who noted alcohol intake in 50 % of the participants and Aung et al. (2012) in Thailand (49.3%) while Sagare et al. (2011) in India noted a prevalence of 33.6 % and Mlunde (2007) in Tanzania noted a prevalence

of 29.6 %. The observed differences could be due to cultural factors hence making generalization of the results difficult and, thus, presenting a need for identifying current local information on the same. Additionally, in places where the prevalence rates are lower, the lack of education to control the rise in such behaviours that present a risk for hypertension development nurtures an environment that is quite accommodative for perpetuation of behaviours which may further increase the prevalence of hypertension.

Mlunde (2007) notes that a majority of the participants who smoked and consumed alcohol attributed their behavior to a "like" of the substances with few individuals stating that they took alcohol or smoked to forget problems, for health reasons, and also due to peer pressure. This demonstrates the role of socialisation in influencing one's behavior since peer pressure has been implicated as an influence for one to smoke and drink alcohol. It also highlights the presence of ignorance and misconceptions related to certain practices and portrays the need for psychotherapeutic services such as counseling for those who smoke or drink alcohol in order to forget problems. When an individual has problems, they are under stress which is, in itself, a risk factor for hypertension development (Zafar et al., 2008). If this stress is compounded by alcohol intake and cigarette smoking, then the risk for development of hypertension is increased due to the presence of multiple risk factors. Local hypertension related practices and the reasons behind them ought to be studied to inform how preventive behavior can be encouraged as a way of mitigating the risk for developing hypertension among Malawian adults.

The prevalence of obesity and the state of being overweight have been reported in various prior studies (Diwe et al., 2015; Howitt et al., 2015; Ibekwe et al., 2015; Olack et al., 2015; Forman, Stampfer, & Curhan, 2009; Ajayi, 2016; Maharjan, 2017; Niu & Seo, 2014). The majority of the

studies identified prevalence rates less than 20 % with a few exceptions presenting higher rates. The highest prevalence of obesity (37.5 %) was reported by Diwe et al. (2015) in Nigeria followed by Howitt et al. (2015) in Barbados who noted a prevalence of 33.8 %. A 54.6 % prevalence of central obesity was reported by Olack et al. while Niu and Seo reported a central obesity prevalence of 35.7 %. The two highest rates of overweight were reported by Maharjan et al. (47.9 %) and Niu and Seo (38.3 %). These prevalence rates are of concern as it has been observed that each of the categories of overweight, obesity, and central obesity are independently associated with the development of hypertension (Olack et al., 2015; Jo et al., 2001). Maharjan further reported that the majority (68.9 %) of the obese and 44.9 % of the overweight participants in their study were hypertensive. In addition, Howitt et al. reported a higher prevalence of obesity among men while Olack et al., in contrast, reported four times higher prevalence of obesity among female participants. The heterogeneity of results probably results from a multitude of factors. However, each of these parameters are areas of interest that ought to be addressed in hypertension prevention programs.

Sagare et al. (2011) studied salt intake among rural adults in India and reported higher salt intake in 39.4 % of their study cases and 23.9 % of their controls. Sagare et al. further noted a significant association between higher salt consumption and hypertension; those consuming more than 5 grams of salt per day were noted to have twice the risk of developing hypertension. This points to the importance of knowing salt intake patterns so that appropriate corrective measures can be taken. Excessive salt intake is a preventable risk factor for hypertension that ought to be noted and addressed accordingly in prevention programs for hypertension. No data were found regarding salt intake among adults in Malawi.

Aung et al. (2012) noted that physical activity was rampant among their participants owing to the fact that most of them were farmers and manual workers and thus had a physically active lifestyle; only 3.7 % reported a sedentary lifestyle. Physical activity may also be highly prevalent in Malawi because a majority (81 %) of the population are farmers (Danish Trade Union Council for International Development Cooperation, 2014). High levels of physical activity were also noted by Olack et al. (2015) in Kenya. Mlunde (2007) in Tanzania, however, noted much higher levels of sedentary lifestyle as only 52.4 % of their participants engaged in physical exercise.

Mlunde (2007) assessed motivation for engaging in physical exercise and reports that 73.1 % of those who exercised mentioned a desire for fitness as their reason for exercising. This suggests an association between knowledge and behavior because Mlunde also noted a high level of hypertension awareness. It also suggests that individuals with adequate knowledge about hypertension may be more likely to engage in preventive behavior. Mlunde reports that those people who did not exercise reported that they had no time to exercise due to the nature of the employment they had; many of them worked the whole day and returned to their homes at night feeling tired and having no interest to exercise. Work was, therefore, regarded as an obstacle for preventive behaviour. This observation depicts a need to include workplaces as target areas in the institution of mechanisms that will assist in the prevention of hypertension. It will help to ensure a healthy and more productive work force since rates of absenteeism and early retirement due to hypertension and its complications will be reduced. In addition, individuals with long working hours may need professional advice on how they can introduce exercise into their busy routine without feeling overwhelmed. Sagare et al. (2011) observed an association between leisure time physical inactivity and hypertension. The results presented by Mlunde, therefore, highlight the need to identify current information related to hypertension preventive practice in Malawi so that

appropriate strategies are employed to facilitate the uptake of preventive measures that are suitable for the Malawian context.

In regards to prior blood pressure checks, Aung et al. (2012) reported that only 20 % of their study participants had their blood pressure checked in the previous year prior to the study. Oladapo et al. (2013) also report a significant lack of early detection services and preventive practices for hypertension among their rural Nigerian study participants and these were attributed to the knowledge gaps that were present among the participants. Oladapo et al. noted that 59.7 % of their participants had never had their blood pressure measured before the study and only about 10 % had their blood pressure measured during their last 1-4 visits to a health facility.

Reasons noted by Oladapo et al. (2013) for no prior blood pressure check include a clash between working hours and clinic operation time. Oladapo et al. also noted that both the health care providers and the care seekers only advocated intermittent, symptom-led treatment which meant that in the absence of any symptoms, care was not sought. This portrays a need for tailor made services that will suit the population in the area by ensuring availability of blood pressure checking services that can be provided after working hours or during other convenient hours that would render them available for all categories of people at times and places suitable for most. It also highlights further the need to include workplace interventions in hypertension prevention services. As such, there is need to study practices among Malawian adults so that appropriate measures to facilitate good practices for hypertension prevention are encouraged.

Studies conducted in other countries (Ajayi et al., 2015; Azubuike and Kurmi, 2014; Maharjan, 2017), however, report a higher prevalence of people who have had previous blood pressure checks before the time of the studies they were enrolled in. Ajayi et al. (2015) in Nigeria

report that only 18.6 % had never had their blood pressure checked before while Azubuike and Kurmi (2014), also in Nigeria, report that 42.9 % of their participants had their blood pressure checked regularly. In addition, Maharjan (2017) in Nepal reports that 78.1 % of the participants had checked their blood pressure within the past 12 months.

Challenges in access to blood pressure checking services have been reported in Malawi during prior studies (Mwale, Maluwa, & Malata, 2014; Chimtembo, Maluwa, Chimwaza, Chirwa, & Pindani, 2013). There is no current information that portrays any improvement in the local situation, thus, highlighting the need to research on prevalent blood pressure checking practices.

Good practices in relation to hypertension prevention were noted by Azubuike & Kurmi (2014) in their study among rural Nigerian women. These include irregular consumption of alcohol and non-tobacco use/smoking, engagement in regular exercise, regular checking of blood pressure and weight reduction practice. In addition, 49.2 % of their study participants reported that they did not put additional salt in food that they were served. Overall, 61.3 % of the participants engaged in practices that are desirable for the prevention of hypertension.

Such good results, however, may be attributed to the fact that all the participants were women and also that they had high literacy levels. Msyamboza et al., in a 2011 article on the burden of selected chronic NCDs in Malawi, discovered that tobacco smoking, alcohol drinking, and excessive alcohol drinking were all significantly more common in men than women. It is, therefore, crucial to obtain current information regarding practices that relate to hypertension and also observe if there may be any significant gender related observations that may require gender specific strategies for hypertension control.

Chingatichifwe et al. (2014), note inconsistent practice of healthy lifestyle among diabetic, hypertensive, and stroke patients in Mzuzu district, Malawi. Chingatichifwe et al., however, did not explore adoption of healthy lifestyles by non-hypertensive adults. Furthermore, this study was conducted in Mzuzu district which is in the northern region of Malawi while the current study will be conducted in Lilongwe, which is located in the central region of Malawi. Practices may be different between the regions due to influence from environmental factors such as culture and may also be different among adults of unknown hypertension status as opposed to those with an already existing NCD.

In previous studies (Oladapo et al., 2013; Onyekwere et al., 2013; Azubuike & Kurmi, 2014; Chingatichifwe et al., 2014) , associations have been made between knowledge on hypertension and adoption of healthy lifestyles. For instance, Chingatichifwe et al. (2014) noted strong association between health education and participant's opinion that they were practicing/living a healthy life style; those who received health education were ten times more likely to mention that they lived a healthy lifestyle than those who did not receive health education. In addition Onyekwere et al. (2013) report that most adults engage in unhealthy lifestyles due to ignorance about hypertension. The observations made in these studies emphasise the need to study, in addition to knowledge, the practices undertaken by adults that relate to hypertension.

Silva and Junior (2007) in Brazil noted that 18.2 % of those who had an above normal BMI were hypertensive, 16.7 % of smokers were hypertensive, 5.2 % of alcoholics were hypertensive, and 7.6 % of those with low activity were hypertensive. This indicates, together with the results of other studies presented in this section, that behavior has a big role in either increasing or decreasing the burden of disease that is associated with hypertension. The need to study prevailing

behavioural practices among adults in Malawi is further supported by the fact that some of the hypertension risk factors are modifiable. As such, current information on their prevalence would help inform the design of hypertension prevention programs for greater efficacy.

There is currently no recent information on adoption of healthy lifestyles by the general adult population in Malawi. Even though the Malawi national STEPS survey conducted in 2009 by Msyamboza et al. notes the prevalence of risky behaviors for hypertension, practices may have changed following the implementation of activities that are in line with the Malawi NCD action plan objective to "improve public awareness about NCDs and their risk factors by 2016" (Malawi Ministry of Health, 2012b). Identification of current practices is necessary to provide information that will guide in the design of effective health education programs aimed at promoting adoption of healthy lifestyle among Malawian adults.

Chapter Three

Methodology

Introduction

This section describes the methodology that was used in the conduct of this study. It contains information pertaining to the research design, the study setting, the study population, sampling method, sample size, data collection method, data management plan, data analysis tools and ethical considerations.

Research Design

The study employed a quantitative research approach using a cross sectional design. According to Neuman (2014) a cross sectional study is one where the researcher gathers data at one point in time and provides a snapshot of social life at that time.

Study Setting

The study was conducted at Nathenje Health Centre, a public health facility situated in Lilongwe district, the capital city of Malawi which is located within the central region of the country. This Health Centre is a primary health care facility located at Nathenje Trading Centre, a semi-urban area and it serves a catchment population of 64,000 people. Nathenje Health Centre provides outpatient services for the sick, under-five services, family planning services, treatment and support services for people living with HIV, antenatal services, labour and delivery services, and postnatal services. Between January 2016 and May 2016, the facility had an overall outpatient

department (OPD) attendance of 24,759 patients. The facility utilizes Kamuzu Central Hospital as a referral site for patients whose conditions it is unable to manage effectively.

Nathenje Health Centre was selected because it serves a population that has not yet had an opportunity for early diagnosis of hypertension due to the absence of screening programs within the area. Considering the silent nature of hypertension, the lack of screening programs places the catchment population at risk for late detection of the condition which is more likely to happen when an individual has already developed complications.

Study Population

The target population for this study was adult patients of unknown hypertension status, visiting Nathenje Health Centre outpatient department for medical consultation due to ill health.

Inclusion Criteria

The study recruited men and women aged 18 years and above who had come to the health centre as outpatients, were well enough to withstand the interview, and were of unknown hypertension status.

Exclusion Criteria

The study excluded known hypertensive clients, those who refused to participate, those younger than 18 years, and those who were not in a stable condition to withstand the interview.

Sampling Method

Systematic random sampling was used to select study participants. This sampling technique involves a random selection of the first participant and then proceeds with the selection

of subsequent participants at regular pre-determined intervals (Bhattacherjee, 2012). Upon arrival at Nathenje health centre, clients were seated on benches outside the clinician's consultation room awaiting consultation. Upon completion of the consultation with the clinician, they visited the desk of the registration clerk who entered their details into the health centre register, after which they collected their prescribed medication from the pharmacy and were then free to leave the health facility.

Clients were recruited for the study after they had collected their medication from the pharmacy and were ready to leave the health centre. The first client was selected at random, following which, every 5^{th} client was selected for possible inclusion in the study as long as they met the inclusion criteria and did not have any qualities that were included in the exclusion criteria.

Sample Size

According to Al-Subaihi (2003) sample size (n) should be calculated using the formula below:

$$n = \frac{Z^2\, p(1-p)}{e^2}$$

Where:

n = sample size

Z = level of confidence. For a 95% confidence interval, this value is 1.96

p = proportion of adults attending the OPD clinic at Nathenje Health Centre who were not known hypertensives. This proportion was, at the time of the study, unknown and therefore 0.5 was used as the proportion for calculating the sample size. Agresti and Franklin (2007)

state that where the proportion is unknown, setting the proportion at 0.5 gives the largest value for the sample size (n) and it guarantees that the researcher will have enough data.

e = allowable error which for this study, with a 95% confidence interval, is 0.05

Therefore:

$$n = \frac{1.96^2 \text{ X } 0.5\ (1-0.5)}{0.05^2}$$

$$= \frac{3.8416 \text{ X } 0.5\ (0.5)}{0.0025}$$

$$= \frac{3.8416 \text{ X } 0.25}{0.0025}$$

$$= \frac{0.9604}{0.0025}$$

$$= 384$$

The sample size (n) was, therefore, 384 adults.

Data Collection

Data were collected from eligible adults in the months of June and July 2017 by the researcher using a structured interviewer administered questionnaire available in English

(Appendix 3 A) and Chichewa (Appendix 3 B). Neuman (2014) recommends the use of a questionnaire in survey research which includes cross sectional studies. The questionnaire was interviewer administered because of varying literacy levels among the clients visiting Nathenje Health Centre; most of the respondents were illiterate, hence unable to use the questionnaire without assistance. Formal written informed consent was sought from each participant before data collection.

Data were collected using a translation of English (Appendix 3A) to Chichewa (Appendix 3B) structured questionnaire. The first section of the questionnaire had questions regarding personal details of the respondents such as age, sex, occupation and level of education.

The second section of the questionnaire assessed knowledge of the participants on hypertension. It contained questions on the definition of hypertension, aetiology, diagnosis, risk factors, treatment, and complications of hypertension among others.

The third section of the questionnaire contained questions on the sources of information for the knowledge that the respondents had while the fourth section included questions that assessed hypertension related practices among the study participants. It included questions on the lifestyle behaviours that were undertaken and the reasons why they were undertaken.

The fifth section of the questionnaire collected information on weight and height and blood pressure readings of the participants. From the weight and height measurements, the body mass index was calculated using the formula "body weight in kg divided by height in metres squared" (kg/m^2). These anthropometric measurements were taken by the researcher. Blood pressure was measured using battery powered Omron digital blood pressure machines after ensuring that the participants had at least 15 minutes of rest. Two blood pressure measurements were taken, five

minutes apart, and the average of the two was considered as the final blood pressure reading of the individual as per guidelines of the American Society of Hypertension and the International Society of Hypertension (Weber et al., 2014). Weight was also checked using a battery powered digital weighing scale while height was measured using a stadiometre. The anthropometric measurements provided information on the presence or absence of physical risk factors for hypertension among the study participants.

Each interview with the participants lasted less than 30 minutes. The interview was only conducted after the researcher had relayed the necessary information about the study to each participant using the participants' information sheet in English (Appendix 1 A) or Chichewa (Appendix 1 B). The consent form in English (Appendix 2 A) or Chichewa (Appendix 2 B) was administered by the researcher after relaying the information but prior to commencement of the interview.

Validity and Reliability of the Data Collection Instrument

The questionnaire was developed by the researcher using information from available literature and with reference to the study objectives. It was initially developed in English, then translated to Chichewa and later back translated to English to check for consistency. Some of the English terms lack local terminologies. In such circumstances, lengthy descriptions were used to convey the meaning and clarify what was meant where necessary.

The questionnaire was shared with experienced health workers from Area 25 Health Centre Non-Communicable Disease clinic (Karonga Prevention Study) for their input before it was piloted to obtain expert opinion in order to ensure content validity, providing assurance that the

questionnaire captures the desired information. Based on the comments, a few changes were made to the questionnaire.

Reliability of the questionnaire was tested during a pilot study on a random sample of 10 participants at Lumbadzi Health Centre, a public health facility in another semi-urban setting in Lilongwe district. Some modifications to the questionnaire were made based on observations made during the piloting process. Blood pressure, weight, and height measurements were done by the researcher for consistency. Digital blood pressure machines and weighing scales were used.

The equipment used was validated at the Physical Assets Management department of Kamuzu Central Hospital, one of the public referral hospitals in Malawi. The department is manned by trained medical engineers who are responsible to ensure that all medical equipment in the hospital is functional and well maintained; it also provides medical equipment related supportive services to clinical research organisations working within and around Lilongwe district.

Data Management

Each questionnaire was given a code number that was based on the number of the participant in the study. Collected raw data were stored securely by the researcher in a locked environment and was only accessible to the research team which includes the researcher and the researcher's supervisors. The computer on which the data were entered for analysis was password protected.

Following data entry, data were checked using summary statistics including frequencies, minimum values and maximum values. This enabled identification of data entry errors that eventually allowed for data cleaning. Data will remain in storage for three years after completion of the research and then destroyed.

Data Analysis

Data analysis was done using SPSS software version 20. Variables that were measured include the demographic characteristics of the participants, knowledge that adults have about hypertension, the practices that adults undertake in relation to hypertension, and also the sources of knowledge that the adults have about hypertension, the presence of modifiable risk factors for hypertension was also noted and relationships between variables examined.

Descriptive statistics were used for univariate analysis of the data. This involved the use of means and standard deviations to describe continuous variables and also the use of frequencies and percentages to describe categorical variables. Data have been presented in tables and charts.

Knowledge was measured in terms of responses to each particular question as recommended by Kaliyaperumal (2004) and Macías and Glasauer (2014); the data were analysed in terms of the absolute number of correct responses to a question and calculations were made as to what percentage of the sample knows the correct answer to each individual question. Each question in the practices section of the questionnaire was analysed separately using descriptive statistics. The percentage of individuals who partake in each practice has been presented.
Pearson's Chi square test was used to examine the relationship between awareness of hypertension (dependent variable) and participant characteristics (independent variable) which include age, sex, education level, marital status, and religion.

Ethical Considerations

The research proposal was submitted to the College of Medicine Research and Ethics Committee (COMREC) for ethical approval and it was granted (Appendix 4 E). Permission to pilot the questionnaire and conduct the study was sought by the researcher (Appendix 4 A), with

an accompanying letter from the institution of her studies (Appendix 4 B), from Lilongwe District Health Office, the institution responsible for overseeing the operations of the public health facilities used during the study. Permission was granted to pilot the study at Lumbadzi Health Centre (Appendix 4 C) and to conduct the study at Nathenje Health Centre (Appendix 4 D).

Before commencement of the interviews with each participant, the researcher introduced herself and explained in detail the purpose of the study, including any potential benefits and harm that the participant may experience due to their involvement in the study. the English version of this information is found in Appendix 1 and the Chichewa version in Appendix 1 B. Participants were also informed that participation is voluntary and that they were free to withdraw from participating in the study at any given time. The information enabled each participant to make an informed decision on whether to participate in the study or not. Each participant who was willing to participate was asked to provide their consent by signing a consent form in English (Appendix 2A) or Chichewa (Appendix 2B) which provided evidence of their voluntary participation in the study. Illiterate participants were allowed to express their consent by making a thumbprint on the signature section of the consent form. No material or financial benefits were given to the respondents for their participation in the study.

The interviews were held in a private room provided at the health centre, ensuring confidentiality for participants during the data collection process. Names of the participants were not indicated anywhere on the questionnaires. Data collected from all the respondents were kept confidential. Any participant whose blood pressure was found to be high was given advice on lifestyle modifications that are necessary for the control of blood pressure levels and was referred to the health centre clinician for continued monitoring, further investigation and management.

Chapter Four

Results

Introduction

This chapter presents results of a cross sectional study on knowledge and practices of hypertension among adult outpatients at Nathenje Health Centre in Lilongwe, Malawi. The aim of the study was to determine the knowledge and practices on hypertension among adults in the general outpatient department.

Demographic Characteristics of the Participants

The participants were aged between 18 and 82 years with a mean age of 36.6 years (SD = 13.7). Majority (82.6 %, n=317) of the participants were from the age group of 18 to 49 years. Most participants (85.7 %, n=329) were female. More than half (59.9 %, n=230) had attained primary education. Table 1 shows the demographic characteristics of the study participants.

Table 1: Demographic characteristics of the participants

Variable	Frequency(n)	Percent (%)
Age (years)		
18-49	317	82.6
50-64	52	13.5
≥ 65	15	3.9
Sex		
Male	55	14.3
Female	329	85.7
Educational level		
None	63	16.4
Primary	230	59.9
Secondary	82	21.4
Tertiary	9	2.3
Marital status		
Single	22	5.7
Married	302	78.6
Separated	10	2.6
Divorced	33	5.7
Religion		
Christianity	349	90.9
Islam	3	0.8
Traditional	32	8.3
Occupation		
Farmer	307	79.9
Businessperson	33	8.6
Civil servant	17	4.4
Student	13	3.4
Casual labourer	5	1.3
Place of residence		
Trading centre	21	5.5
Village	363	94.5
Tribe		
Chewa	347	90.4
Ngoni	20	5.2
Tumbuka	6	1.6
Lomwe	5	1.3
Yao	3	0.8
Mang'anja	2	0.5

Body Measurements of the Participants

Participants' blood pressure.

Blood pressure is defined as the pressure exerted by blood on the artery wall during the pumping action of the heart which involves contraction and relaxation (Patton & Thibodeau, 2013). Blood pressure of the participants was checked using an Omron digital sphygmomanometer that was validated at the Physical Assets Management department of Kamuzu Central Hospital, Lilongwe. This is a department located in one of the four biggest hospitals in Malawi, manned by trained medical engineers who are responsible to ensure that all medical equipment in the hospital is functional and well maintained, and it also provides supportive services to clinical research organisations working within the hospital premises.

Two blood pressure measurements were taken, five minutes apart, and the average of the two was considered as the final blood pressure reading of the individual as per guidelines of the American Society of Hypertension and the International Society of Hypertension (Weber et al., 2014). Overall, 22.1 % of the participants were hypertensive (Grade 1 to 3 hypertension).

Participants' systolic blood pressure.

Systolic blood pressure (SBP) is the pressure exerted by blood on the artery wall during the contraction phase of heart action (Patton & Thibodeau, 2013). The SBP ranged from 84 mmHg to 208 mmHg with a mean of 127.3 mmHg and a standard deviation of 17 mmHg from the mean. Figure 1 presents the frequency of the average systolic blood pressure readings of the participants categorised. A high normal systolic blood pressure was noted in 17.4 % (n=67) of the participants while others had raised systolic blood pressure, a majority had normal readings.

The actual values were categorised according to the 1999 World Health Organisation and International Society of Hypertension guidelines which define optimal systolic blood pressure as that which is below 120 mmHg, normal SBP as that which is from 120 to 129 mmHg, high normal SBP as that which is from 130 to 139 mmHg, grade 1 hypertension as SBP from 140 to 159 mmHg, grade 2 hypertension as SBP from 160 – 179 mmHg, and grade 3 hypertension as a SBP that is equal to or above 180 mmHg (Chalmers, 1999).

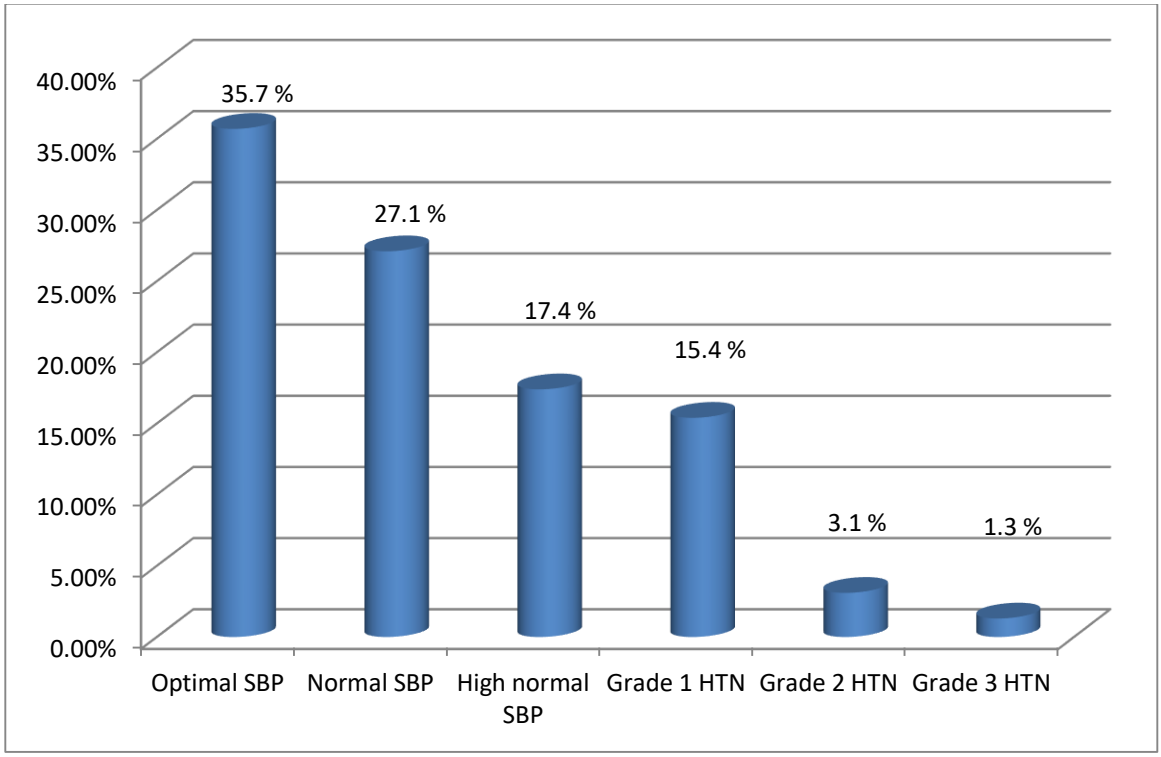

Figure 1: Participants' systolic blood pressure

Participants' diastolic blood pressure.

Diastolic blood pressure (SBP) is the pressure exerted by blood on the artery wall during the relaxation phase of heart action (Patton & Thibodeau, 2013). The diastolic blood pressure readings of the participants ranged from 54 mmHg to 127 mmHg with a mean of 78 mmHg and a standard deviation of 9.8 mmHg from the mean. Figure 2 shows the frequency of the average diastolic blood pressure of the study participants categorised. It was noted that 10.9 % (n=42) of the participants had a high normal diastolic blood pressure while others had raised diastolic blood pressure, a majority had normal readings. The diastolic blood pressure values were categorised as per the 1999 World Health Organisation and International Society of Hypertension guidelines which define optimal diastolic blood pressure as that which is below 80 mmHg, normal blood pressure as that which is from 80 mmHg to 84 mmHg, high normal DBP as that which is from 85 to 89 mmHg, grade 1 hypertension as DBP from 90 mmHg to 99 mmHg, grade 2 hypertension as DBP from 100 – 109 mmHg, and grade 3 hypertension as a DBP that is equal to or above 110 mmHg (Chalmers, 1999).

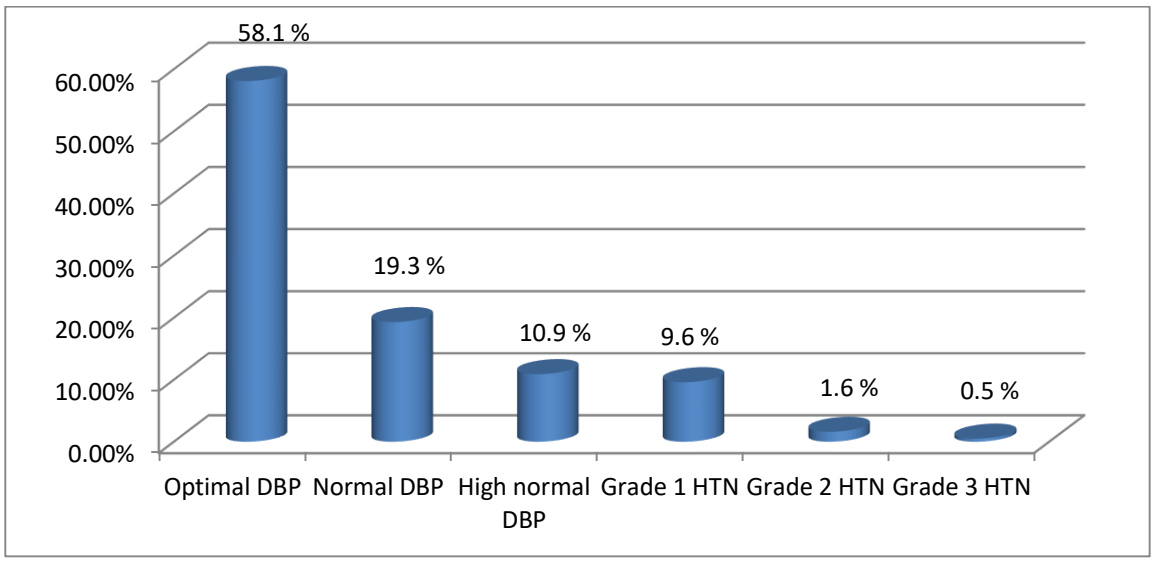

Figure 2: Participants' diastolic blood pressure

Participants' body mass index.

Body mass index (BMI) is a measure of a person's proportion of body weight to height, providing information on whether someone is above or below their ideal body weight and is also used to track trends in obesity among other health conditions (Patton & Thibodeau, 2013). Body weight and height of the participants were checked to identify their body mass index (BMI) categories. The BMI values were categorised according to WHO guidelines which categorise BMI readings of less than 18.5 as underweight, 18.5 to 24.9 as normal, 25 to 29.9 as overweight, and 30 or more as obese (Flegal, Kit, & Graubard, 2014). Figure 3 presents a frequency diagram of the participants' BMI.

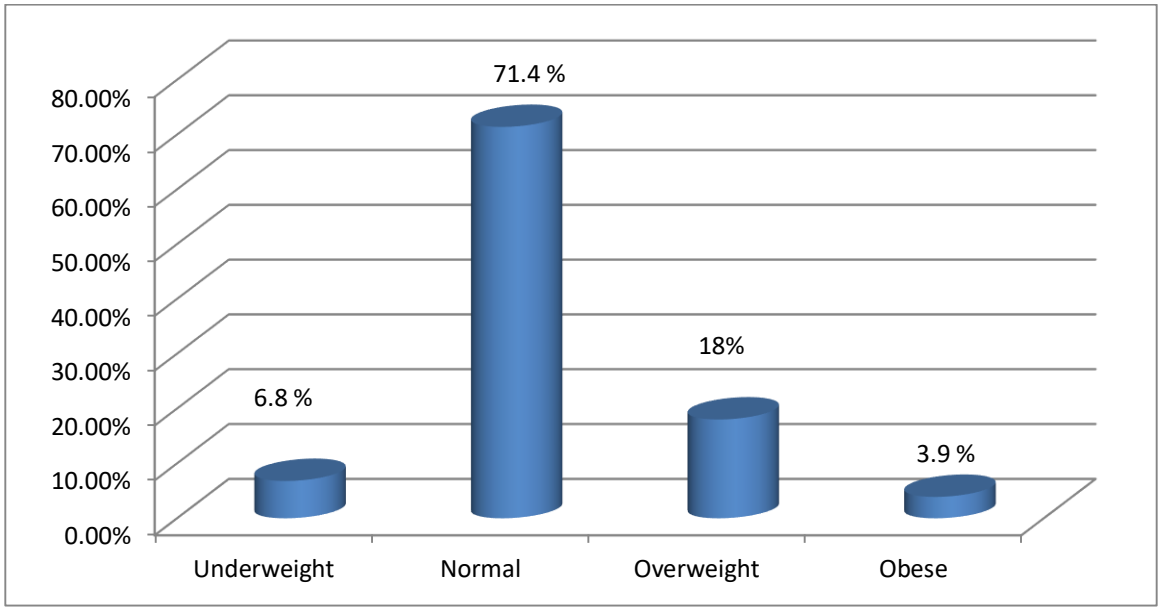

Figure 3: Participants' body mass index

Some of the study participants were noted to be underweight, overweight, and obese.

Knowledge of the Participants on Hypertension

The results presented in this section are on the knowledge that adults have regarding the definition of hypertension; risk factors for hypertension; signs and symptoms of hypertension; hypertension treatment; possible complications and preventive measures. The participants were asked if they had ever heard about hypertension. Just above half of the participants, 59.4 % (n= 228), had ever heard about hypertension.

Further questions assessing knowledge were only administered to those who had ever heard about hypertension. The results on knowledge are, therefore, presented against a sample size of 228 participants. Of those who had ever heard about hypertension, 61.4 % (n=140) knew someone who had hypertension and 23.7 % (n= 54) had ever lived in the same house with a hypertensive individual.

Knowledge of the participants on risk factors for hypertension.

Knowledge of each individual risk factor for hypertension was different across variables, the results are presented in Table 2. The most well-known risk factor was stress which represented 12.8 % (n=212) of the responses, followed by excessive salt intake representing 12.5 % (n=206). Multiple response analysis was used for this section because participants were allowed to choose any option that they regarded as a risk factor for hypertension. The total in the table therefore represents the total number of responses selected by the participants while the percent of response column represents the percentage of the particular response against the total number of responses and the percent of cases represents the percentage of respondents who have selected that particular item, using the total number of participants who responded to that question as a base for calculation of percentage (Seegers, 2009; Subedi, 2016).

Table 2: Risk factors for hypertension as selected by the participants (n=228)

Risk factor	Frequency (n)	Percent (%)
Stress	212	12.8
Excessive salt intake	206	12.5
Diabetes mellitus	177	10.7
Excessive alcohol intake	155	9.4
Sedentary lifestyle	154	9.3
Obesity	154	9.3
Smoking and tobacco use	145	8.8
Drinking excess coffee or tea	121	7.3
Old age	116	7.0
Family history	103	6.2
Taking excess sugar	83	5.0
Gender	24	1.5
Eating high fat food	1	0.1
Eating chilli	1	0.1
TOTAL	1652	100.0

Knowledge of the participants on hypertension symptoms.

The study identified that 82.5 % (n=188) of the participants who had ever heard about hypertension reported that hypertension has symptoms while only 11.4 % (n=26) knew that hypertension is asymptomatic; 6.1 % of this grouping were unaware of weather hypertension has symptoms or not.

Half (n=114) of the participants who had ever heard about hypertension said that it was not possible for someone to have hypertension and not have any signs or symptoms, only 35.5 % (n=81) knew that it was possible while 14.5 % (n=33) did not know if it was possible or not. The participants who said that hypertension has symptoms were asked what the symptoms of

hypertension were; 11.2 % (n =21) said they did not know the symptoms while 88.8 % (n =167) attributed several signs and symptoms to hypertension; see Table 3. Heart palpitations were the most mentioned symptom at 26.6 % (n=92), followed by headache which represented 11.3 % (n= 39) of the responses.

Table 3: Hypertension symptoms stated by the participants (n=228)

Symptoms	Frequency (n)	Percent (%)
Heart palpitations	92	26.6
Loss of consciousness	16	4.6
Anger	24	6.9
Headache	39	11.3
Fever	23	6.6
Excess sweating	28	8.1
Difficult breathing	25	7.2
General ill feeling	31	9.0
Mental health problem	12	3.5
Musculoskeletal problems	21	6.1
Others	35	10.1
TOTAL	346	100.0

Knowledge of the participants on hypertension diagnosis.

Measurement of blood pressure was selected by 97.4 % (n=222) of the participants as the best way to tell that someone is hypertensive and only 1.8 % (n=4) reported that feeling of illness was the best way to tell that someone is hypertensive. The remaining 0.9 % (n=2) were not aware of the best way to tell that someone is hypertensive.

Knowledge of the participants on hypertension treatment.

The participants who had ever heard about hypertension were asked about their knowledge on hypertension; 28.5 % (n=65) knew that hypertension requires lifelong treatment, 55.3 % (n=126) said that hypertension is a curable disease, while 16.2 % (n=193) were unaware whether hypertension requires lifelong treatment or not.

When asked regarding the best action to be taken by any individual who is found to have high blood pressure, 99 % (n=380) of the participants said that they should visit a health facility, 0.8 % (n=3) said they should buy drugs from a pharmacy and 0.3 % (n=1) said the individual should act according to whatever seems best to them.

Knowledge of the participants on hypertension complications.

Regarding hypertension complications, 64.9 % (n=148) of the participants who had ever heard about hypertension (n=228) were aware that hypertension can complicate to other illnesses, 11 % (n=25) said that hypertension has no complications and the remaining 24.1 % were not aware of whether hypertension can complicate to other illnesses or not. Several complications were identified by 97.3 % (n=144) of those who said that hypertension can complicate to other diseases (see Table 4) while 2.7 % (n=4) said that they were not aware of the complications. The most stated complication was heart disease at 22.5 % (n = 125) followed by stroke which represented 19.2 % (n=107) of the total responses.

Table 4: Hypertension complications identified by the participants (n=228)

Complication	Frequency (n)	Percent (%)
Stroke	107	19.2
Heart disease	125	22.5
Kidney disease	79	14.2
Atherosclerosis	93	16.7
Eye disorders	81	14.6
Diabetes	16	2.9
Respiratory disorders	8	1.4
Infectious conditions	22	4.0
Neurological disorders	6	1.1
General illness	16	2.9
Cancer	3	0.5
TOTAL	556	100.0

The participants included various health problems that are not complications of hypertension such as respiratory disorders including asthma; infectious conditions including malaria and HIV; neurological disorders including epilepsy and confusion; and general illnesses including skin sores abdominal pains and body weakness.

Knowledge of the participants on hypertension prevention.

Some of the participants who had ever heard about hypertension, 13.2 % (n=30), were unaware of whether it is possible to prevent hypertension or not while 64.5 % (n=147) said that it is possible and 22.4 % (n=51) said that it was not possible for one to take measures to prevent the occurrence or delay the onset of hypertension.

Of the 147 participants who said that it was possible to prevent hypertension, 56 (38.1%) participants were unaware of how to prevent hypertension. The remaining 91 (61.9%) participants

presented several measures that they felt could be used to prevent hypertension, representing only 23.6 % of the total study participants, see Table 5. Furthermore, 92.5 % (n=211) of the participants stated that it was necessary for one to have regular blood pressure checks even if they felt healthy while only 6.6 % (n=15) stated that it was not necessary, 0.9 % (n=2) were not aware of whether it is necessary or not. Low salt diet was the most common reported prevention strategy, representing 22.4 % (n=49) of all responses, followed by stress management (20.5 %, n = 45).

Table 5: Participants' reported hypertension prevention strategies (n=91)

Reported prevention strategy	Frequency (n)	Percent (%)
Low salt diet	49	22.4
Low sugar diet	42	19.2
Low fat diet	21	9.6
Low alcohol intake	11	5.0
Avoiding smoking	6	2.7
High fluid diet	3	1.4
Stress management	45	20.5
Physical activity	26	11.9
Balanced diet	1	0.5
Eating organic food	1	0.5
Avoiding hot places	1	0.5
Taking prophylactic medicine	2	0.9
Anger management	3	1.4
Regular BP checks	7	3.2
Weight loss	1	0.5
TOTAL	219	100.0

Sources of Participants' Knowledge on Hypertension

The participants who had ever heard about hypertension (n=228) were asked about the sources of the information they had about hypertension. Figure 4 indicates the sources of participants' knowledge on hypertension. The most common source of information on hypertension was friends (78.1 %, n = 178) followed by family (74.6 %, n=170), and then the hospital (71.6 %, n = 164).

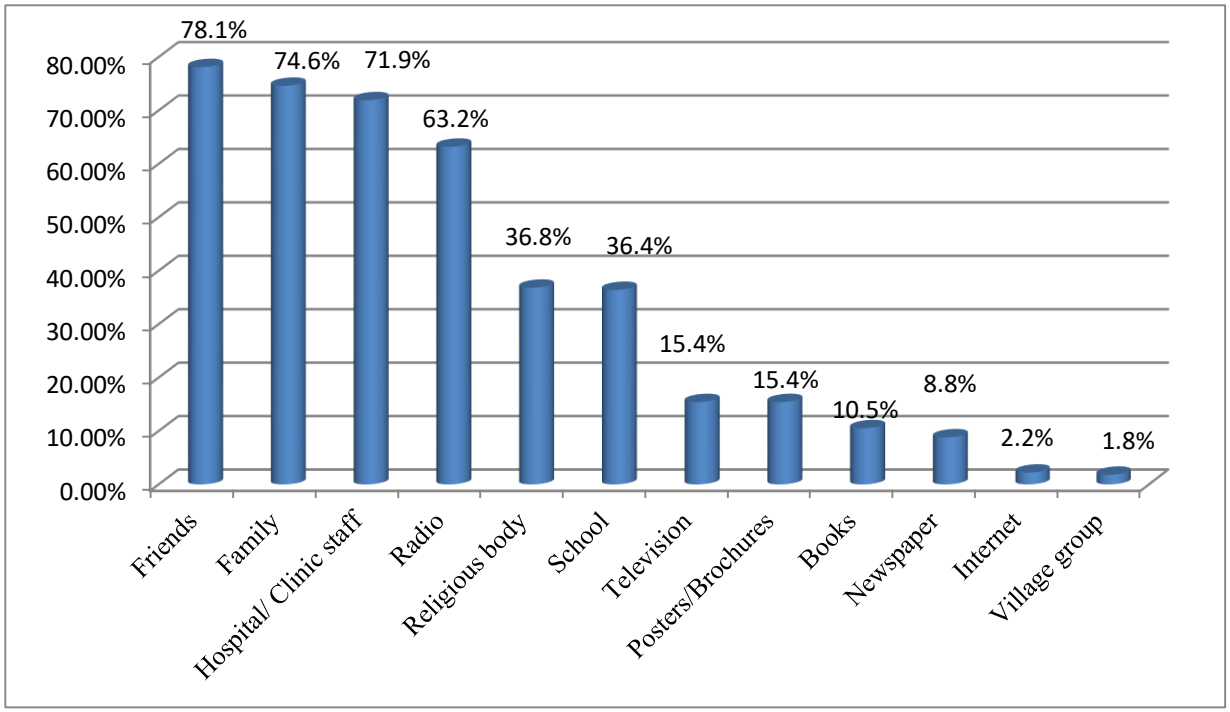

Figure 4: Sources of participants' knowledge on hypertension (n=228)

Most informative source of information selected by the participants.

The participants were asked to select the most informative source of the information regarding hypertension from among the multiple sources of information they mentioned. The most informative source of information selected is indicated in Figure 5. The hospital was identified as the most informative source of information (36 %, n= 82) followed by family members (18 %, n=41).

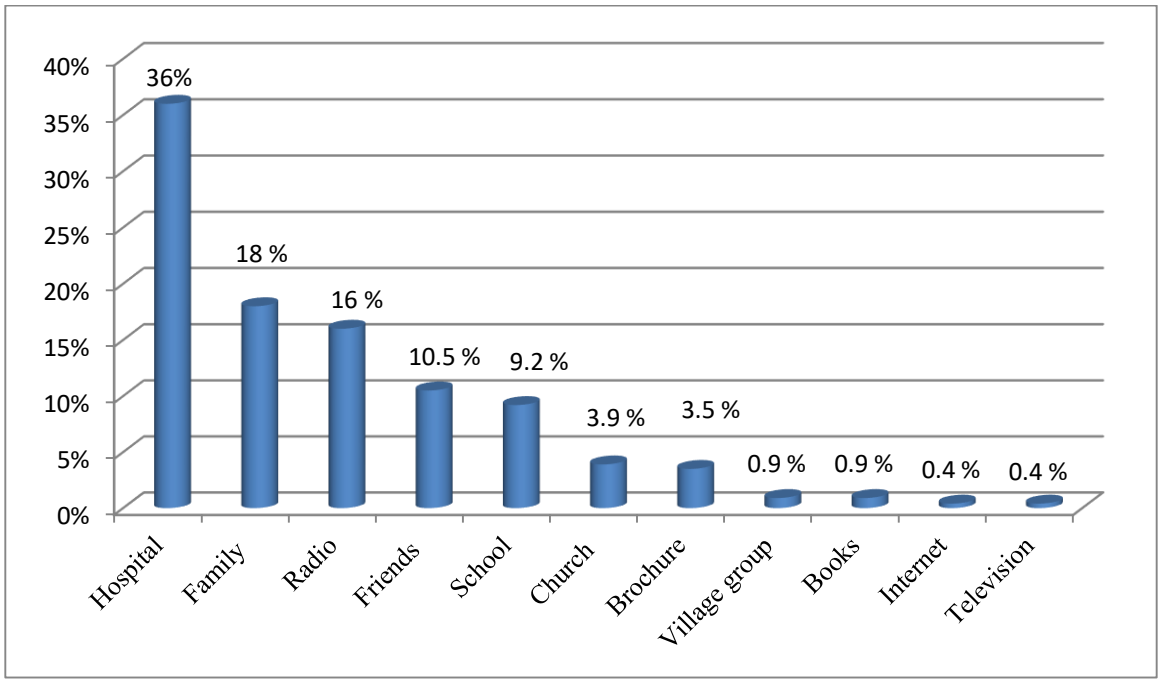

Figure 5: The most informative source of the participants' hypertension knowledge

Most convenient source of information selected by the participants.

Figure 6 presents the information sources which the participants regarded as most convenient to learn about hypertension from, if they were given the opportunity to choose. More than half (64 %, =146) selected the hospital as a preferred source of information with less preference for the other sources.

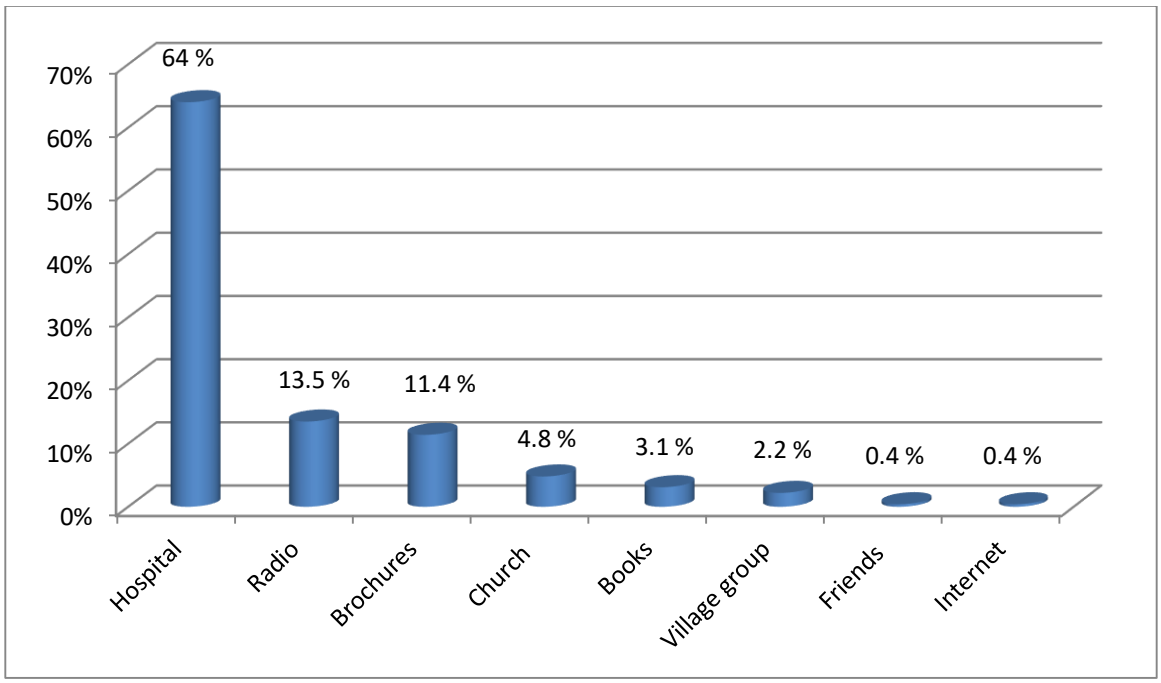

Figure 6: Participants' preferred source of information

Hypertension Related Lifestyle Practices Among the Participants

All the study participants were asked about their lifestyle practices that relate to hypertension including hospital visits, previous blood pressure checks, smoking and tobacco use, alcohol consumption, stress, physical activity, and salt intake.

Hospital visits by the participant.

The number of hospital visits within the past year was assessed in order to find out exposure to chances of ever having a blood pressure checked, and also exposure to opportunities to learn about hypertension since health facilities are supposed to have educative postures and also provide health education on various health topics.

Only 9.9 % (n= 38) of the participants (n=384) had never been to the clinic within the past year prior to the study. Of the remaining 90.1 % (n= 346) who had been to the clinic in the past year, 34.6 % (n=133) had been there once or twice, 18.8 % (n=72) were there three to four times and 36.7 % (n=141) were there $\geq$ 5 times within the year prior to the study.

Participants' previous blood pressure checks.

The participants were asked if they had ever had a blood pressure check before. Only 32.8 % (n=126) of the participants had ever had a blood pressure check while 67.2 % had never had their blood pressure checked. Of those who had ever had their blood pressure checked (n=126), 34.1 % (n=43) had their blood pressure checked once, 38.1 % (n=48) twice or thrice, 6.3 % (n=8) four to five times, while 21.4 % (n=27) had more than five blood pressure checks.

Timing of the last blood pressure check among those who had ever had a blood pressure check was within the past 6 months for 30.2 % (n=38), past year for 19.8 % (n=25), past two years for 12.7 % (n=16), and more than 2 years for 37.3 % (n=47). The prior blood pressure checks were done at a health facility for 93.7 % (n=118) and during a community outreach activity for 11.1 % (n=14). None of the participants had ever had their blood pressure checked at their workplace.

The participants reported that their prior blood pressure reading was either high (24.6 %, n=31) normal (52.4 %, n=66) or low (2.4 %, n=3). Only 12.7 % (n=16) did not know what it was and 7.9 % (n=10) did not remember their last blood pressure reading. Figure 7 shows the possible reasons presented for no prior blood pressure check by those who had never had their blood pressure checked before (n= 258). Note in Figure 7 that 52.9 % (n=137) of the participants who had never had a blood pressure check before gave lack of opportunity as their reason for failure to have a blood pressure check.

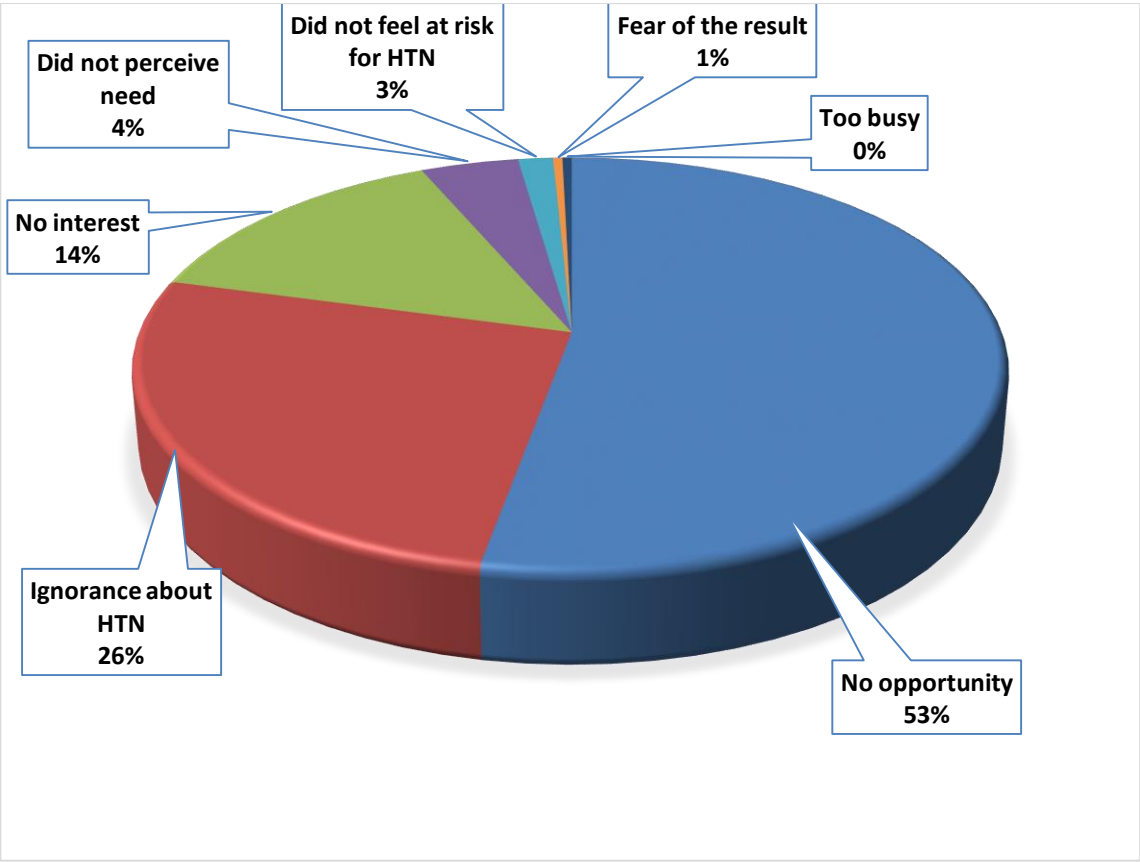

Figure 7: Reasons for no prior blood pressure check among the participants

Smoking and tobacco use among the participants.

Only 5.2 % (n=20) of the participants admitted to smoking and use of tobacco while 93.5 % (n=359) expressed that they did not smoke and 1.3% (n=5) said they quit smoking. The frequency of smoking among those who smoked was assessed. Note from Figure 8 that 65 % (n=13) of the smokers admitted to smoking several times every day.

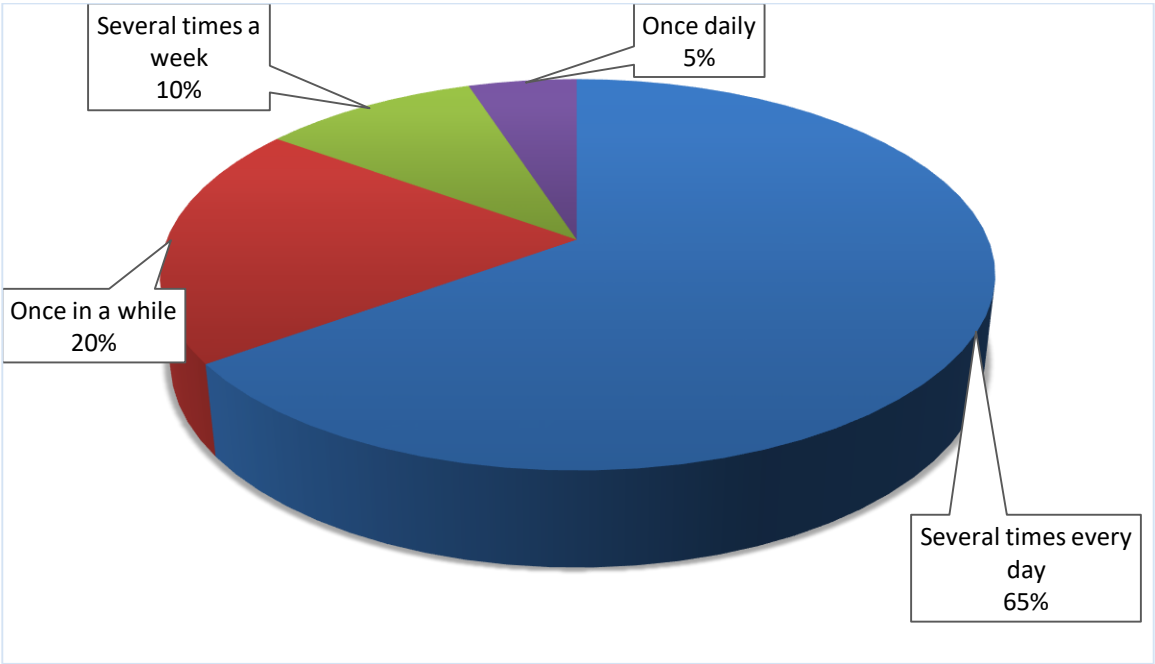

Figure 8: Frequency of smoking among the participants

The participants who smoked gave several reasons for smoking; note from Table 6 that leisure (33.3 %) was the most common reason presented for smoking, followed by peer pressure and healing which both individually represented 28.6 % of the participants who smoked.

Table 6: Reasons for smoking stated by the participants who smoked (n=21)

Reason for smoking	Frequency (n)	Percent (%)
Leisure	7	33.3
Peer pressure	6	28.6
To forget problems	1	4.8
For healing (after a dream)	6	28.6
To get energy for work	1	4.8
TOTAL	21	100.0

Alcohol consumption among the participants.

Only 6 % (n=23) of the participants admitted to consuming alcohol. The frequency of alcohol consumption from these participants was once daily in 8.7 % (n=2) of them, several times every day in 4.3 % (n=1) of them, once a week in 21.7 % (n=5) of them, several times a week in 4.3 % of them, and once in a while in 60.9 % (n=14).

The participants who took alcohol gave several reasons for taking alcohol, Table 7. The participants who took alcohol together presented varying reasons for taking alcohol, providing a total of 27 responses. The most common was leisure which represented 59.3 % (n=16) of the responses followed by peer pressure representing 18.5 % (n = 5) of the responses.

Table 7: Participants' reasons for taking alcohol (n=23)

Reason for taking alcohol	Frequency (n)	Percent (%)
Leisure	16	59.3
Peer pressure	5	18.5
To forget problems	3	11.1
Nature of the job	2	7.4
For health reasons	1	3.7
TOTAL	27	100.0

Stressful lifestyle as reported by the participants.

About 90 % (n=346) of the participants reported that they lead a stressful lifestyle. Figure 9 presents the frequency of experiencing stress as reported by the participants. Note from figure 9 that 39.8 % (n=153) of the study participants reported that they experience stress almost always.

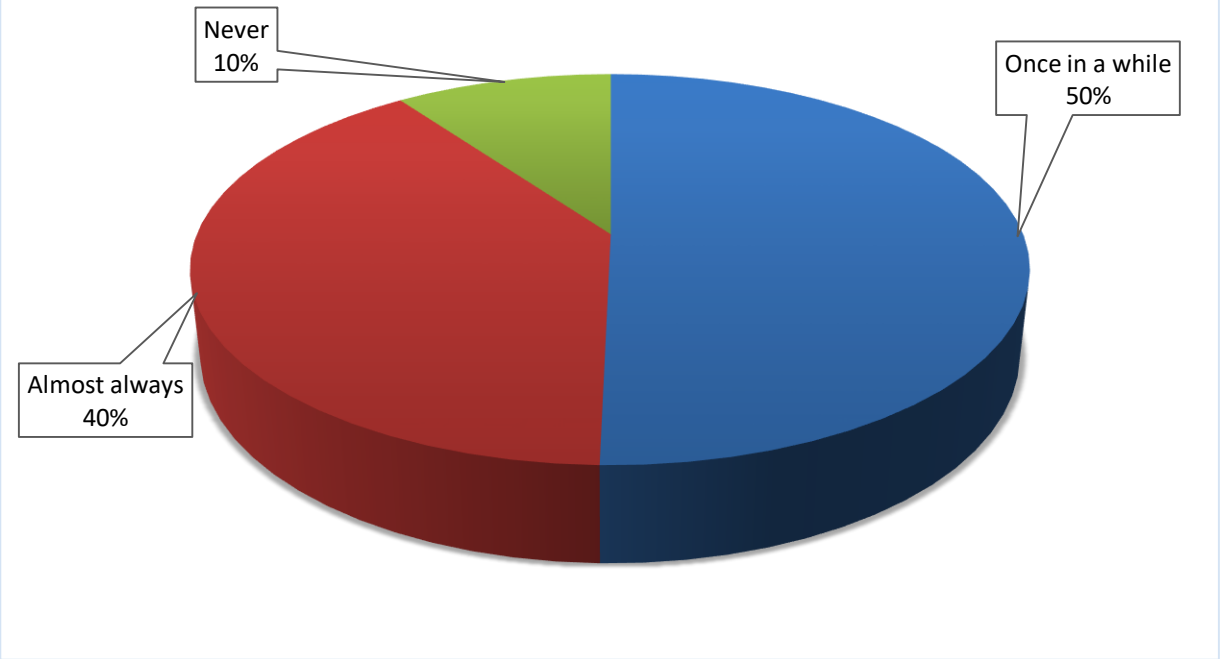

Figure 9: Participants' reported frequency of experiencing stress

Participants' engagement in physical activity.

Almost all study participants (99.5 %, n=382) said they engage in various forms of physical activity while only two participants said they had a sedentary lifestyle. Of those who engaged in physical activity, 0.8 % (n=3) said it was once daily, 87.4 % (n=334) several times daily, 1.6 % (n=6) once a week, 6 %, (n=23) several times a week, and 4.2 % (n=16) once in a while. The participants who engage in physical activity were asked about their reasons for engaging in physical activity, Table 8.

Table 8: Participants' reported reasons for engaging in physical activity (n=382)

Reason for activity	Percent (%)
Leisure	11.4
Occupation	38.4
Fitness	11.0
Household chores	38.5
To forget problems	0.7
TOTAL	100.0

The most common reason presented by the participants for engaging in physical activity was household chores which represented 38.5 % (n = 325) of the responses followed by occupation representing 38.4 % of the responses. Two participants were not physically active; one said that it was due to lack of time and the other said that it was due to health problems.

Participants' reported salt intake.

Participants were asked to select the option which best described their salt intake from the options excess, average, and below average. The intake was reported to be average by 54.9 %

(n=211) of the participants, below average for 25.3 % (n=97) and excess for 19.8 % (n=76) of the participants.

Furthermore, 88 % (n=338) of all the study participants (n=384) said they never add salt to food before tasting, 8.9 % (n=34) said they rarely add salt before tasting, 2.1 % (n=8) said they often add salt before tasting, and 1 % (n=4) said they almost always add salt before tasting.

Modifiable Risk Factors for Hypertension among the Participants

Several modifiable risk factors for hypertension were identified among the study participants. Their prevalence is presented in Figure 10.

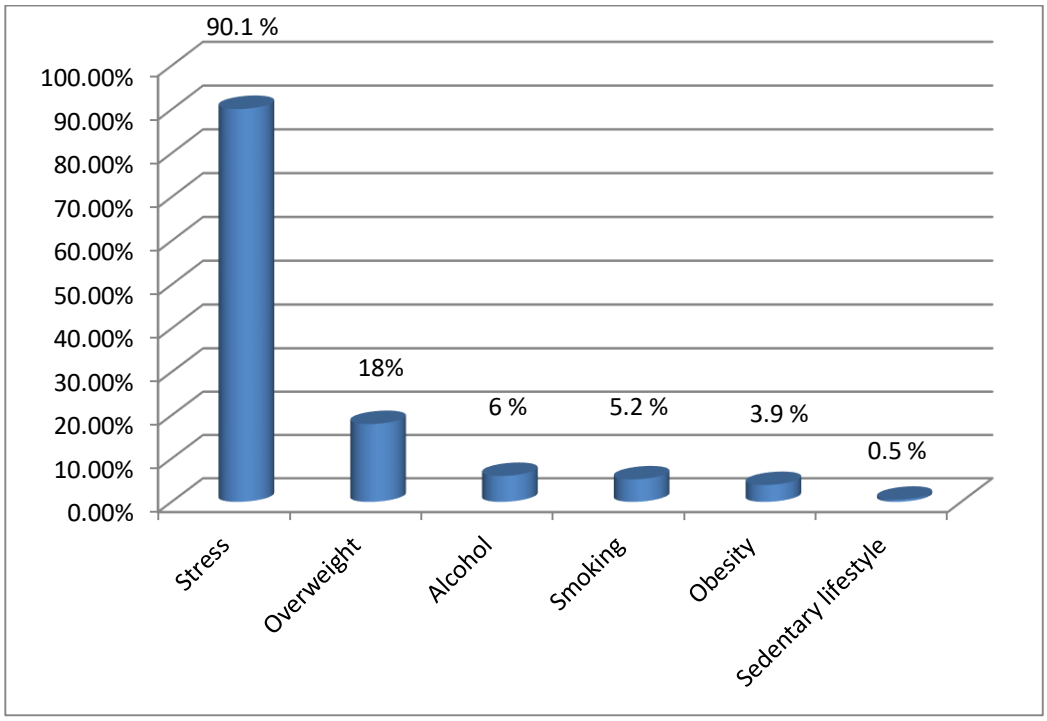

Figure 10: Prevalence of modifiable risk factors for hypertension among the participants

The most prevalent modifiable risk factor was stress as 90.1 % of all the participants reported that they experience stress. This was followed by overweight at 18 %. Other risk factors were less prevalent.

The distribution of hypertension against the modifiable risk factors identified among the participants was noted. Table 9 shows the distribution of hypertension in relation to the various modifiable risk factors for hypertension that were present among the study participants.

Table 9: Distribution of hypertension against modifiable risk factors (n=384)

Risk factor	Number of participants	% with hypertension
Sedentary lifestyle	2	50
Overweight	69	30.4
Smoking	20	30
Obese	15	26.7
Alcohol consumption	23	26.1
Stress	346	21.7
Excess salt intake	76	19.7

The prevalence of hypertension among the participants who led a sedentary lifestyle was 50 % while for those who overweight it was 30.4 %. The lowest prevalence was noted among those who consumed excessive salt (19.7 %).

Relationship between Participants' Awareness of Hypertension and Age, Education, Marital Status, Gender, and Number of Health Facility Visits.

Participants who had ever heard about hypertension were regarded as having awareness about hypertension. The relationship between participants 'awareness of hypertension and socio-demographic variables, particularly, age, education, marital status, gender, and number of visits made to a health facility in the year prior to the study was examined using Pearson's Chi-Square test and the results are displayed in Table 10.

Table 10: Relationship between awareness of hypertension and participants' characteristics

Variable	$\chi 2$	df	p-value
Age	7.758	2	0.021
Education	32.50	3	0.000
Marital status	0.688	4	0.953
Gender	1.660	1	0.198
Health facility visits	2.425	3	0.484

Note from Table 10 that there was some association between knowledge of hypertension and age. Participants within the age group of 18 – 49 years were more likely to have heard of hypertension (86.8 %) compared to those within the age groups of 50 to 64 years (9.6 %) and those 65 years of age and above (3.5 %). Table 10 further presents a strong association between knowledge of hypertension and education level of the participants. Participants with a higher level of education were more likely to have heard of hypertension as compared to those with lower

education. None of the participants who had attained tertiary education reported that they had never heard about hypertension while the representation was present among those who had attained secondary education (9.0 %), primary education (71.2 %), and no formal education (19.9 %). There was no association between awareness of hypertension and participants' marital status, gender, or number of visits made to a health facility, Table 10

Conclusion

This chapter has presented the demographic characteristics of the study participants in addition to results on participants' awareness of hypertension and knowledge on the risk factors, presentation, treatment, complications, and prevention of hypertension. Sources of knowledge on hypertension, practices that relate to hypertension and prevalence of modifiable risk factors have also been presented in addition to the relationship between practices and participants' socio-demographic variables.

The results of the study indicate lack of knowledge among many of Nathenje outpatient department adult clients about hypertension in general and its various aspects. The results also reveal the presence of good and bad practices in regards to hypertension and the presence of multiple risk factors for hypertension among the study participants. Association has been noted between awareness of hypertension and participants' age and education level while there was none between awareness of hypertension and participants' marital status, gender, and number of visits made to a health facility.

Chapter Five

Discussion

Introduction

This chapter provides a discussion of the main results which emerged from the study assessing knowledge and practices related to hypertension among adult outpatients at Nathenje Health Centre in Lilongwe, Malawi. The results will be discussed in the context of existing literature on the subject. Strengths and limitations of the research are presented; recommendations for practice, policy and future research are offered; and conclusions are highlighted.

Participant Characteristics

The study was conducted at Nathenje Health Centre which is located in a semi-urban setting but the majority of the participants were not from this semi-urban setting as they had to trek from their villages in the surrounding rural areas to the clinic in the semi-urban setting because it was the nearest public health facility available. Only 5.5 % of the participants were from the actual trading centre. The trading centre, however, is the business hub of Nathenje area, suggesting that even though most of the people were from the surrounding villages, they may have visited the trading centre on a regular basis. A majority of the study participants were women, a scenario which was also depicted in the Malawi national non-communicable disease (NCD) survey reported by Msyamboza et al. (2012) who reported that two thirds of the participants were female.

The overall prevalence of hypertension among the study participants was 22.1 %. This is lower than the national prevalence of 32.9 % which was noted by Msyamboza et al. (2011). Studies from other countries within Africa noted varying prevalence rates of hypertension that ranged from

12 % to 38.5 % (Azubuike & Kurmi, 2014; Olack et al., 2015; Ibekwe, 2015; Diwe et al., 2015; Ajayi et al., 2016). Studies outside Africa, however, identified higher prevalence rates ranging from 35.7 % to 44.5 % (Niu & Seo, 2014; Howitt et al., 2015; Maharjan, 2018; Rodríguez Pérez et al., 2012).

The differences noted in hypertension prevalence rates could be attributed to differences in study sample characteristics from the different studies such as age distribution, sex distribution, differences in lifestyle habits, race variations, and differences in prevailing risk factors. It should also be noted that other participants in the present study had high normal blood pressures which are also a cause for concern in themselves as they are associated with an increased risk of cardiovascular disease (Vasan et al., 2001).

Knowledge of the Participants on Hypertension

Almost half of the participants had never heard about hypertension before. The steps survey conducted in Malawi by Msyamboza et al. (2012) only reported low awareness of hypertensive status among those who were noted to be hypertensive. The results of the present study highlight the lack of awareness about hypertension itself among the adult population. Thus, it can be deduced that low awareness of hypertension as a condition is a contributing factor to the low awareness of one's hypertensive status because one cannot know one's status of something that one does not know exists.

In regard to risk factors, 40.6 % of the participants were not aware of any single risk factor for hypertension. Among those who were aware, there was variation in the knowledge of individual risk factors as some risk factors were better known than others. The most well-known risk factors include stress, excessive salt intake, diabetes mellitus, excessive alcohol intake,

sedentary lifestyle, and smoking while gender was not well known. The current study, even though it was done among individuals with unknown hypertension status identified better awareness on most of the risk factors of hypertension among the participants who had ever heard about hypertension than previous studies which were done among known hypertensive individuals (Chingatichifwe et al., 2014; Mbeba, 2014). Mbeba (2014), in a study among hospitalized hypertensive patients noted that only 80.8 % of the respondents were aware that hypertension has risk factors. However, there was low awareness of most of the risk factors including heredity, excessive salt intake, alcohol consumption, and cigarette smoking while there was high knowledge of stress (83.8 %) as a hypertension risk factor. This suggests insufficient provision of information even to individuals who are found to be hypertensive and calls for more stringent action in the fight against hypertension to ensure that prevention is advocated for sufficiently at all levels; primary, secondary, and tertiary.

Little knowledge on the asymptomatic nature of hypertension was observed among the participants. Previous studies on hypertension in Malawi did not report on this. However, some studies conducted outside Malawi (Zafar et al, 2008; Oladapo et al, 2013) also identified the same. This widespread misconception that someone cannot have hypertension without feeling ill can affect engagement in preventive practices and utilisation of any available screening services.

A few of the various conditions that were presented as symptoms of hypertension by the participants of the present study were also mentioned by the participants in studies conducted by Zafar et al. (2008) and Mbeba (2014). These include headache; heart palpitations; excessive sweating; eye problems; musculoskeletal pains; general symptoms of illness such weakness and vomiting; mental health problems such as confusion; and dizziness. It is well documented,

however, that hypertension is a silent killer due to its asymptomatic presentation (Oladapo et al., 2013; Onyekwere et al., 2013; Ibekwe, 2015; Sagare et al., 2011). In addition, Oladapo et al. (2013) note that any signs and symptoms experienced by an individual with hypertension are indications of target organ damage. The presence of misconceptions on the presentation of hypertension can affect attendance of hypertension screening services, if they were made available, since those individuals who feel healthy may not see the need to have their blood pressure checked.

Knowledge of blood pressure checking as the correct way of diagnosing hypertension was unsatisfactory and this is a cause for concern because it can also affect negatively the uptake of hypertension screening services if they were to be freely available. Ailinger (1982) notes that 78 % of the participants in their study were aware that the only way for a person to know if they have high blood pressure is to have their blood pressure measurement taken. This higher level of awareness on hypertension diagnosis was noted decades before the present study and highlights the need for Malawi to work towards ensuring that the public are aware that hypertension has a silent presentation and that blood pressure checking is necessary for true diagnosis of hypertension whether one feels ill or not.

Low awareness of the lifelong nature of hypertension and its treatment was noted. Most of the participants, however, were aware that seeking treatment from the hospital when someone has high blood pressure is the best action to take with only a few stating that treatment should be obtained through the purchase of over the counter drugs or acting according to whatever seems best to the affected individual at the moment. Faronbi, Oladepo, Faronbi, and Olaogun (2014) in Nigeria noted that 42.5 % of the participants opted to buy medicine in the event that one is found to have high blood pressure.

The results of the present study indicate little belief and reliance on traditional measures and self-help strategies for the control of hypertension and higher preference for hospital based healthcare on health issues to do with hypertension. The present study, though, did not explore if this was because the participants were exposed to the semi-urban setting surrounding the hospital and their villages as this may have influenced their high belief in modern health system. Simwaka, Peltzer, and Maluwa-Banda (2007) reported that more than 70 % of individuals from rural areas in Malawi rely on traditional medicine as a primary healthcare source. There is, therefore, a need to find out if people from typical rural villages whose health facility is also in a rural area would have the same choices or would opt for traditional means of healing. In addition, it may be a possibility that the participants opted for modern medical services because hypertension is not well known so they may think that traditional medicine may not have a cure for it.

A majority of the participants in the current study were not aware that hypertension can complicate to other conditions. However, the participants who were aware were able to mention some hypertension related complications. Among those who had ever heard about hypertension, however, there was good overall knowledge; with high knowledge of heart disease, stroke, atherosclerosis, eye disorders, and kidney disease as hypertension complications. High knowledge of stroke and heart problems has also been reported in prior studies (Ailinger, 1982; Zafar et al., 2008; Maharjan, 2017; Savoca et al., 2009) with low awareness of atherosclerosis, eye disease and kidney problems (Zafar et al., 2008; Maharjan, 2017, Mbeba, 2014). In the study by Chingatichifwe et al. (2014), however, a majority of the participants were unable to mention complications of NCDs in general even though they had reported that they received health education. This indicates another challenge in the area of both primary and secondary prevention of hypertension that ought to be addressed accordingly in hypertension prevention programs.

Knowledge on hypertension prevention was generally low with only a few of the participants aware that it is possible to prevent hypertension while others were unaware if it can be prevented or not and others believed that it was impossible to prevent. Savoca et al. (2009) also note challenges in regards to knowledge on prevention strategies for hypertension and belief in their effectiveness among the participants of their study. Lack of knowledge on hypertension prevention has the potential to hinder participation in preventive measures more especially in those who feel that hypertension cannot be prevented because they would think that any effort to prevent is in vain and therefore useless.

The three most common preventive measures mentioned included low salt diet, stress management, and low sugar diet. Other preventive practices mentioned include physical activity, low fat diet, low alcohol intake, smoking avoidance, anger management, regular blood pressure checks and weight loss. The fact that the majority of individuals were not aware of hypertension prevention measures portrays a great need for education on the same with the ultimate goal of reducing the currently high burden of hypertension. Empowering individuals with knowledge of hypertension preventive measures is important as a tool for encouraging individuals to engage in lifestyle behaviours that would help to reduce the hypertension risk that is associated with modifiable factors. Mbeba (2014) reported that 91.7 % of the participants in the study conducted among hypertensive patients were aware of exercise as a preventive measure for hypertension. There is paucity of information in regards to the other preventive measures hence the results of the present study present new information to inform the design of hypertension prevention programs.

Among those who had ever heard about hypertension in the present study, there was good knowledge on the need for regular blood pressure checking as a preventive measure for

hypertension even among individuals who feel healthy. Such knowledge is important as it can encourage uptake of hypertension screening services if they were to be made available.

The results of the present study indicate the presence of misconceptions on several aspects of hypertension knowledge including risk factors, clinical presentation, diagnosis, treatment, complications, and prevention. Among the participants, eating chilli was presented as a risk factor for hypertension while misconceptions on hypertension complications included diabetes, respiratory disorders, infectious conditions, neurological disorders such as confusion, general illness and cancer. Misconceptions presented on blood pressure prevention strategies include high fluid diet, balanced diet, eating organic food, avoiding hot places, and taking prophylactic medications. Oladapo et al. (2013) also note misconceptions on the nature and symptoms of hypertension while Oke and Bandele (2004) note misconceptions on the nature, risk factors, complications, and treatment of hypertension.

The presence of misconceptions presents a need for more education on hypertension to the public in order to clear the misconceptions. Stephens (1973) identifies health education as the best weapon against misconceptions about health and emphasises its importance. Stephens further notes that what an individual knows or does not know or erroneously believes will influence his action. Thus, misconceptions present a barrier to hypertension prevention and ought to be cleared if hypertension prevention is to be enhanced.

Sources of Information for the Participants' Knowledge about Hypertension

A variety of channels were mentioned by the participants as sources through which they learn about hypertension; friends, family, and the hospital constituted the three most popular sources of information mentioned. Print media was not a popular source of information, the least

common sources of information mentioned were village group meetings and the internet. Other studies (Oladapo et al., 2013; Akter et al., 2014) have also identified friends and family as popular sources of information on hypertension.

Redmond, Baer, Clark, Lipsitz, and Hicks (2010) describe sources of information as means for health communication that are associated with health beliefs and health behaviors. Redmond et al. who studied the associations of two classes of health information (interpersonal sources and mass media) in the adoption of health behavior noted that the use of print media, community organisations, and healthcare providers as information sources had higher odds of meeting recommendations for health behaviours. The present study, did not examine this but the results recognise the highest influence of friends and family as informants while the hospital comes third. A critical analysis of the results, though, indicates that a majority of these friends and family members are not well knowledgeable about hypertension and thus can facilitate the spread of misconceptions related to the same.

The internet and village groups were the least mentioned available sources of information on hypertension. For the internet, it could be due to access problems because most of the participants were illiterate and from rural areas such that they were probably less aware of the existence of the internet or how to use it. The identified low availability of village groups as information sources, denotes the gap that exists in the area of community involvement for hypertension prevention.

Mchombu (2003), in a study on the impact of information dissemination among rural communities in Malawi and Tanzania noted low use of print media among the Malawian community and this was attributed to low levels of education. Mchombu, however, also noted

higher participation in information dissemination activities that were not print dependent such as meetings, video shows and games. These results coupled with those of the present study should guide in the development of information dissemination strategies so that information carriers that will be effective in delivering the right message to the public should be utilised most while minimizing the use of sources that have been noted to be less effective such as books and brochures.

The various sources of information presented by the participants provided varying levels of information. Redmond et al. (2010) note that different sources of information are used in varying degrees among different groups of people. Marriott, Palmer, and Lelliott (2000) on information dissemination emphasises the cruciality of considering who needs to know (the audience) and how they can be reached (the vehicle). The hospital was mentioned as the source which had provided them with most of the information they knew about hypertension which points towards the critical role that health workers have in the campaign for hypertension prevention and in improving knowledge about hypertension among the public. It also emphasises the benefits that can be realized in hypertension prevention especially if advantage could be taken of the high outpatient service utilisation rates in Malawi to provide hypertension education.

The advantage that the hospital holds as a facilitator for hypertension prevention is also evident in the fact that when asked to select the preferred source to get information from, 64 % of the participants who had ever heard about hypertension before identified the hospital as a convenient source of information followed by the radio at only 13.5 % preference. This preference coupled with the regard of the hospital the most informative source of information suggests great reliance and trust in hospital based information despite whatever challenges may be present in the

health system at the moment. It further argues the case for capacity building of health facilities in the area of information dissemination to enhance hypertension prevention.

The preferred method for hypertension information dissemination, however, was only inquired from the individuals who had ever heard about hypertension which is seen as a limitation of the study because educational initiatives will not only target this group but are meant to target all individuals. It is therefore recommended that future studies should inquire about this among all study participants.

Despite the present role that the hospital plays, knowledge of the study participants on the various aspects that relate to hypertension is not satisfactory, indicating the need to improve health service delivery in regards to information dissemination for hypertension. The hospital may have its own challenges that affect delivery of information to clients hence these have to be investigated and addressed accordingly. As such, building the capacity of health facilities in information dissemination is likely to greatly improve hypertension knowledge among the public. This acquisition in knowledge, as earlier stated, is bound to facilitate the uptake of preventive behaviour and in turn ease the burden of hypertension in Malawi.

Practices That Relate to Hypertension among the Participants

From the study results, it is evident that opportunities for the health system to enhance hypertension screening at health facilities during regular outpatient visits were greatly available in view that only 9.9 % of the participants had never been to a health facility within the past year prior to the study. In addition, there was a high frequency of hospital visits as 36.7 % of those who had been to the clinic in the past year reported that they had been there $\geq$ 5 times. There is a record of high outpatient service utilisation rates at government health facilities of 1288 visits per 1000

population owing to, among others, the fact that individuals do not have to pay for health services (Ministry of Health, 2011b). Thulin, Schersten and Andersson (1975) notes that blood pressure check is a routine test during clinic attendance, hence these visits can be utilised as good opportunities for hypertension screening among those who visit the hospital.

Despite that fact that there is high outpatient service utilization, hypertension screening opportunities are not accorded to adults seeking outpatient services. The study noted that only a minority of the participants had ever had a blood pressure check before with 72.2 % of those who had ever had a blood pressure check reporting that they had less than four blood pressure checks in their lifetime. Also, quite interesting is the fact that most of the study participants were women of childbearing age who may have attended antenatal services at some point in time where it is expected that they would have their blood pressure checked. The results of the present study, however, suggest that blood pressure checking in antenatal settings is not done routinely as recommended. The study, however, did not assess parity of the participants and prior antenatal attendance, therefore, rendering this suggestion inconclusive.

Among those who had ever had a blood pressure check before, the majority had the check within the past two years which is the frequency recommended particularly for those whose prior blood pressure reading was high (Takahashi, Glasziou, Perera, Shimbo, & Fukui, 2012). Msyamboza et al. (2012) also report that 75 % of the participants in their survey had never had their blood pressure checked. This shows that despite the study by Msyamboza et al. having highlighted gaps in service delivery, not much has been done to address this problem of missed opportunities for hypertension screening.

The low availability of chances for blood pressure checking in Malawian hospitals was also reported by Mwale et al. (2014) who noted that only 28.6 % of midwives at Bwaila Hospital checked patients' blood pressure pre-operatively. Another study conducted in several Christian Health Association of Malawi (CHAM) and government health facilities reports that only patients admitted to CHAM facilities had their vital signs checked at least once a day (Chimtembo et al., 2013). Related to this Chimtembo et al. (2013) discovered that 63% of the midwives in all government health facilities discharged postnatal mothers and their neonates without checking their vital signs.

The results from these two studies in maternity settings depict the typical scenario in many of the public hospitals, which also happen to constitute a majority of the health facilities in the country. In such an environment, it is difficult for one to know whether they have hypertension or not and also for one to learn about hypertension. Studies conducted in other countries (Ajayi et al., 2016; Azubuike and Kurmi, 2014; Maharjan, 2017), however, report a higher prevalence of people who have had previous blood pressure checks before the time of the study; these ranged from 42.9 % to 81.4 % indicating how low this practice is in Malawi.

Of those who had ever had their blood pressure checked, the majority had their blood pressure check at the hospital; signifying lack of sufficient community outreach programs for hypertension screening and also presents a missed opportunity for disseminating hypertension information to the public through the use of community outreach activities. However, the health facility emerges as a champion again in regards to sites where the participants had ever had blood pressure checks hence advancing the argument that there is a need for capacity building of health facilities to enable them provide screening services for hypertension as a strategy for prevention

more especially since blood pressure checking does not require highly expensive and sophisticated equipment and also because the people come to the hospital often enough.

It is recommended that adults should undergo hypertension screening every three years at most depending on risk profile determined from the prior blood pressure reading (Takahashi et al., 2012). Ma and Stafford (2005) consider routine blood pressure checking as a quality indicator for outpatient services. Furthermore, Whitehead (2005) recommends that hospitals should move away from illness focus alone and become health promoting hospitals. Whitehead further notes that this requires the hospitals to expand their focus to include health promotion activities as this is in line with recommendations from the 1986 World Health Organisation Ottawa Charter for Health Promotion.

Among those who had ever had a blood pressure check, 24.6 % reported that their previous blood pressure reading was high. This study, however, did not assess the action taken or the advice given to these individuals for an ultimate decision to be made that the individual is not hypertensive. However, the fact that the individual did not consider self as hypertensive is suggestive that even in the event where an individual has that rare chance to have their blood pressure checked, there is poor response in regards to secondary prevention for a conclusion to be made on the hypertension status of the individual. It may be beneficial to have a study assessing whether this challenge is health worker mediated or client mediated or there may be other factors concerned.

Lack of opportunity was the most prevalent reason given by the participants who had never had a blood pressure check, shading more light on the present gap in screening for hypertension during outpatient services. This was followed by ignorance about hypertension which in itself

suggests that the individuals may have some level of commitment to get screened for conditions they know about provided the knowledge is there and the opportunity to get checked is also there. The other reasons presented; lack of interest to have a blood pressure check, did not see the need for a blood pressure check, did not think is at risk for hypertension, too busy to have a blood pressure check, and fear of the result also indicate the effects of lack of knowledge and lack of sufficient opportunities for blood pressure screening.

The prevalence rates of smoking and alcohol consumption were much lower than those identified in the national NCD STEPS survey by Msyamboza et al. (2011) possibly owing to the fact that a majority of the participants were female. Msyamboza et al. noted that smoking, tobacco use, and alcohol consumption were more common in men than in women

However, a large proportion admitted to smoking several times a day. In contrast, a majority of the participants only took alcohol once in a while. Major reasons given for smoking and alcohol consumption included leisure, peer pressure, to forget problems and for healing. This points towards a need to facilitate the presence of healthier options for leisurely activities, to encourage their uptake and also to provide health education that would help to dispel associated misconceptions. In addition, there is an evident need for mental health services that build the capacity of individuals to be able to handle stressful situations positively to enable them to identify plausible solutions to own problems being faced.

A majority of the participants reported that they experience stress in their lives with many of them reporting that they experience stress almost always. No data were found regarding stress in Malawi. Sagare et al. (2011) who identified the presence of stress in most of the participants of

a study conducted in India report the presence of higher stress levels in very few of the participants while the majority had lesser stress.

The high presence of stress is of great concern because stress has been noted to cause repeated blood pressure escalations which may eventually lead to the development of hypertension while interventions to manage stress have been found to be effective in reducing blood pressure and the development of hypertension (Kulkarni, O'Farrell, Erasi, & Kochar, 1998). The high prevalence of stress among the participants further highlights a need for mental health services to support individuals to manage the stress that they experience in healthy ways in order to reduce the hypertension burden in Malawi.

Low engagement in sedentary lifestyle was noted among the participants possibly owing to the fact that most of them were farmers by occupation. In addition, most of the participants were female and were not in formal employment, and therefore, had high engagement in household chores as part of their daily activities. Msyamboza (2011) also noted high levels of physical activity as only 10 % of the participants were noted to be physically inactive.

Though it is pleasing to note that there is a high level of involvement in physical activity, it is of concern that there is low engagement in deliberate self-initiated activity. Sagare et al. (2011) in India, also noted low engagement in leisure time activity. The current status suggests that a change of occupation will bring an end to physical activity and render some individuals leading a sedentary lifestyle. In addition, the arrival of someone else to take over responsibility for household chores is likely to result in less engagement in physical activity for most of the participants because they will have delegated their chores to another. This study, however, did not use metabolic equivalents to assess the levels of physical activity mentioned to explore the time

spent in physical activity for the participants to check if what was regarded as physical activity by the participants is sufficient. The use of metabolic equivalents is recommended for exercise testing (Jetté, Sidney, & Blümchen, 1990).

Excessive salt intake was not highly prevalent as only a minority of the participants engaged in self-reported excessive salt intake. Sagare et al. (2011), however, noted higher prevalence of above-optimal salt consumption among their study participants. There is a need to educate the public on the dangers of excessive salt intake in relation to hypertension as a prevention strategy.

Modifiable Risk Factors for Hypertension among the Participants

Just as in the results of the survey by Msyamboza et al. (2011) several modifiable risk factors for hypertension have been noted among the participants of the study with stress being the most prevalent. Others include overweight, alcohol consumption, smoking, obesity, and sedentary lifestyle. The presence of these risk factors is of concern when it comes to the fight against the burden of hypertension as Assman et al., (1998) note that the presence of any risk factor can contribute to overall increase in blood pressure. Some of the prevalence rates noted, however, are lower than the national rates that were reported by Msyamboza et al. (2011) possibly owing to the fact that the studies enrolled different populations as the current one only focused on outpatients at a health centre while the study by Msyamboza et al. was done countrywide.

Prevalence of hypertension among the participants who had risk factors was assessed; the highest prevalence was noted among those who led a sedentary lifestyle followed by the overweight and then smokers, then the obese, those who took alcohol, those who had stress and those who reported excess salt intake. In comparison, Msyamboza et al. (2012) notes the highest

prevalence of hypertension among those who were overweight followed by those who consumed alcohol, those who smoked, those who were obese, and those who had a sedentary lifestyle. These results highlight the impact of each individual risk factor on hypertension development and portray a great need to put in place public focused interventions that can help to address them.

Relationship between Participants' Awareness of Hypertension and Age, Education, Gender, and Marital Status.

No association was noted between participants' awareness of hypertension and participants' marital status, gender, or number of visits made to the hospital. Association was noted between participants' awareness of hypertension and participants' age ($p = 0.021$) and education level ($p = 0.000$). Participants in younger age categories were more likely to have heard about hypertension than their older counterparts, suggesting the presence of more exposure to or interest in information about hypertension in the younger generation. Additionally, the more the education level, the more likely it was that one would have ever heard about hypertension, highlighting the influence that education has on hypertension prevention and thus identifying hypertension as a health problem which requires a multi-sectoral approach with interventions that surpass the bounds of the health sector.

Conclusion

There is lack of knowledge among most of Nathenje outpatient department clients about hypertension in general and its various aspects. Knowledge of hypertension was associated with selected participant characteristics. Various avenues are present to enable information sharing but they are not efficiently utilised in order to enhance knowledge about hypertension among adults enough to facilitate adequate hypertension control. There is a presence of good and bad practices

in regards to hypertension but there is a challenge in availability of screening services and a general lack of deliberate individual effort to control development of hypertension despite the presence of multiple risk factors for hypertension among the study participants which may be compounded by low knowledge and awareness regarding hypertension. All of these factors affect hypertension prevention efforts and ought to be considered and addressed in hypertension prevention strategies in order to ensure their efficacy.

Strengths of the Study

The study, which managed to obtain approval from the College of Medicine Research Ethics Committee, was done on an area in which there is paucity of information despite hypertension being one of the major contributors to mortality and morbidity among adults in Malawi. The results of the study are quite informative and have highlighted several issues that ought to be considered in the design and implementation of hypertension prevention programs.

The researcher obtained support from Lilongwe District Health Office through permission to pilot the questionnaire at Lumbadzi Health Centre and to conduct the study at Nathenje Health Centre. There was more support from the health centre staff as they were able to provide a suitable room to ensure participant privacy during the study and they were also able to manage the participants who were referred to them after being found with problems. There was also support from Kamuzu Central Hospital Physical Assets Management department in regards to validation of the blood pressure machine and weighing scale used during the study.

Good support and interest was also noted from the study participants particularly after they learnt that they would also have a blood pressure check during the research process. The study provided an opportunity for adults to have their blood pressure and body mass index checked and those with problems were given necessary advice and referred to the health centre clinician for further assessment, management and follow up. This was of great benefit as some people who thought they had no blood pressure problem had the opportunity for timely detection of the same.

The study highlights the burden of hypertension and the lack of knowledge about it among the general public despite the fact that the national STEPS survey which discovered the high burden of non-communicable diseases in Malawi was conducted in 2009. Particular grey areas for emphasis in regards to hypertension prevention have been pinpointed to aid in the design of appropriate strategies to address the problem. Furthermore, the study notes the health system as a key player in hypertension prevention and some of its challenges and missed opportunities that ought to be addressed if the fight against hypertension is to gain higher ground.

Limitations of the Study

One of the limitations of the study is the inability to conduct the study at nationwide scale. The study, also, did not inquire about co-morbidities in the study participants which may have contributed to high blood pressure readings in those who were identified as having hypertension. In addition, the study identified certain issues in regards to knowledge and practices affecting hypertension that require deep exploration to identify more issues than the study was able to identify as they were beyond the scope of the study. Furthermore, the high representation of women affected the ability to compare results between men and women, hence the results may not necessarily be representative of men as well. The study, also did not analyse in-depth the lifestyle

of the participants who were identified to have high blood pressure as they may have had other less reported modifiable risk factors that contributed to their high blood pressure result. In addition, the study was clinic based hence the results may not necessarily be representative of the people of Nathenje area but rather of those who visit Nathenje Health Centre.

Recommendations

Recommendations have been made for practice, education, management and future research in view of the results of the study to guide interventions for hypertension control.

Practice.

There is need to build the capacity of hospitals and health workers in the area of hypertension prevention by providing necessary training to health-workers on the burden of hypertension and how they can contribute to addressing it. This will help to ensure commitment of hospital staff to participate more in providing hypertension related information to their clients and will also encourage them to ensure that the blood pressure of clients who visit their health facilities seeking health services is checked.

Hospital capacity building should also involve providing necessary human and material resources to enable routine screening of hypertension among all outpatients that visit a health facility for health services. Furthermore; information, education and counselling materials that can help to disseminate information about hypertension on a regular basis to clients seeking health services should be made available and utilised by health staff.

It is necessary to ensure the availability of regular periodic community outreach services to increase the availability of opportunities for hypertension screening among the general public, such events can also be utilised as opportunities to give information about hypertension to community members. There is also need for community involvement in the fight against hypertension through the use of existing community groups to include, among their agenda, information sharing sessions on hypertension.

Use of information dissemination methods that have been shown to be suitable and preferable within the context can help to make sure that the information reaches the intended audience; dispelling misconceptions and stressing the silent nature of hypertension, its complications and possibility to prevent it if one engages in the necessary lifestyle modifications.

There is need to conduct an intervention study that will implement a designed hypertension health education and prevention program after assessing current knowledge and practices and then follow up after time to note the impact of such interventions in regards to hypertension related knowledge and practices of adults.

Furthermore, there is need to enhance the capacity of health facilities in providing mental health services that empower individuals to manage life stressors in healthy ways so as to help reduce the burden of stress, thereby influencing individual responses to stress which is a modifiable risk factor for hypertension.

There is need to make available community friendly exercise and leisure facilities to promote exercise and deter engagement in harmful practices for leisure.

Education.

There is a need to design effective strategies and educational materials to enhance dissemination of hypertension information to the public.

There is a need to emphasise the nature, burden, and necessary approaches for dealing with hypertension during education of health workers.

Management.

There is need for a renewed commitment from the health sector authorities in addressing hypertension.

There is a need for development of policies to guide the design of context sensitive information dissemination strategies and materials for hypertension knowledge dissemination to the public.

There is need for health policy makers to designate special days for hypertension prevention campaigns just like it is done for other health programs in Malawi.

It is imperative that policies should be developed that will help to ensure that blood pressure checking in all outpatient departments becomes a mandatory activity except where clients opt out and to make on-demand blood pressure checking services freely available to the public.

Research.

There is need to conduct a similar study on national scale in order to determine the knowledge and practices related to hypertension in the nation as a whole.

There is need to assess knowledge and practices in urban and deep rural areas to compare with the results of the current study which was conducted in a semi-urban area.

There is also a need to study in-depth the lifestyle of participants incidentally identified as having elevated blood pressure as there may be other associated modifiable risk factors that have not been well explored and reported in hypertension studies.

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Appendices

Appendix 1 A: Participant's Information Sheet, English Version

Research Title: Assessment of knowledge and practices on hypertension among adult outpatients of unknown hypertension status at Nathenje Health Centre in Lilongwe, Malawi.

Researcher: Pempho C. Katanga

Introduction

You have been asked to participate in a study that seeks to assess the knowledge and practices of adults on hypertension. This study is being undertaken by Pempho C. Katanga in partial fulfillment for the award of a Master of Science degree in Adult Health Nursing at Kamuzu College of Nursing. Your understanding of why the study is being conducted, what will be involved, possible risks and benefits to you because of your participation is very important.

The purpose of this study is to find out what you know about hypertension and also the preventive practices you undertake that may have a bearing on your hypertensive status. The study is for adult patients who are not known hypertensives, visiting the outpatient department of Nathenje Health Centre.

Participation in this study is voluntary and you may choose to withdraw at any point in time. Your refusal to participate will not affect the type of care that you will receive at this health facility.

If you agree to participate in the study, you will be asked to sign a consent form to indicate that you have understood the information that has been provided and that you have voluntarily agreed

to participate in the study. This form contains the contact details of the researcher in case you may have questions that you desire to ask after the interview is over.

What Is Expected Of You After You Consent To Participate in The Study?

You will be asked several questions by the researcher that will identify how much you know about hypertension and how you practice your lifestyle. You will also have your blood pressure, weight, and height checked. Your role is to respond to the questions honestly and to avail yourself for the body measurements. The interview is expected to take less than thirty minutes. Feel free to respond according to what you know.

How Your Privacy and Confidentiality Will Be Maintained

The interview will be done privately and any information that is discussed between you and the researcher will be kept confidential. Your name will not be used on the research questionnaire. An identification number will instead be used to identify your questionnaire. Your signature will only appear on the consent for participation in the study.

Filled questionnaires will be kept privately and will only be accessible to the research team members. No individual information will be disseminated. The results that will be disseminated in relation to the study will only reflect group information.

What Are The Risks Associated With The Study?

There are no risks that you will encounter by participating in this study. The study has been reviewed and approved by the College of Medicine Research and Ethics Committee (COMREC) to ensure that it is conducted in an ethical manner that prevents the introduction of harm to those who will participate in the study.

How Will You Benefit From The Study?

There are no financial or material benefits that you will derive from participating in this study. However, the knowledge that will be generated from the results of this study will inform the design of effective measures for the prevention of hypertension among adults in Malawi. This will in turn reduce the high rate of illness and deaths associated with hypertension.

What Will Happen If You Refuse To Participate In This Study?

Participation in the study is absolutely voluntary. There is no penalty for refusal to participate or for withdrawing from the study. Be assured that your refusal to participate will not affect the care that you receive at this health centre.

What Will Happen If You Have Any Questions?

You are free to ask any questions that you may have regarding the study. If you happen to have any questions following the interview, please contact the researcher or the chairperson of COMREC on the contact details below:

Pempho C. Katanga,
Kamuzu College of Nursing,
Private Bag 1,
LILONGWE.
Cell: 0 999 454 994

The Chairperson,
College Of Medicine Research and Ethics Committee,
Private Bag 360,
Chichiri,
BLANTYRE 3.
Tel: 01 871 911
Location: Mahatma Gandhi road, Blantyre, Malawi

Appendix 1 B: Participant's Information Sheet, Chichewa Version

Mutu wa Kafukufuku: Kufufuza zimene anthu amadziwa ndi kuchita zokhudza matenda a kuthamanga kwa magazi

Wochita kafukufuku: Pempho C. Katanga

Chiyambi

Mwafunsidwa kuti mukhale m'modzi wa anthu otengapo mbali pa kafukufuku wofufuza zimene anthu amadziwa ndi kuchita zokhudza matenda a kuthamanga kwa magazi. Amene akupanga kafukufuku ndi mayi Pempho C. Katanga amene akupanga maphunziro owonjezera a unamwino ku sukulu ya Kamuzu College. Ndi zofunikira kwambiri kuti mumvetsetse chifukwa chomwe kafukufuku ameneyu akupangidwa, zomwe zitachitike mukafukufuku ameneyu, komanso zovuta kapena zabwino zimene mungakumane nazo potenga nawo mbali.

Cholinga cha kafukufukuyu ndi kufufuza zimene inu mumadziwa komanso kuchita zokhudzana ndi matenda a kuthamanga kwa magazi. Zimenezi zikufufuzidwa mwa anthu akuluakulu amene sanapezedweko ndi nthenda ya kuthamanga magazi amene abwera kudzalandira chithandizo ku chipatala cha Nathenje.

Kutenga mbali mukafukufukuyu si kokakamiza komanso mukhoza kusankha kusiya nthawi iliyonse. Kusatengapo mbali sikusokoneza mu njira iliyonse chithandizo chimene mutalandire pa chipatala chino.

Mukavomera kutengapo mbali, mupemphedwa kuti musayine chikalata chosonyeza kuti mwavomera kutenga nawo mbali komanso mwamvetsetsa zimene mwafotokozeredwa zokhudza kafukufuku ameneyu. Pa pepala lino, pali nambala ya foni ya amene akupanga kafukufukuyu kuti ngati mungakhale ndi mafunso pambuyo mukhonza kufunsa.

Kodi kutenga mbali kwanu ndi kotani?

Ngati mutavomereze kukhala nawo mukafukufuku ameneyu mufunsidwa mafunso angapo okhudza zimene mumadziwa za matenda a kuthamanga magazi komanso zimene mumachita pa moyo wanu zimene zimakhudzana ndi matenda amenewa. Kuwonjezera apo, muyezedwa m'mene magazi anu akuthamangira komanso sikelo yanu ndi katalikidwe kanu. Udindo wanu ndi kuyankha mafunso malingana ndi zomwe mukudziwa komanso kukhalapo kuti muyezedwe kuthamanga kwa magazi, sikelo, ndi katalikidwe. Khalani omasuka kuyankha malingana ndi kudziwa kwanu.

Kodi chinsinsi chanu chisungidwa bwanji?

Dziwani kuti zokambirana zichitikira pambali komanso zimene mutakambirane ndi wofufuza sizikambidwa ndi anthu ena. Dzina lanu sililembedwa pa pepala limene muziyankhilapo mafunso. Tilembapo nambala chabe. Inu muyembekezeredwa kusayina pa pepala la chilolezo lokha basi.

Mapepala amene ali ndi mayankho anu asungidwa malo abwino achinsinsi ndipo agwiritsidwa ntchito ndi okhawo amene akulongosola za kafukufukuyu. Zotsatira za kafukufuku zidzakambidwa mofotokoza zomwe zapezedwa kwa gulu lonse pamodzi osati munthu m'modzi m'modzi.

Pali zovuta zanji zimene mungakumane nazo pa kafukufuku ameneyu?

Palibe zovuta zimene mungathe kukumana nazo chifukwa chotenga mbali pa kafukufuku ameneyu. Kafukufukuyu waunikidwa ndi kuvomelezedwa ndi bungwe lovomerezeka ndi boma lomwe liri ku sukulu ya madotolo ya College of Medicine. Iwo amaunika ndondomeko zonse ndi cholinga chowonetsetsa kuti onse otenga mbali asayikidwe pa chiopsyezo china chirichonse.

Kodi mupindula bwanji potenga nawo mbali?

Palibe phindu la ndalama kapena katundu limene mutapeze popanga nawo kafukufuku ameneyu. Koma choti mudziwe ndi choti zotsatira za kafukufuku ameneyu ndi zofunikira kwambiri popititsa patsogolo umoyo wa anthu akuluakulu popeza zithandiza kukhazikitsa ndondomeko zoyenerera zothandizira kupewa matenda a kuthamanga kwa magazi muno mu Malawi. Zimenezi zithandizira kuchepetsa mulingo wa anthu odwala komanso omwalira chifukwa cha nthenda ya kuthamanga kwa magazi umene pakali pano uli wokwera modandaulitsa.

Chitachitike ndi chani mukakana kutenga nawo mbali?

Kutenga nawo mbali ndi chisankho chanu. Palibe vuto liri lonse limene mungakumane nalo chifukwa chokana kutenga nawo mbali mu kafukufukuyu.

Mupange bwanji ngati muli ndi mafunso?

Khalani omasuka kufunsa funso liri lonse limene mungakhale nalo lokhudza kafukufuku ameneyu. Ngati mungapezeke ndi funso ena patsogolo, mukhonza kulemba kalata kapena kuyimba foni kwa amene akupanga kafukufukuyu kapena a pampando pa bungwe loona zoti kafukufuku ndi woyenerera. Adilesi za kalata ndi nambala za foni nazi:

Pempho C. Katanga,

Kamuzu College of Nursing,

Private bag 1,

LILONGWE.

Foni: 0 999 454 994

The Chairperson,

College Of Medicine Research and Ethics Committee,

Private bag 360,

Chichiri,

BLANTYRE 3.

Foni: 01 871 911

Komwe ili: Msewu wa Mahatma Gandhi, ku Blantyre, Malawi

Appendix 2 A: Participant's Consent Form, English Version

Research Title: Assessment of knowledge and practices on hypertension among adult outpatients of unknown hypertension status at Nathenje Health Centre in Lilongwe, Malawi.

Researcher: Pempho C. Katanga

To be a participant in this study, you must sign on the spaces provided at the end of this sheet. Your signing of this sheet is a confirmation that:

- Information about this study has been thoroughly explained to you.
- You have clearly understood the information that was explained.
- You voluntarily agreed to participate in this study.
- You have had the opportunity to ask questions regarding this study and they have been answered to your satisfaction.
- You know that you are free to withdraw at any time

_____	_____	_____
Name of participant	Date	Signature/ Thumb print
_____	_____	_____
Name of witness	Date	Signature
_____	_____	_____
Name of researcher	Date	Signature

Appendix 2 B: Participant's Consent Form, Chichewa Version

Mutu wa Kafukufuku: Kufufuza zimene anthu amadziwa ndi kuchita zokhudza matenda a kuthamanga kwa magazi

Wochita Kafukufuku: Pempho C. Katanga

Kuti mutengepo mbali pa kafukufuku ameneyu, mukuyenera kusayina pamene pali mzere, pa mapeto pa pepala lino. Kusayina kwanu kukusonyeza kuti:

- Mwafotokozeredwa mwa tsatanetsatane zokhudza kafukufukuyu
- Mwamvetsetsa zimene munafotokozeredwa
- Mwavomereza mwa kufuna kwanu kutengapo mbali mu kafukufukuyu
- Munapatsidwa mpata wofunsa mafunso ndipo mwayankhidwa
- Mukudziwa kuti mukhonza kusiya kutengapo mbali pamene mwafuna

_____	_____	_____
Dzina la wofunsidwa	Tsiku	Sayini/ Dindani chala
_____	_____	_____
Dzina la mboni	Tsiku	Sayini
_____	_____	_____
Dzina la wofufuza	Tsiku	Sayini

Appendix 3 A: Questionnaire, English Version

Research Title: Assessment of knowledge and practices on hypertension among adult outpatients of unknown hypertension status at Nathenje Health Centre in Lilongwe, Malawi.

CODE Number: _____ **DATE: _____**

No	QUESTION
SECTION A: DEMOGRAPHIC DATA	
A1	Please state your age in years : _____
A2	Please indicate your sex: 1. Male 2. Female
A3	What is your current level of education: 1. None 2. Primary 3. Secondary 4. Tertiary
A4	What is your marital status: 1. Single 2. Married 3. Separated 4. Divorced 5. Widowed
A5	Please select your religion: 1. Christianity 2. Islam 3. Other (please specify) _____

A6	What is your occupation (fill in the blank space)? _____
A7	Where do you reside? 1. _____ village (indicate village name in the blank space) 2. Trading centre 3. Other _____ (please specify)
A8	What is your tribe? 1. Chewa 2. Ngoni 3. Other (please specify) _____
SECTION B: KNOWLEDGE ABOUT HYPERTENSION	
B1	Have you ever heard about hypertension? 1. Yes 2. No If yes, proceed to question B2. If no, proceed to section C.
B2	Do you know anyone with hypertension? 1. Yes 2. No If yes, proceed to question B3. If no, proceed to question B4
B3	Have you ever lived in the same house with someone who has hypertension? 1. Yes 2. No
B4	A person is said to have hypertension when the blood pressure is equal to or above: 1. 120/70 2. 140/90 3. Don't know

B5 Tick yes beside any item that is a risk factor for hypertension (tick all that apply):

ITEM	YES (1)	NO (2)
a. Obesity		
b. Smoking and tobacco use		
c. Excessive salt intake		
d. Excess alcohol intake		
e. Sedentary lifestyle		
f. Stress		
g. Family history		
h. Gender		
i. Diabetes mellitus		
j. Old age		
k. Drinking excess coffee or tea		
l. Other (please specify)_____		
m. Don't know any		

B6	Is it possible for someone to have hypertension without showing or feeling any physical signs and symptoms and without knowing it? 1. Yes 2. No 3. Don't know
B7	Is it true that hypertension has symptoms: 1. Yes 2. No 3. Don't know If yes, proceed to qestion B8. If no or don't know, proceed to qestion B9
B8	The symptoms of hypertension are (list all those that you know): _____ _____ _____ _____
B9	The best way to tell that someone has hypertension is through: 1. Measurement of blood pressure 2. Feeling of symptoms 3. Don't know 4. Other (please specify) _____
B10	Which statements is true regarding the outcome of hypertension treatment: 1. Hypertension is a curable disease 2. Hypertension requires lifelong treatment 3. Don't know

B11 Can high blood pressure complicate to other illnesses?

1. Yes
2. No
3. Don't know

If yes, proceed to question B12. If no or don't know, proceed to question B13

B12 Tick yes beside any potential complication of hypertension (tick all that apply)?

ITEM	**YES (1)**	**NO (2)**
a. Stroke		
b. Heart disease		
c. Kidney disease		
d. Atherosclerosis		
e. Eye disorders		
f. Other (please specify) _____		
g. Don’t know		

B13 Is it necessary for one to have regular blood pressure checks even if they feel healthy?

1. Yes
2. No
3. Don't know

B14 Is it possible for one to take measures to prevent or delay the onset of hypertension?

1. Yes
2. No
3. Don’t know

If yes, proceed to question B15. If no or don’t know proceed to section C

B15	List all the activities you know which can help one to prevent hypertension: _____ _____ _____

SECTION C: SOURCES OF KNOWLEDGE ON HYPERTENSION

C1 Tick yes beside any source from which you acquired the knowledge that you have about hypertension (select all that apply)?

ITEM	**YES (1)**	**NO (2)**
a. Internet		
b. Radio		
c. Television		
d. Hospital/clinic staff		
e. Family		
f. Friends		
g. Newspapers		
h. Books		
i. Church/ mosque		
j. School		
k. Posters/ Brochures		
l. Other (please specify) _____		

C2 Which one out of the selected sources provided you with the most information about hypertension (state one, fill in the blank space)?

_____

C3	Which one out of all the listed sources of information do you find most convenient to learn from (state one, fill in the blank space)? _____
SECTION D: PRACTICES RELATED TO HYPERTENSION PREVENTION	
D1	How many visits for clinical consultation did you make to a health facility in the past one year? 1. 0 2. 1-2 3. 3-4 4. ≥ 5
D2	Have you ever had your blood pressure checked before? 1. Yes 2. No If yes, proceed to question D3. If no, proceed to question D7.
D3	How many times? 1. One 2. Two to three 3. Four to five 4. Greater than five
D4	How recent was your last blood pressure check? 1. Within the past six months 2. Within the past one year 3. Within the past two years 4. More than two years ago

<table>
<tr><td>D5</td><td>Where was your blood pressure checked (tick yes against all settings where you once had your blood pressure checked)?

<table>
<tr><th>PLACE</th><th>YES (1)</th><th>NO (2)</th></tr>
<tr><td>Health facility</td><td></td><td></td></tr>
<tr><td>Community outreach activity</td><td></td><td></td></tr>
<tr><td>Workplace</td><td></td><td></td></tr>
<tr><td>Other (please specify) _____</td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>D6</td><td>When you last had a blood pressure check, your blood pressure reading was:

1. High
2. Normal
3. Low
4. Don't know/ remember

Proceed to question D8</td></tr>
<tr><td>D7</td><td>What would you consider as the cause for not ever having your blood pressure checked (list all that apply)?

_____
_____</td></tr>
<tr><td>D8</td><td>If someone has high blood pressure they should (circle only one):

1. Visit a health facility
2. Buy drugs from a pharmacy or medicine store,
3. Visit a traditional healer
4. Ignore it until it subsides
5. Other (please specify) _____</td></tr>
<tr><td>D9</td><td>Do you smoke or sniff tobacco?

1. Yes
2. No
3. I used to
If yes, proceed to question D10. If no or used to, proceed to question D12</td></tr>
</table>

D10	How often do you smoke or sniff tobacco? 1. Once every day 2. Several times every day 3. Once a week 4. Several times a week 5. Once in a while 6. Other (please specify) _____
D11	What is your reason for smoking? 1. Leisure 2. Because someone else smokes/ peer pressure 3. To forget problems 4. Other (please specify) _____
D12	Do you take alcohol? 1. Yes 2. No 3. I used to If yes, proceed to question D13. If no, proceed to question D15
D13	How often? 1. Once every day 2. Several times every day 3. Once a week 4. Several times a week 5. Once in a while
D14	What is your reason for taking alcohol (circle all that apply)? 1. Leisure 2. Because someone else smokes 3. To forget problems 4. Other (please specify) _____

D15	How often do you experience stress? 1. Almost always 2. Once in a while 3. Never
D16	Do you engage in physical activity? 1. Yes 2. No If yes proceed to question D17. If no, proceed to question D19.
D17	How often do you engage in physical activity? 1. Once every day 2. Several times every day 3. Once a week 4. Several times a week 5. Once in a while 6. Other (please specify) _____
D18	What is the reason behind your physical activeness (circle all that apply)? 1. Leisure 2. Nature of your job 3. To lose weight 4. To stay fit 5. Other (please specify) _____ **Proceed to question D20**
D19	What prevents you from being physically active (circle all that apply)? 1. Lack of interest 2. Lack of time 3. Other (please specify) _____
D20	How would you quantify your salt intake? 1. Average 2. Below average 3. Excess

D21	How often do you add salt to your food before tasting it? 1. Never 2. Rarely 3. Often 4. Almost always
SECTION E: BODY MEASUREMENTS	
E1	Blood pressure reading (fill in the blank spaces): a. Systolic: _____ b. Diastolic: _____
E2	Weight (in kilograms)_____
E3	Height (in metres) _____
E4	BMI _____
THANK YOU	

Appendix 3 B: Questionnaire, Chichewa Version

Research Title: Assessment of knowledge and practices on hypertension among adult outpatients of unknown hypertension status at Nathenje Health Centre in Lilongwe, Malawi.

CODE Number: _____ **DATE: _____**

No	**FUNSO**
GAWO A: ZA MBIRI YANU	
A1	Zaka zanu ndi zingati? : _____
A2	Ndinu: 1. Aamuna 2. Aakazi
A3	Sukulu munalekezera pati? 1. Sindinayimbeko 2. Pulayimale 3. Sekondale 4. Koleji
A4	Mbiri yanu ya banja ndi yotani? 1. Osakwatira 2. Okwatira 3. Munagosiyana pang'ono chabe 4. Oti banja linatha 5. Ofeledwa
A5	Mpingo wanu ndi: 1. Chikhirisitu 2. Chisilamu 3. Wina (chonde masulirani) _____

A6	Mumagwira ntchito yanji (lembani pa mzerepo)? _____
A7	Mumakhala kuti? 1. Mudzi wa _____ (lembani dzina la mudzi pa mzerepo) 2. Trading centre 3. Kwina _____ (chonde masulirani)
A8	Ndinu mtundu wanji wa a Malawi? 1. Chewa 2. Ngoni 3. Wina (chonde masulirani) _____
GAWO B: ZIMENE MUKUDZIWA PA NTHENDA YA KUTHAMANGA KWA MAGAZI	
B1	Kodi munamvako za nthenda ya kuthamanga kwa magazi ? 1. Eya 2. Ayi Ngati ndi eya, pitilizani kuyankha mafunso kuyambira funso B2. Ngati ndi ayi, pitani ku gawo C.
B2	Kodi mukudziwa munthu aliyense amene amadwala nthenda yothamanga magazi? 1. Eya 2. Ayi Ngati ndi eya, pitilizani kuyankha kuyambira funso B3. Ngati ndi ayi, pitani ku funso B4
B3	Munayamba mwakhalako nyumba imodzi ndi munthu amene ali ndi nthenda ya kuthamanga magazi? 1. Eya 2. Ayi

B4 Munthu amatchulidwa kuti ali ndi nthenda yothamanga magazi pamene magazi akuthamanga pa mulingo woyambira kapena kupitilira:

1. 120/70
2. 140/90
3. Sindikudziwa

B5 Chongani eya pambali pa chinthu chilichonse chimene chingayike munthu pa chiwopsyezo chodwala nthenda ya kuthamanga kwa magazi (chongani zonse zimene mukuzidziwa):

CHINTHU	**EYA (1)**	**AYI (2)**
a. Kunenepa kwambiri		
b. Kusuta kapena kufwenkha fodya		
c. Kudya za mchere wambiri		
d. Kumwa mowa kwambiri		
e. Kusapanga masewera olimbitsa thupi		
f. Nkhawa		
g. Kuchokera ku banja lomwe kuli anthu odwala nthendayi		
h. Kukhala wa m'muna kapena wa mkazi		
i. Nthenda ya shuga		
j. Kukalamba		
k. Kumwa tiyi kapena khofi kwambiri		
l. Zina (chonde masulirani) _____		
m. Sindikudziwa		

B6	Kodi ndi zotheka munthu kukhala ndi nthenda yothamanga magazi osakhala ndi zionetsero zirizonse kapena osamva chirichonse mthupi? 1. Eya 2. Ayi 3. Sindikudziwa
B7	Kodi ndi zoona kuti nthenda ya kuthamanga kwa magazi ili ndi zizindikiro ? 1. Eya 2. Ayi 3. Sindikudziwa Ngati ndi eya, pitilizani kyankha funso B8. Ngati ndi ayi kapena sindikudziwa pitiliza kuyankha kuyambira funso B9
B8	Zizindikiro za nthenda yothamanga magazi ndi ziti (lembani zonse zimene mukuzidziwa)? _____ _____ _____ _____
B9	Kodi njira yodalirika kwambiri yodziwira ngati munthu ali ndi vuto la kuthamanga magazi ndi iti? 1. Kuyezetsa mulingo wa kuthamanga magazi 2. Kumva zizindikiro mthupi 3. Sindikudziwa 4. Zina (chonde masulirani) _____
B10	Kodi zoona zenizeni ndi ziti : 1. Amene ali ndi nthenda ya kuthamanga kwa magazi amatha kuchira 2. Amene ali ndi nthenda ya kuthamanga kwa magazi amafunika kumwa mankhwala moyo wake wonse 3. Sindikudziwa

B11 Kodi nthenda ya kuthamanga kwa magazi imatha kubweretsa matenda ena pa moyo wa munthu?

1. Eya
2. Ayi
3. Sindikudziwa

Ngati ndi eya, pitilizani kuyankha funso B12. Ngati ndi ayi kapena sindikudziwa, pitani mukayambe kuyankha funso B13

B12 Chongani eya pambali pa nthenda iliyonse imene ingathe kubwera chifukwa choti munthu ali ndi vuto la kuthamanga magazi (zungulizani zonse zimene mukuzidziwa)

NTHENDA	**EYA (1)**	**AYI (2)**
a. Sitiroko (kufooka ziwalo mbali imodzi ya thupi)		
b. Nthenda ya mtima		
c. Nthenda ya imphyo		
d. Kuyala mafuta m'misempha ya magazi		
e. Nthenda ya maso		
f. Zina (chonde masulirani)_____		
g. Sindikudziwa		

B13 Kodi ndi zofunikira kuti munthu aziyezetsa kuthamanga kwa magazi pafupipafupi ngakhale asakumva vuto liri lonse la mthupi?

1. Eya
2. Ayi
3. Sindikudziwa

B14	Kodi ndi zotheka munthu kutsata ndondomeko zothandizira kuti nthenda ya kuthamanga kwa magazi ayipewe kapena iyambe mochedwa? 1. Eya 2. Ayi 3. Sindikudziwa Ngati ndi eya, pitani ku funso B15. Ngati ndi ayi kapena sindikudziwa pitilizani kuyankha mafunso ku gawo C
B15	Lembani zonse zimene mukudziwa zoti munthu angatsate kuti apewe nthenda yothamanga magazi: _____ _____ _____

GAWO C: KUMENE MUNADZIWIRA ZIMENEZI

C1 Chongani eya pambali pa njira iliyonse imene inu munamverapo za uthenga wa matenda a kuthamanga kwa magazi (chongani zones zimene mukuzidziwa):

NJIRA	**EYA (1)**	**AYI (2)**
a. Intaneti		
b. Wayilesi		
c. Wayilesi ya kanema		
d. Chipatala		
e. Kwa achibale		

	f. Kwa anzanu		
	g. Nyuzipepala		
	h. Mabuku		
	i. Kutchalitchi / ku mzikiti		
	j. Ku sukulu		
	k. Mapostala kapena timapepala todziwitsa		
	l. Kwinanso (chonde masulirani) _____		

C2	Ndi yiti mwa njira zimene mwasankhazi imene inakupatsani uphungu wochulukitsitsa wa matenda a kuthamanga kwa magazi (sankhani imodzi, lembani pa mzerepo)? _____
C3	Ndi yiti mwa njira zonse zili m'mwambazi imene inu mukuona kuti muli nayo omasuka kwambiri kuphunzilirako za matenda a kuthamanga kwa magazi (sankhani imodzi, lembani pa mzerepo)? _____

GAWO D: ZIMENE MUMACHITA ZOKHUDZA KUPEWA NTHENDA YA KUTHAMANGA KWA MAGAZI

D1	Kodi munapitako kangati ku chipatala kuti mukaonane ndi adotolo mu chaka chimodzi chapitachi? 1. 0 2. 1-2 3. 3-4 4. ≥ 5

D2 Kodi munayamba mwayezedwako mulingo wa kuthamanga kwa magazi anu?

1. Eya
2. Ayi

Ngati ndi eya, pitilizani kuyankha funso D3. Ngati ndi ayi, pitilizani kuyankha kuyambira funso D7.

D3 Munayezedwapo kangati?

1. Kamodzi
2. Kawiri kapena katatu
3. Kanayi kapena kasanu
4. Koposera kasanu

D4 Munayezedwa liti komaliza?

1. Miyezi sikisi yapitayi
2. Chaka chimodzi chapitachi
3. Zaka ziwiri zapitazi
4. Kuposa zaka ziwiri zapitazi

D5 Chongani eya pambali pa malo onse amene munayezedwako mulingo wa kuthamanga kwa magazi anu:

MALO	**EYA (1)**	**AYI (2)**
Ku chipatala		
Ku zochitika za m'mudzi		
Ku ntchito		
Kwina (chonde masulirani) _____		

D6	Nthawi yomaliza imene munayezetsa mulingo wa kuthamanga kwa magazi, magazi anu amayenda bwanji (zungulizani chimodzi chokha): 1. Amathamanga koposera mulingo woyenerera 2. Amathamanga moyenerera 3. Amathamanga mosafikira pa mulingo woyenerera 4. Sindikudziwa / sindikukumbukira ***Pitilizani kuyankha kuyambira funso D8***
D7	Kodi mukuona ngati ndi chifukwa chani simunayezedweko mulingo wa kathamangidwe ka magazi anu (nenani zonse zimene mukuzidziwa)? _____ _____
D8	Munthu amene wapezeka kuti magazi ake akuthamanga kwambiri apange bwanji (zungulizani chimodzi chokha): 1. Apite ku chipatala 2. Agule mankhwala ku golosale ya mankhwala 3. Apite kwa asing'anga 4. Ayembekeze mpaka magaziwo adzasiye okha kuthamanga 5. Zina (chonde masulirani) _____
D9	Kodi inu mumasuta kapena kufwenkha fodya? 1. Eya 2. Ayi Ngati ndi eya, pitilizani kuyankha funso D10. Ngati ndi ayi, pitilizani kuyankha kuyambira funso D12
D10	Mumasuta kapena kufwenkha fodya motalikirana bwanji? 1. Kamodzi pa tsiku 2. Kangapo pa tsiku 3. Kamodzi pa wiki 4. Kangapo pa wiki 5. Patalipatali 6. Zina (chonde masulirani) _____

D11	Chomwe chimakupangitsani kusankha kusuta kapena kufwenkha fodya ndi chani (zungulizani zonse zimene mukuzidziwa)? 1. Kukondwa naye fodyayo 2. Chifukwa ena amene ndikuwadziwa amasuta 3. Kuti ndiyiwale mavuto 4. Zina (chonde masulirani) _____
D12	Kodi mumamwa mowa? 1. Eya 2. Ayi Ngati ndi eya, pitilizani kuyankha funso D13. Ngati ndi ayi, pitilizani kuyankha kuyambira funso D15
D13	Mumamwa mowa motalikirana bwanji? 1. Kamodzi pa tsiku 2. Kangapo pa tsiku 3. Kamodzi pa wiki 4. Kangapo pa wiki 5. Patalipatali 6. Zina (chonde masulirani) _____
D14	Ndi chifukwa chani mumamwa mowa (zungulizani zonse zimene mukuzidziwa)? 1. Kukondwa nawo mowawo 2. Chifukwa ena amene ndikuwadziwa amamwa 3. Kuti ndiyiwale mavuto 4. Zina (chonde masulirani) _____
D15	Kodi mumakhala ndi nkhawa motalikirana bwanji? 1. Pafupifupi nthawi zonse 2. Patalipatali 3. Olo pang'ono olo

D16	Kodi mumapanga ntchito kapena masewera olimbitsa thupi? 1. Eya 2. Ayi Ngati ndi eya pitilizani kuyankha funso D17. Ngati ndi ayi, pitilizani kuyankha kuyambira funso D19.
D17	Mumapanga masewera olimbitsa thupi motalikirana bwanji? 1. Kamodzi pa tsiku 2. Kangapo pa tsiku 3. Kamodzi pa wiki 4. Kangapo pa wiki 5. Patalipatali 6. Zina (chonde masulirani) _____
D18	Chimakupangitsani zolimbitsa thupi ndi chani (zungulizani zonse zimene mukuzidziwa)? 1. Kukondwa nazo 2. Ndi m'mene iliri ntchito yanu 3. Kuti muchepetseko thupi 4. Kuti mukhale ndi thanzi 5. Zina (chonde masulirani) _____ **Pitilizani kuyankha funso D20**
D19	Chimakulepheretsani kupanga zolimbitsa thupi ndi chani (zungulizani zonse zimene mukuzidziwa)? 1. Kusazikonda 2. Kusowa nthawi 3. Zina (chonde masulirani) _____
D20	Mungafotokoze bwanji mulingo wa mchere umene mumagwiritsa ntchito (zungulizani chimodzi chokha)? 1. Monga achitira anthu ambiri 2. Wocheperako 3. Wochuluka

D21	Ndi nthawi zochuluka bwanji zimene mumathira mchere ku zakudya musanazilawe? 1. Sindimachitako 2. Mwa patalipatali 3. Nthawi zambiri 4. Pafupifupi nthawi zonse
GAWO E: ZOYEZA ZA M'THUPI	
E1	Mulingo wa kuthamanga kwa magazi (lembani pa mizerepo): a. Systolic: _____ b. Diastolic: _____
E2	Sikelo (mu ma kilogalamu)_____
E3	Katalikidwe (mu ma mita) _____
E4	BMI _____
ZIKOMO	

Appendix 4 A: Letter Seeking Site Approval from Lilongwe District Health Office

Kamuzu College of Nursing,

Private bag 1,

Lilongwe.

The District Health Officer,

Lilongwe District Health Office,

Lilongwe.

22nd March, 2017

Dear Sir,

REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT NATHENJE HEALTH CENTRE AND A PILOT STUDY AT LUMBADZI HEALTH CENTRE

I am a second year Master of Science in Adult Health Nursing student at Kamuzu College of Nursing. In partial fulfillment for the award of the aforementioned qualification, I am expected to carry out research. The title of my study is "Assessing **knowledge and preventive practices of hypertension among adult outpatients at Nathenje Health Centre in Lilongwe, Malawi**".

I write to seek permission from your office to conduct the study at Nathenje Health Centre and to conduct a pilot study of the same at Lumbadzi Health Centre. Attached is my research proposal and a letter from the college substantiating my request.

Looking forward to your favourable and timely response.

Pempho C. Katanga (Miss)

Cell: 0999 454 994 / 0888 504 244

Email: katanga2016pempho@kcn.unima.mw

Appendix 4 B: Letter of Introduction from College to Lilongwe District Health Office

University of Malawi
KAMUZU COLLEGE OF NURSING

ACTING PRINCIPAL
Prof. E. Chirwa, DipNurs, MRM,
B.Sc., MN, PhD

P/BAG 1, LILONGWE, MALAWI
TELEPHONE:265 (0)1 751 622/200
TELEGRAMS: NURSING
FAX: 265 (0) 1 756 424
EMAIL: principal@kcn.unima.mw
Website: www.kcn.unima.mw

Our Ref.:KCN/DPGS

March 21, 2017

The DHO
P.O. Box 1274
LILONGWE

Dear Sir

RE: REQUEST FOR PERMISSION TO CONDUCT A RESEARCH STUDY

The bearer of this letter is Ms Pempho C. Katanga, a Master of Science in Adult Health Nursing degree student.

As part of the requirement for the fulfillment of the course, she is required to conduct a research study related to adult health nursing. The title of her study is ***"Assessing knowledge and preventive practices of hypertension among adult outpatients at Nathenje Health Centre in Lilongwe, Malawi.***

Ms Katanga would like to request for permission to conduct a study at Nathenje Health Centre and a pilot study of the same at Lumbadzi Health Centre.

Would you please assist her with the information she is requesting in order to substantiate her proposal.

Yours faithfully,

Belinda Gombachika, PhD.
DEAN FOR POSTGRADUATE STUDIES AND RESEARCH

BG/cm

Appendix 4 C: Letter of Permission for Pilot Study from Lilongwe District Health Office

Ref. No.:
Telephone No.: 265 726 466/464
Telefax No.: 265 727817
Telex No.:
E-Mail. lilongwedho@malawi.

In reply please quote NO DZH/MALAWI,
Lilongwe District Health Office
P.O. Box 1274
Lilongwe
Malawi

COMMUNICATIONS TO BE ADDRESSED TO:

23rd March, **2017**

The In-charge, Lumbadzi Health Centre

Sir/Madam

PERMISSION TO CONDUCT A PILOT STUDY IN LILONGWE

Approval has been granted to the bearer of this letter:- Pempho C. Katanga, to conduct a research study at your facility.

" Assessing knowledge and preventive practice of hypertension among adult outpatients at Nathenje Health Centre in Lilongwe, Malawi "

Any assistance rendered would be appreciated.

LILONGWE DISTRICT HEALTH OFFICE
Dr. P.W. Mumba
MEDICAL OFFICER
DISTRICT HEALTH OFFICER
P. O. BOX 1274,LILONGWE

Appendix 4 D: Letter of Permission to Conduct Study at Nathenje Health Centre

Ref. No.:
Telephone No.: 265 726 466/464
Telefax No.: 265 727817
Telex No.:
E-Mail. lilongwedho@malawi.

In reply please quote NO DZH/MALAWI,
Lilongwe District Health Office
P.O. Box 1274
Lilongwe
Malawi

COMMUNICATIONS TO BE ADDRESSED TO:

23rd March, **2017**

The In-charge, Nathenje Health Centre

Sir/Madam

PERMISSION TO CONDUCT A RESEARCH STUDY IN LILONGWE

Approval has been granted to the bearer of this letter:- Pempho C. Katanga, to conduct a research study at your facility.

" Assessing knowledge and preventive practice of hypertension among adult outpatients at Nathenje Health Centre in Lilongwe, Malawi "

Any assistance rendered would be appreciated.

LILONGWE DISTRICT HEALHT OFFICE
2017
P. O. BOX 1274.LILONGWE

Dr. P.W. Mumba
MEDICAL OFFICER

Appendix 4 E: Certificate of ethics approval from COMREC

CERTIFICATE OF ETHICS APPROVAL

This is to certify that the College of Medicine Research and Ethics Committee (COMREC) has reviewed and approved a study entitled:

P.04/17/2146 - Assessing knowledge and preventive practices of hypertension among outpatients at Nathenje Health Centre version 2 dated 23rd May 2017 by Miss Pempho C. Katanga

On

As you proceed with the implementation of your study, we would like you to adhere to international ethical guidelines, national guidelines and all requirements by COMREC as indicated on the next page

14-Jun-17

Dr. YB. Mlombe - Chairperson (COMREC)

Date