



**College of Medicine**

**Hypertension Service Delivery Capacity Assessment in Malawi: Results  
from Malawi Longitudinal Study of Families and Health in Balaka,  
Machinga, Mchinji and Rumphi Health Care Facilities**

**By**

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**A Dissertation Submitted in Partial Fulfillment of the Requirement of the**

**Master of Public Health Degree**

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## DECLARATION

I, Lucia Davie Mbulaje, hereby declare that this thesis is my original work and has not been presented for any other awards at this University or any other university.

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Signature:



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Date 31<sup>st</sup> December, 2020

## **CERTIFICATE OF APPROVAL**

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## **ABSTRACT**

Management of hypertension has challenges due to different factors. These include unavailability of drugs, poor infrastructure, inexperienced personnel, insufficient diagnostic tools, and high treatment costs. Malawi adopted a Package for Essential Non-communicable (PEN) and was incorporated in Malawi Standard Treatment Guidelines (MSTG) for the management of various diseases including hypertension in 2015. Since the inception of the MSTG, the service delivery capacity for hypertension care in some health care facilities has not been well researched. We conducted this cross-sectional study to assess health service capacity to deliver comprehensive hypertension care. Data were extracted from the parent study of Health Care Facility questionnaire of the Malawi Longitudinal Study of Families Health. Descriptive statistics were analyzed using Stata version 14. Of the facilities managers' qualifications, 53.6% of them were Medical Assistants and 45.8% of them had 2 years of post-secondary education. Most of the managers 82.1% did not have in-service training or update on topics specific to the diagnosis and/or management of hypertension. In 57.1% of the facilities, copies of protocols and guidelines for the or management of hypertension were not available. Aspirin was the most available drug (89.3%) and Calcium Channel Blockers were not available in 69.7% of the health care facilities. We have found gaps in health facilities capacity to deliver comprehensive hypertension care. Future interventions should aim in targeting the highlighted gaps to improve capacity.

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## **ABBREVIATIONS AND ACRONYMS**

ACEI	Angiotensin Converting Enzyme Inhibitors
CHAM	Christian Health Association of Malawi
COM	College of Medicine
COMREC	College of Medicine Research and Ethics Committee
DHO	District Health Officer
Htn	Hypertension
HAS	Health Surveillance Assistance
HCW	Health Care Worker
HSSP	Health Sector Strategic Plan
LMICs	Low and Middle-Income Countries
MSTG	Malawi Standard Treatment Guidelines
MDHS	Malawi Demographic Health Survey
MLPs	Middle Level Providers
MLSFH	Malawi Longitudinal Study for Families Health
MNTG	Malawi National Treatment Guidelines
MOH	Ministry of Health (of Malawi)
NCD's	Non communicable Diseases
PEN	Package for Essential Non-Communicable Diseases
QECH	Queen Elizabeth Central Hospital
SDG	Sustainable Development Goals
SSA	Sub Saharan Africa
Stata	Statistical Package for Analysis of Data
UK	United Kingdom

USA

United States of America

WHO

World Health Organization

# CHAPTER 1: INTRODUCTION

## 1.1 Background

Blood pressure is defined as the force exerted by the blood against the inner walls of the arteries, during the different phases of the contraction of the heart (1). Hypertension also known as raised blood pressure is a condition in which the blood vessels have persistently raised pressure with systolic pressure of 140 mmHg and above and diastolic pressure of 90 mmHg and above following repeated examination at rest (1). Reviewing global figures, an estimated 1.39 billion people had hypertension in 2010 (1,2). It is a leading cause of cardiovascular diseases which include: chronic kidney disease, coronary artery disease, stroke, arrhythmias and retinopathy (2,3). Hypertension is the leading cause of death accounting for 10.4 million deaths per year (1).

In Malawi, hypertension is the leading cause of morbidity and mortality amongst all non-communicable diseases (4). Prevalence is ranging between 15.8 to 32.9% as per systematic review of Hypertension and Diabetes burden, risk factors, and interventions for prevention and control in Malawi (5–7). Malawi is amongst countries with highest prevalence in hypertension compared to other countries in Sub Saharan region (7). It is a silent condition that mostly does not show symptoms, more prevalent in older adults with an overall pooled estimate of 57% (from individual studies with prevalence ranging from 23.3% to 90.0%) across 37 data points according to a systematic review and meta-analysis of hypertension in older adults in Africa (8).

Hypertension prevention, detection, management and control is challenged by a number of factors such as poor health seeking behavior, unhealthy lifestyles among the population,

inadequate human and financial resources, poor reporting by health facilities and poor infrastructure (3). To achieve hypertensive disease control, there should be adoption of health promotion strategies which promotes healthy lifestyles, early detection, treatment and control of the condition (9). Use of both non-pharmacological and pharmacological approaches to lower their BP is essential.

Cost-effective approaches to reduce hypertension should include a mixture of interventions using inexpensive technologies, non-pharmacological approaches for modification of hypertension risk factors and affordable medications for prevention and treatment of the disease (10). If effectively delivered, these interventions can reduce medical costs and improve quality of life and productivity amongst people (11). In addition, the importance of accuracy in measurement of BP, team-based care with shared decision-making, maximizing adherence, staff trainings and experience, effective use of guidelines, availability of infrastructure, essential drugs and equipment for diagnosing and managing has proven to be effective in hypertensive disease control. Providing health care workers with current evidence-based practice and guidelines can increase staff knowledge on hypertensive disease control. Trainings has the potential to effect positive social change by empowering staff and patients to improve health care outcomes by enabling staff to coach patients on hypertensive disease control using up-to-date evidence-based practice guidelines (12). Guidelines provide the necessary information for decision-making by health care providers or patients themselves about disease management in the most commonly encountered situations (12). Context-specific policies are required to improve access to essential drugs in hypertensive disease control. Specific classes of drugs should be available in health care facilities according to facilities level of service delivery. Improving facility governance and effective management of drugs by using stock cards, internal and external assessment of supply may

improve availability. Prices in local pharmacies where people can buy should also be affordable (13).

Weak health systems are part of substantive gaps affecting implementation (14). For provision of equitable care for people with and at risk of hypertension, there has to be efficient use of limited resources, access to basic diagnostics and essential medicines, infrastructure, well trained personnel and organized medical information and referral systems (15). Ministries of Health (MoH) need to take steps to improve health outcomes and to reduce rising incident rate of hypertension and its preventable complications.

Malawi adopted the PEN guidelines. However, to make it relevant Malawi developed standard treatment guidelines for the management of various diseases including hypertension in 2015. The treatment guidelines highlight on diagnosing and treatment of hypertension (16). Hypertension diagnoses should be made based on high blood pressure taken at rest on three separate visits weeks apart (16). It is categorized as mild, moderate and severe hypertension according to severity (16) that is ascertained by the Systolic and Diastolic Readings. Treatment is to be given according to severity and antihypertensive ladder which starts with diuretics, Calcium channel blockers, Beta blockers and lastly Angiotensin Converting Enzymes (ACE) inhibitors (16). Despite an adoption of Pen guidelines, the effective delivery of hypertension care in some districts such as Balaka, Machinga, Mchinji, Rumphi districts health care facilities are not well researched.

It was therefore important to assess how the country is performing in hypertension care service delivery using secondary data from Balaka, Machinga, Mchinji and Rumphi districts

health care facilities to understand whether it was consistent with the provisions in the WHO and national hypertension guidelines.

## **1.2 Statement of the Problem**

In Malawi, hypertension is the leading cause of morbidity and mortality amongst all non-communicable diseases (4). Each and every person is at risk of being hypertensive considering the predisposing factors and this leaves almost every household affected (17). Hypertension prevention, detection, management and control is challenged by a number of factors such as poor health seeking behavior, unhealthy lifestyles among the population, inadequate human and financial resources, poor reporting by health facilities and poor infrastructure (3). Due to weak health systems and inadequate health-care expenditure of the country, the poor do not have access to services at all or receive substandard services (17). This contributes to rise in prevalence, incidence, complication rate and deaths of people of which some are and others not aware of their medical problems (7). Resource constraints prevent many interventions targeting hypertension from being achieved (18). Despite an adoption of Pen guidelines, the effective delivery of hypertension care in some districts such as Balaka, Machinga, Mchinji, Rumphi districts health care facilities are not well researched.

## **1.3 Literature Review**

Hypertension is a major public health problem as it contributes to the development of extensive disease and disability (1). The quality of primary care between and within countries differs between High Income Countries (HICs) and Low Income Countries (LMICs) and is affected by many factors (1). Evidence suggests that substandard care wastes significant resources and harms the health of populations, destroying human capital and reducing productivity (2). Quality of care, especially patient safety, is essential to creating trust in



health services. It is also a key to global health security, which starts with local health security. Building quality health services requires a culture of transparency, engagement, and openness about results, which are possible in all societies – regardless of their income level (19). Technological innovation plays a key role in offering new ways to expand high-quality health care services more rapidly, and at an affordable cost.

### **1.3.1 Globally**

Hypertension was regarded as a disease of affluence but this has changed drastically in the last two decades with average blood pressures now higher in Africa with a rise in prevalence from 25% in 1975 to 28% in 2015 and the prevalence increasing among poor sections of society (7). However, there has been a drop in prevalence from 29% in 1975 to 13% in 2015 in western countries (7). Proportion of the global burden of disease attributable to hypertension has significantly increased from about 4.5 percent (nearly 1 billion adults) in 2000, to 7 percent in 2010 (20). This makes hypertension the single most important cause of morbidity and mortality globally and highlights the urgent need of action to address the problem.

Clinical guidelines are aimed at providing simple practical protocols that could be followed in the primary care setting to improve the quality of care. They are targeted particularly at professional health care providers and reflect realistic objectives that can be applied widely, aiming to diminish the impact of poorly treated hypertension in a country (8). A key component of this process is physician adherence to treatment guidelines. Factors that influence physician behavior and optimal use of practice guidelines are poorly understood, however it is associated with availability, awareness and familiarity with treatment guidelines of practices (21). It has shown that the incorporation of guidelines into clinical

practice is largely dependent of the attitudes of health professional in clinical settings and that a passive dissemination of the guidelines is unlikely to affect change (22).

In the US healthcare setting, health centers achieved higher quality of primary care as compared to secondary or tertiary hospitals which were associated with less continuity of care (23). Similar results were found in a Chinese study which showed that community health centers provided better-quality primary care when compared with secondary and tertiary healthcare facilities (24). This was so because of health reforms in the country that targeted subsidizing health care in the rural society.

### **1.3.2 Africa**

Hypertension is the number one risk factor for cardiovascular disease (CVD) in Africa. CVD has taken over as number one cause of death accounting for three quarters of 17.7 million deaths (global CVD attributed deaths) in LMIC (25) and the total numbers will further increase in the next decades reflecting on the growing urbanization and related lifestyle changes (20). It is essential to develop and share best practices for affordable and effective community-based programs in screening and treatment of hypertension. In order to prevent and control hypertension in the population, Africa needs policies implemented through a multi-sect oral approach involving the Ministries of Health and other sectors including education, agriculture, transport, finance among others (2).

People with high blood pressure were not diagnosed in African societies in the first half of the twentieth century, however estimates showed that in some settings in Africa, there were more than 40 percent adults with hypertension (26). The condition is increasingly emerging in LMICs where health resources are scarce and stretched by a high burden of infectious

diseases such as HIV, malaria and tuberculosis, and where awareness and treatment levels on hypertension control are still very low (20). Currently, the worldwide burden of hypertension is greatest in LMICs where it affects about 1 in every 5 of the adult population and this is projected to increase such that by 2025, almost 3 out of every 4 people with hypertension will be living in LMICs (20). There were approximately 80 million adults with hypertension in sub-Saharan Africa in 2000 and projections based on current epidemiological data suggest that this figure will rise to 150 million by 2025 (27).

Primary health care in Africa is a challenge. A possible contributory factor would be the affordability of the cost of health care, which remains a major barrier in the African setting as out-of-pocket spending is the main source of funding for health care costs (28). Another common occurrence is the non-adherence to treatment and follow-up for hypertension. In one intervention study on setting up NCDs clinic in Cameroon, just about half of the participants were still in the program at one-year follow-up (29). Indeed, patients are expected to be treated and have their blood pressure under control only if they can access appropriate health services, receive adequate advice and prescriptions and subsequently afford and adhere to those prescriptions. Increasing awareness, treatment and control rates of hypertension will have a huge impact on CVD prevention in Africa.

Often, more than one drug is necessary to achieve control. The five main classes with proven effect are: Beta-blockers (BB), Diuretics (DIU), Calcium channel blockers (CCB), Angiotensin converting enzyme inhibitors (ACEI) and, Angiotensin receptor blockers (ARB). Providing medication is an important and cost effective way to reduce hypertension (30), but the accessibility of the treatment is often forgotten. There is a lot of opportunity for hypertension control through improving the availability of medication. However, managing

hypertension is challenging for a variety of reasons, including unavailability of drugs, high treatment costs, no infrastructure, in experienced medical personnel and lack of diagnostic tools (31).

In a recent study in several African countries, staffing levels, staff experience, availability of equipment and facility management were some factors that accounted for variation in the quality of primary care (32).

In the Democratic Republic of Congo (DRC), the prevalence of hypertension has increased significantly from 14.2 % in urban areas and 9.9 % in rural areas in 1987 to 26.7 % in 2005 (33). Relating increase in prevalence and hypertension care in health facilities in Africa, a South African study showed that public rural and urban primary care users had similar experiences of quality of care and this was attributed to standardized service packages and treatment guidelines within the sector (34).

### **1.3.3 Malawi**

Like other countries in SSA, Malawi is experiencing an increase in the prevalence of common NCDs from 20% in 1975 to 30% in 2015 (7). A recent WHO STEPS survey reported high rates of hypertension and diabetes (35). An increase in hypertension prevalence invariably leads to dramatic rises in the incidence of CVDs and their consequences, which has the potential to overwhelm health care systems (36). It will also have financial implications for national and local treatment plans because there is increasing evidence that the majority of patients with hypertension will require two or more drugs to achieve blood pressure control and this is dependent on coexisting disease conditions and on the presence or

absence of complications (20). This is unlike the minor group that does follow prescribed diet and life-style modification to achieve blood pressure control.

The Ministry of Health identified hypertension as a priority disease with emphasis on the provision of primary health care services to control and minimize the sequel of the condition (4). Low rates of awareness, treatment and control of hypertension in Malawi are major public health concerns as the population in this region is growing (18). The low levels of all these indicators imply that there will be significantly large populations of hypertensive patients unaware of their increased risk of hypertension-related complications in the coming years (7).

It has been argued that a comprehensive surveillance system is important for the management of non-communicable diseases including hypertension (37). There is need to highlight for an information system that monitors the processes and outputs at health facility level. In addition to population based information, it is suggested that some indicators that could be used for the management of hypertension should be developed and evaluated (7).

In order to inform the development of a coherent strategy to improve the management of hypertension, it is necessary to conduct an assessment of care delivered in Malawi's health care facilities.

#### **1.4 Conceptual Framework**

This study was guided by the Donabedian structure-process-outcome framework, WHO and national treatment guidelines in hypertension management. The model was originally developed by Avedis Donahedian in 1966 (38). The framework is used in assessing quality of

health care services (38). It describes ‘structure’ as all aspects that affect the context in which care is delivered (38) such as guidelines, infrastructure, human and material resources. The ‘process’ element means the actual provision of the health care services. This includes all interpersonal activities performed between provider and clients (38). The activities include clients’ examination, health education and treatment among others. Lastly, ‘outcome’, (38) which is determined by the structure and process that may result in change or no change, which can be observed in behavior or through clients’ expression of satisfaction among others (38). Structure elements influence the process that produces an outcome that helps to understand the meaning of quality as it could not be subjectively defined (38).

The structure, process and outcome aspects of the model helped to consider variables that could lead in defining the quality of care in the management of hypertension. However, the aspects provided are universal and not specific to the context of the hypertension care. As such, WHO and national guidelines had an addition value as it helped to contextualize the assessment of quality of care using Donabedian aspects. The guidelines laid down specific elements that a health care facility should have under each aspect of the model to comprehensively evaluate the quality of hypertension care.

#### **1.4.2 WHO Standards of Quality Care in Hypertension Management**

This study also employed WHO standards of quality in hypertension care which offers ideal services to be provided in the health care facilities, education and supportive services as previously explained. The umbrella WHO framework has been used in the establishment of Malawi Standard Treatment Guidelines to give standards that are supposed to be followed in the provision of hypertension care.

### **1.4.3 Application of the WHO Framework and Donabedian Theory to the Study**

The chosen framework is used in assessing quality of hypertension care in Malawi. It provides topical elements that the study focused on when we assessed the quality of care while the WHO and national standards provided the details within each topic that the study assessed focused on. This study, guided by the stated frameworks, assessed the services that were provided in the targeted health care facilities to address the primary objective. According to Donabedian. The available services are referred to as the ‘process’ and WHO has listed the processes that need to be carried out in hypertension management to establish the quality care.

The framework also states that structures determine the provision of quality care, thus, the framework helped to explain the contribution of infrastructure and equipment essential for diagnosing and in achieving quality hypertension care in Machinga, Balaka, Mchinji and Rumphi. Similarly, WHO standards guide in listing the recommended structural elements that every health facility should have a prerequisite for providing quality health care. Studies have argued that availability of basic commodities is essential for the operation of hypertensive management other than staff knowledge and expertise. Assessing structural elements with regard to WHO’s framework highlighted the factors that could influence the quality of hypertension care, which was addressing the study’s third objective. This study evaluated the availability of the infrastructure and equipment essential for diagnosing and managing hypertension. A facility is supposed to have a room where patients can be seen and equipment for diagnosing, assessing and managing hypertension for the service to be provided (39).

The process was addressed in the first, second and fourth objectives of the study that focused on assessing the health care provider's qualification and expertise in delivering hypertension care, availability of guidelines for the management of hypertension at health facilities and determining the availability of drugs for the treatment of hypertension. Health care providers running hypertension clinics must have good knowledge and expertise on top of guidelines that should be effectively used and posted in the clinic where reference can be easily made. The knowledge and expertise will not only help in diagnosing but also in managing using both pharmacological and non-pharmacological ways (13).

The outcome was guided by the last objective which compared the service delivered and what is stipulated in the guideline.

### **1.5 Justification of the Study**

Due to the increase in prevalence of hypertension in Malawi, understanding the quality of hypertension service delivered will assist to improve hypertension care by informing policy and advocacy from health care workers which may lead to refinement and improvement of national strategies and programs using evidence-based information. Further assessing the quality of care delivered will help in planning and proper distribution of healthcare resources which will help improve the quality of care delivered to Malawians.

### **1.6 Objectives of the Study**

The main objective of this secondary analysis was to assess the hypertension service delivery capacity in Malawi health care facilities.



### **1.6.1 Specific Objectives**

1. To assess health care provider's qualification and expertise in delivering hypertension care
2. To assess the availability of copies of national guidelines for the management of hypertension at health facility level.
3. To evaluate the availability of the infrastructure and equipment essential for diagnosing and managing hypertension.
4. To determine the availability of drugs for the treatment of hypertension.

## **CHAPTER 2: METHODOLOGY**

### **2.1 Study Design**

This was a quantitative cross-sectional study where data was analyzed from Malawi Longitudinal Study of Families and Health (MLSFH which was collected in 33 health facilities in 2019). Facilities were surveyed on their staffing levels, qualification of staff, trainings provided to staff, infrastructure, presence of equipment and medications, and perception towards NCD's (40).

### **2.2 Study Setting**

The study setting was in four districts; Balaka (southern region), Machinga (southern region), Mchinji (Central region) and Rumphi (Northern region) (see attached map). MLSFH in 2019 collected data from health facilities serving villages in their catchment area (41). The facilities are similar in a way that they all provide secondary and primary level of care to the people in the districts. However, the facilities are different in a way that they are a mixture of public, private and mission owned with different type of funding that might affect governance, availability of resources and service delivery. In addition to that, the facilities are in three different regions of the country where health issues are influenced by social factors in the communities like culture.

### **2.3 Study Population and Sample Size**

The study population comprised managers and representatives from each of the health care facilities. The MLSFH Health Care Facility data was collected from all health facilities including public, private and mission facilities serving the catchment villages of the main study. Sample size for this study was 33 managers representing each health care facility.

MLSFH Health Care Facility Survey was conducted with representatives of all district hospitals serving the MLSFH study region, and with all health care centers within an approximately 10km radius of the MLSFH study areas. This includes 4 district hospitals; 18 government health centers, health posts, and dispensaries; 3 CHAM health centers; 8 private clinics (41).

### **2.3.1 Selection of Sample**

A manager or in-charge responsible for each of the public health facilities in the three districts were interviewed in the MLSFH.

### **2.3.2 Inclusion and Exclusion Criteria**

The secondary analysis included all health care facilities in the catchment area of MLSFH and a district hospital serving as a referral facility for the health care facilities in the catchment area. Health care facilities outside the MLSFH catchment area were not included.

## **2.4 Data Collection Process**

The study used secondary data from Malawi Longitudinal Study of Families and Health (MLSFH) which was collected in 33 health facilities in 2019. The MLSFH collected data through face-to-face interviews in health care facilities serving selected communities. Trained interviewers collected data using questionnaires translated into 2 languages: English and Chichewa. Pilot data collection with a convenient sample drawn from health care facilities not included in the MLSFH sample was conducted before the survey. Feedback from the pilot test was analyzed including performance of the data collection tool (41).

**Table 1: Dependent and Independent Variables**

Dependent variable	Independent Variables
Quality of hypertension care delivered in relation to WHO and national guidelines	Infrastructure
	Guidelines
	Staff qualification and expertise
	Guidelines
	equipment
	Drugs

## **2.5 Data Management and Statistical Analysis**

Participant's information was de-linked from names and information was kept in a password protected computer. Data clean up and crosschecking for missing variables was performed before conducting the analysis. Data was analyzed using Stata 14. Socio demographic data is summarized and presented in tables. Descriptive statistics such as means and standard deviations is summarized through continuous variables. Proportions and percentages were used to summarize categorical variables.

## **2.6 Limitations**

The calculated sample size was not 100% achieved because the study used secondary data; hence missing data potentially reduced the final sample size included in the analysis. However, the results are still credible because over 80% of the sample size was achieved.

## **2.7 Ethical Considerations**

The study was conducted in line with the main MLSFH and the ethical approval for this study was used. However, a proposal was sent to COMREC for provision of an exemption.

The parent study was approved by the Institution Review Board (IRB) at University of Pennsylvania and the Malawi National Health Sciences Research Committee (NHSRC) (see appendices 1 and 2). Permission to carry out this study was sought from the principal investigator of the MLSFH. The study utilized secondary data hence informed consent was not sought from participants. However ethical clearance to carry out this study was obtained from the College of Medicine Research and Ethics Committee (COMREC) reference number P.09/20/3140. To ensure confidentiality of participant's information, codes were assigned instead of names. Potential identifiers of the study participants were not used in the final report.

## CHAPTER 3: RESULTS

### 3.1 Introduction

This chapter presents the results of a quantitative descriptive study conducted to compare whether and in what ways is hypertension care delivered in health care facilities consistent with WHO and Malawi guidelines for hypertension management. Descriptive statistics were computed using Stata software version 13.0. The level of significance was set at 5%.

### 3.2 Type of Facility of Health Care Manager

Among the 28 managers who completed this question, most of the managers (39.3%) were from health centers.

**Table 2: Type of Health Care Facility**

Type of health care facility	Number of Health care managers N= (28)	Percentages (%)
Health center	11	39.3
Clinic	6	21.4
District hospital	4	14.3
Health post	3	10.7
Rural/ Community hospital	2	7.1
Dispensary	1	3.6
Other hospital	1	3.6

### 3.3 Managing Authority of the Facility

Among the 28 managers who completed this question, most of the managers (67.9%) stated that the government/public is the managing authority of the healthcare facility that they work in. See figure 1.

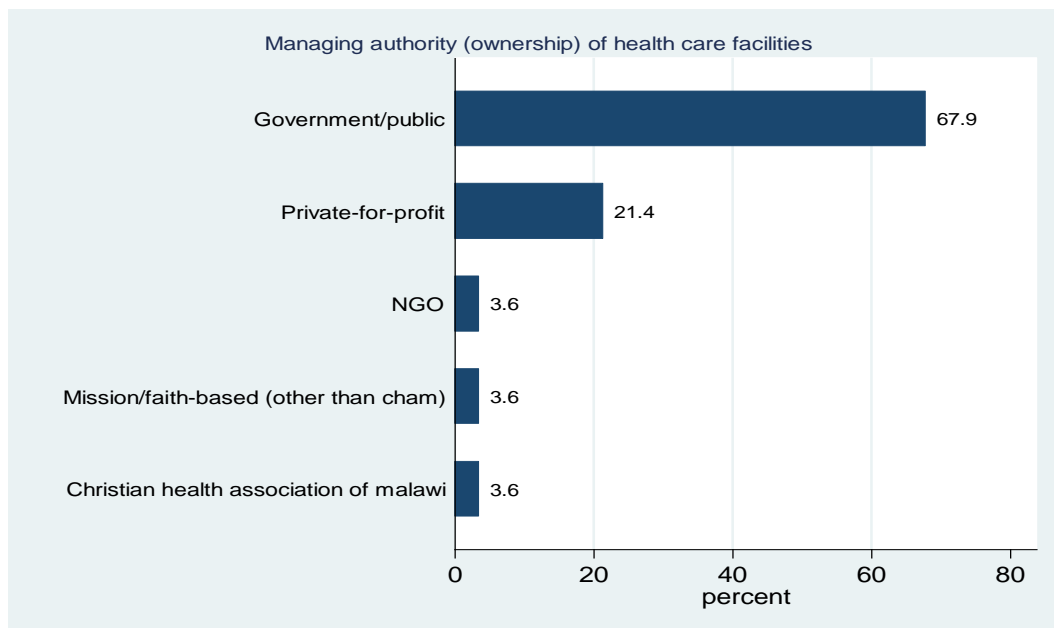
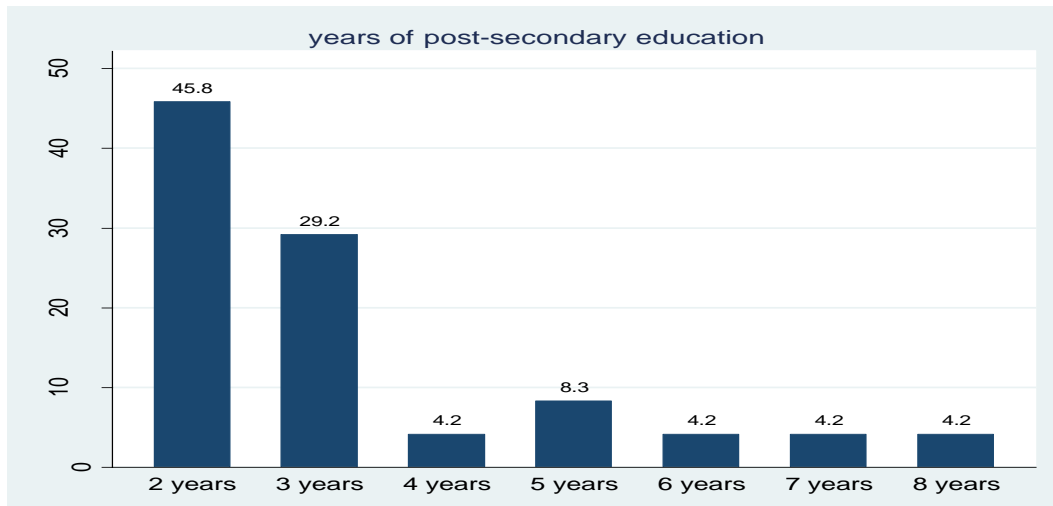


Figure 1: Managing Authority of the Health Care Facilities

### 3.4 Education and Trainings of Health Care Managers

#### 3.4.1 Years of Post-Secondary Education Completed

Among the 24 managers who completed this question, most of the managers (45.8%) had 2 years of post-secondary education. See figure 2.

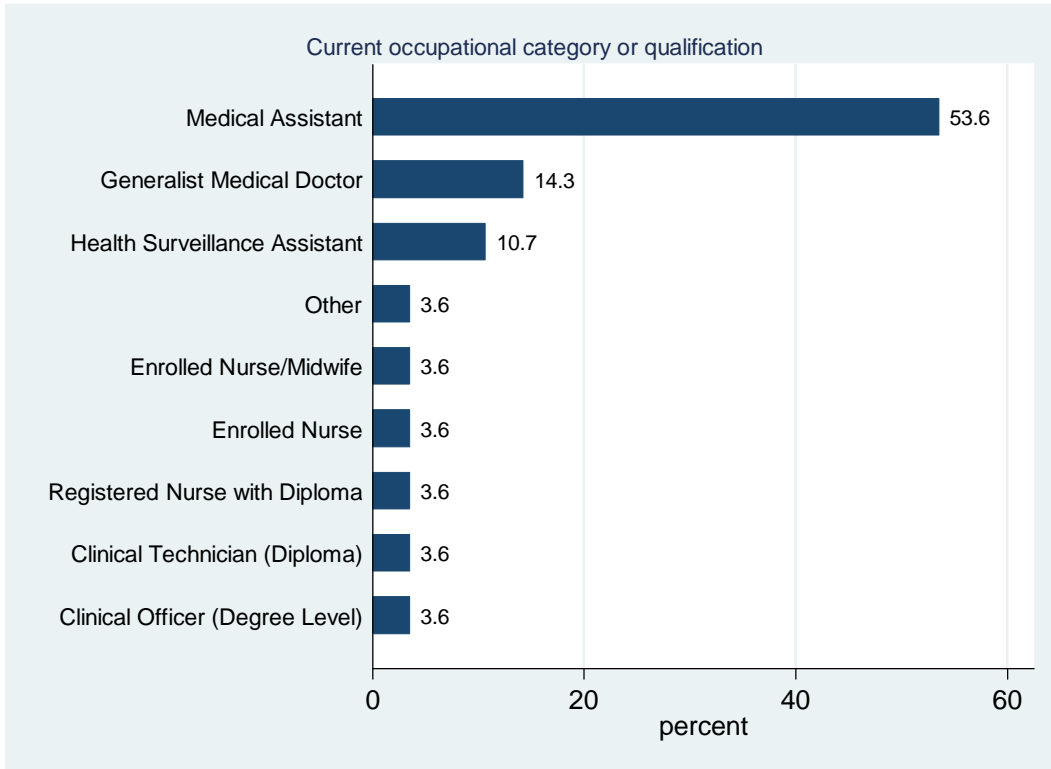


**Figure 2: Years of Post-Secondary Education Managers Completed**

### **3.4.2 Current Occupational Category/ Qualification of Health Care Managers**

Among the 28 managers who completed this question, most of the managers (53.6%) are medical assistants. See figure 3.

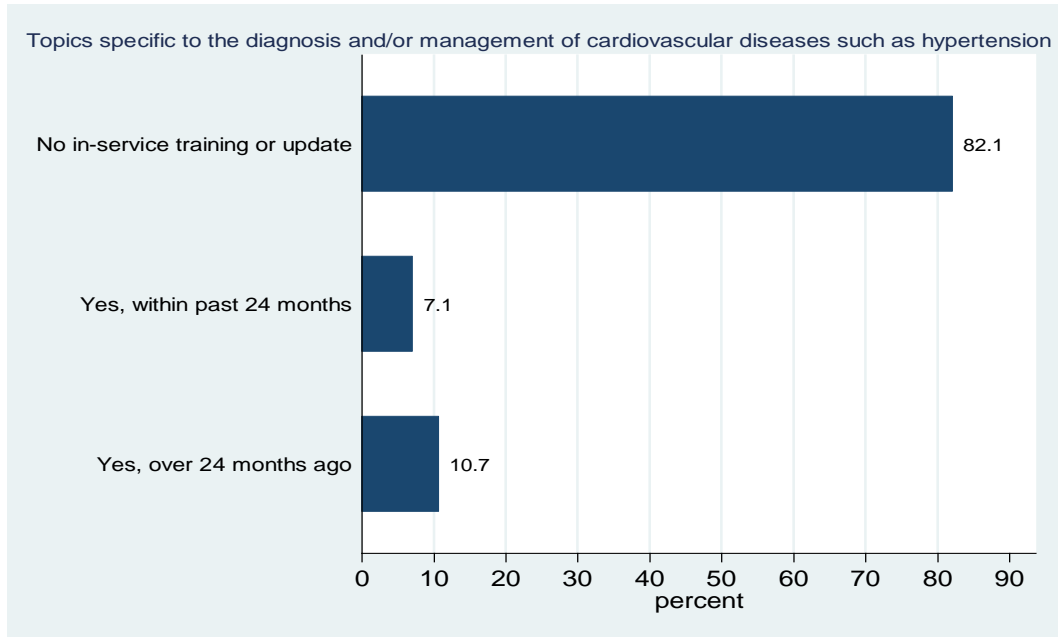




**Figure 3: Current Occupational Category or Qualification**

### 3.4.3 In-Service Trainings Attended

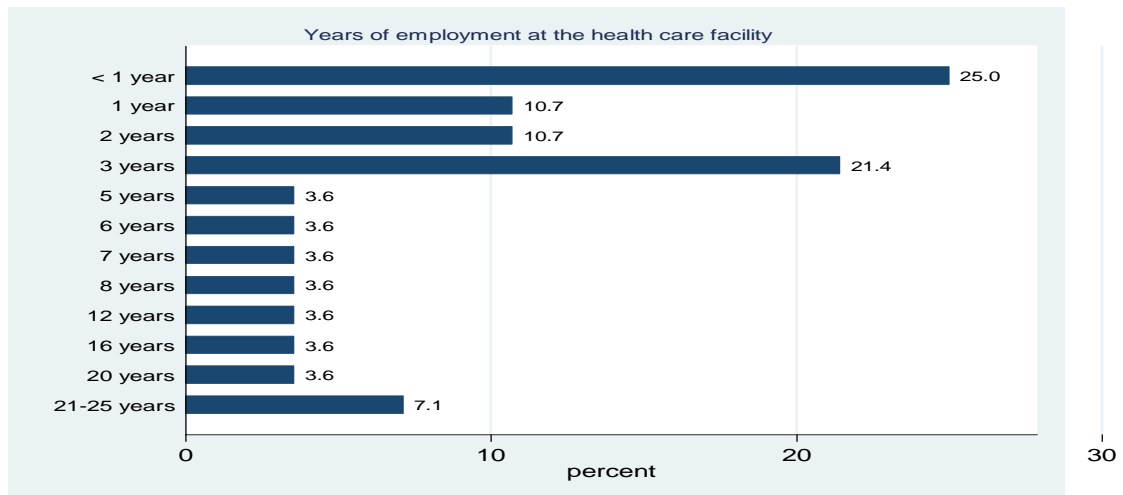
Among the 28 managers who completed this question, most of the managers (82.1%) do not have in-service training (formal training on hypertension attained while working) or update on topics specific to the diagnosis and/or management of cardiovascular diseases such as hypertension. See figure 4.



**Figure 4: In-Service Trainings Attended**

### 3.5 Years of Employment at the Health Care Facilities

Among the 28 managers who completed this question, most of the managers (67.8%) of the managers were employed for < 1 year – 3 years. See figure 5.



**Figure 5: Years of Work at the Health Care Facility**

### 3.6 Visiting Doctors Trained in Management of Hypertension

Among the 28 managers who completed this question, all managers stated that there is no specialist doctor trained in hypertension assigned to visit their facility at least once a month. There is a small portion of managers who replied that there are at least one (10.71%) general/ family doctors assigned to their facility at least once a month who are trained in hypertension. There is a relatively higher portion of managers who mentioned that there is at least one nurse (25%) assigned to their facility at least once a month who are trained in hypertension. All managers stated that there is no community health workers /health educators assigned to visit their facility at least once a month who are trained in hypertension. Notably, 7.14% of the managers mentioned that there are at least 1 other health workers assigned to their facility at least once a month who was trained in hypertension. See figure 6.

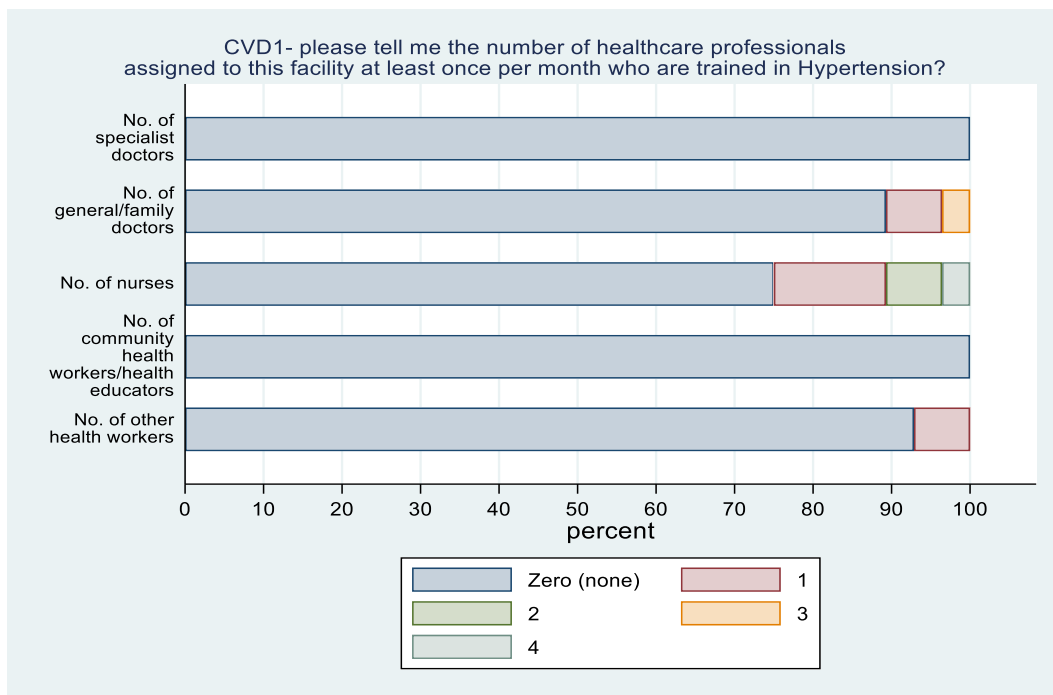
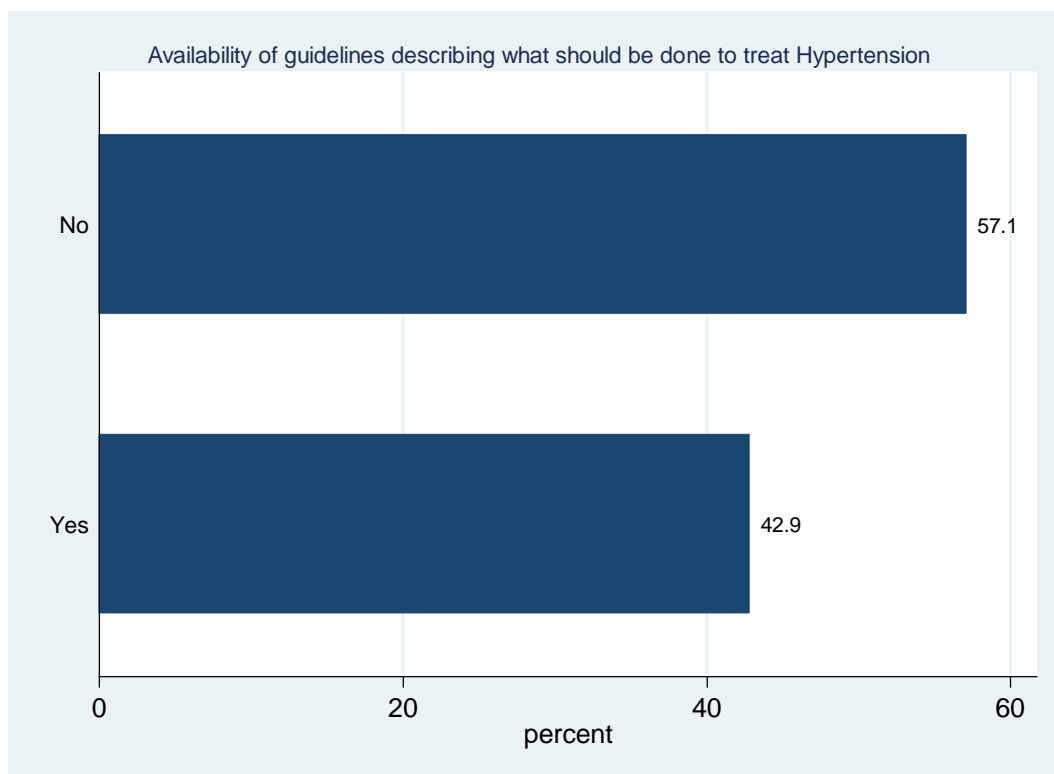


Figure 6: Number of trained HCWP assigned at the Health Care Facility

### 3.7 Usability of Guidelines

Among the 28 managers who completed this question, 57.1% of the managers stated that they do not effectively use guidelines when delivering care to hypertensive patients. See figure 7.

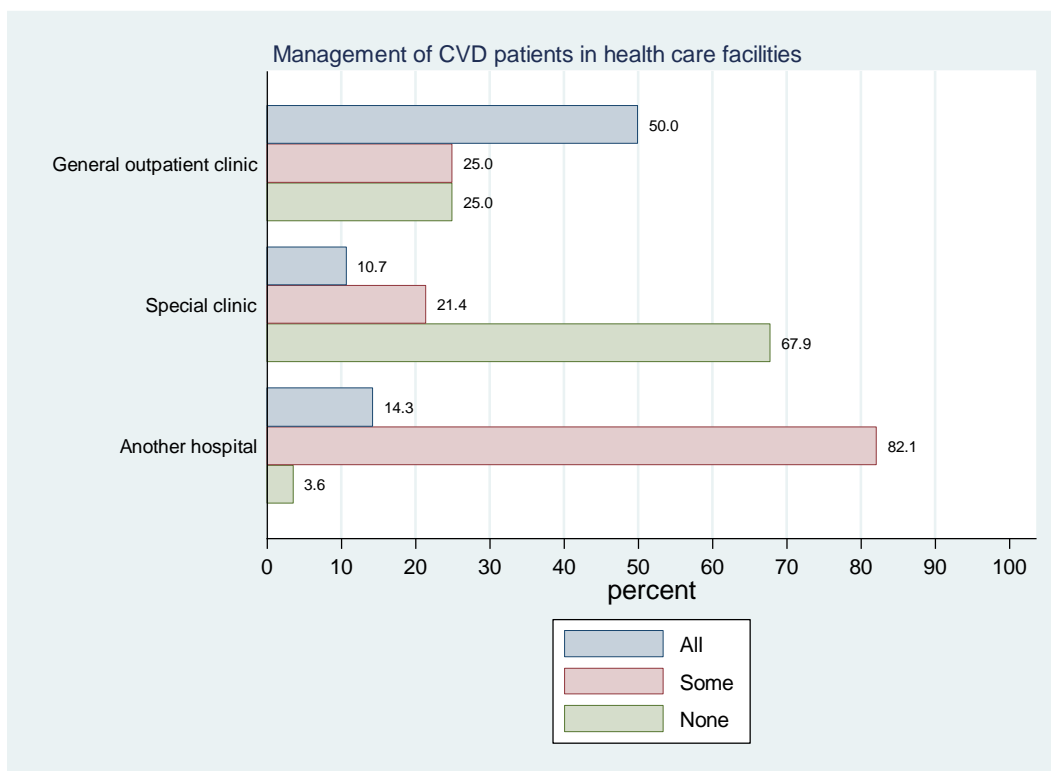


**Figure 7: Usability of Guidelines in Delivering Care at the Health Care Facility**

### 3.8 Infrastructure and Equipment for Managing Hypertension

#### 3.8.1 Infrastructure for Managing Hypertension

Most health care managers 14(50%) indicated that all CVD patients were managed in general outpatient clinics at their health facilities. Out of 28 health care managers, only 3(10.7%) indicated that all CVD patients are managed in special clinics. The majority of health care managers 23(82.1%) indicated that some CVD patient are managed at another hospital. See figure 8.



**Figure 8: Infrastructure for the management of hypertension the Health Care Facility**

### 3.8.2 Equipment for Managing Hypertension

Health care managers indicated that 135(96.43%) functional blood pressure measuring devices were at the health care facilities. Out of 140 blood pressure measuring devices, 80(57.14%) were out of service/waiting repair. Out of 108 mercury blood pressure measuring devices, 20(18.52%) were functional. Health care managers indicated that 8 mercury blood pressure measuring devices were out of service/ waiting repair. See table 3.

**Table 3: Equipment for Managing Hypertension**

<b>Equipment</b>	<b>Frequency (%)</b>	<b>Frequency (%)</b>	<b>Frequency (%)</b>
<b>Blood pressure measuring devices (BPMDs)</b>			
Any functional devices available		Out of service/waiting repair	
No	5(3.57)	No	80(57.14)
Yes	135(96.43)	Yes	60(42.86)
<b>Mercury Blood pressure measuring devices (BPMDs)</b>			
Any functional devices available		Out of service/waiting repair	
No	88(81.48)	No	40(83.33)
Yes	20(18.52)	Yes	8(16.67)
<b>Aneroid Blood pressure measuring devices (BPMDs)</b>			
Any functional devices available		Out of service/waiting repair	
No	68(62.96)	No	32(66.67)
Yes	40(37.04)	Yes	16(33.33)
<b>Weighing machines/scales for adults</b>			
Any functional devices available		Out of service/waiting repair	
No	4(3.70)	No	52(46.43)
Yes	104(96.30)	Yes	60(53.57)
<b>ECG machines</b>			
Any functional devices available		Out of service/waiting repair	
No	104(92.86)	No	100(89.29)
Yes	8(7.14)	Yes	12(10.71)
<b>Measuring tape/height stick</b>			
Any functional devices available		Out of service/waiting repair	
No	20(10.71)	No	92(82.14)
Yes	100(89.29)	Yes	20(17.86)
<b>Stethoscope</b>			
Any functional devices available		Out of service/waiting repair	
No	4(3.57)	No	76(67.86)
Yes	108(96.43)	Yes	36(32.14)

**Thermometer**

Any functional devices available		Out of service/waiting repair	
No	8(7.14)	No	36(32.14)
Yes	104(92.86)	Yes	76(67.86)

**Pulse Oximeter**

Any functional devices available		Out of service/waiting repair	
No	84(75.00)	No	96(85.71)
Yes	28(25.00)	Yes	16(14.29)

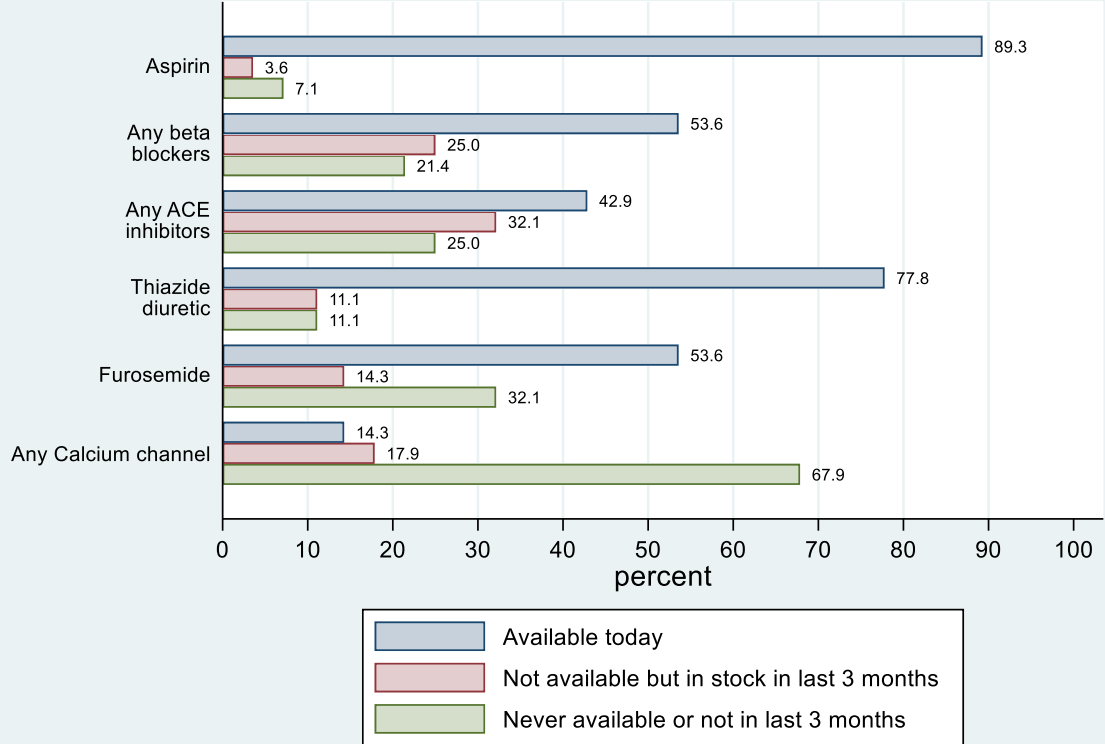
**Glucometer**

Any functional devices available		
No	60	53.57
Yes	52	46.43

**3.9 Equipment for Managing Hypertension****3.9.1 Drugs Availability**

The majority of the managers (89.3%) stated that they had Aspirin in stock on the day of the interview. For Beta blockers 53.6% of the managers reported to have it in stock on the day of the interview. Availability of ACE inhibitors and Furosemide was at 42.9% and 53.6% respectively on the day of the assessment. Stock-outs were high for ACE inhibitors (32.1%), Beta Blockers (25.0%) and Calcium Channel Blockers (17.9%). However, Calcium Channel Blockers was reported by most managers (67.9%) that it is never available or not in stock in the last 3 months. See figure 9.

CVD30\_1 - Next, I am going to ask you about the availability of medicines for CVDs in this facility?



**Figure 9: Drug Availability at the Health Care Facility**



## **CHAPTER 4: DISCUSSION**

We have found gaps in services delivery in drugs availability, guidelines availability and in service training.

This study revealed that all the districts provide care at two levels; primary and secondary levels of care with primary level predominantly. According to Malawi's health care delivery system, there are four central hospitals, one in northern, central, eastern and southern regions of the country. The services provided at a facility depends on the level of service delivery and the qualification of the providers at that facility. Each district has a hospital that serves as a referral facility. People in the districts are first attended in health centres, health posts, clinics and dispensaries where they get primary level of care. In cases where the condition is complex and needs further management, they are referred to the district hospital. District hospitals refers to central hospital if need be.

The study demonstrated that most of the facilities were managed by medical assistants. This carder was introduced as a temporal measure to the shortage of doctors in Malawi (42). Doctors are few in numbers and most of them prefer to work in urban leaving out the rural areas uncovered (42). Medical assistants do not receive specialized training hypertension or any medica condition. The World Health Organization in 2006 recommended a Task Force for Scaling Up Education and Training for Health Workers in response to a shortfall of 4.3 million trained health workers globally, worst shortages in the poorest countries (43). The initiative included a massive and immediate increase in community and mid-level health workers alongside expansion of education and training for more highly trained and specialized health workers (44). In response to this, Malawi trained medical assistants to help medical doctors and other health professionals to examine and treat patients, including

measuring and recording vital signs, administering medications, and performing routine clinical procedures such as giving injections and removing sutures among other things (45). There are existing knowledge gaps in how the cadre can manage disease conditions. With the majority of patients accessing care at primary level of care where MAs are stationed, insufficient management is likely (46).

Thirdly to medical assistants, it was also noted that a remarkable number of Health Surveillance Assistants (HAS'S) were managing the facilities. HAS's are a group of people who undergoes a six months training and they are trained in disease surveillance of TB and Water and Sanitation issues (WASH) (47). Due to the same shortage of health care workers, there are extended duties and responsibilities that were given to HAS's and these include; Extended Program of Immunization (EPI), MCI, management of simple malaria, family panning among many more (48).

From the findings, it was clear that facility leadership was dominated by MA's and HAS's who by training were not taught about leadership and management. As such, when placed in position, they might only focus more on immediate needs than long-term needs depending on the skill level of the leader. Having managerial and leadership skills has a very big impact on the preparedness and functionality of a facility and that determines the capacity of a facility to deliver hypertension service. In addition to that, HAS's were not trained in management of hypertension, as such, they cannot be provided with the medication they cannot prescribe. This might deprive the people in the catchment area of that facility from receiving hypertension care.

On trainings in hypertension delivery capacity, most managers never had any in-service training in hypertension. Studies suggest that if all health care providers receive even brief training in the management and control of hypertension, prevention of complications and major public health benefits are likely to be achieved (49,50). Information changes and it is essential to have up to date information to improve service delivery. In service training helps to add on to knowledge of health care workers and boost confidence in practice. In service trainings are done to introduce staff to new information, new guidelines, protocol and also to refresh on the existing knowledge (51). Not providing in-service training to health care workers has an impact on the quality of care because service provided might not be up to date and new protocols and guidelines might not be known and followed. As new interventions are being developed through research, in service trainings provide an avenue to introduce new methods in routine care.

On guidelines, most of the health care facilities do not have copies of guidelines and Standard Operating Procedures (SOP's) for the management of hypertension available. Guidelines might help to optimize patient outcomes and discourage the performance of ineffective or harmful interventions (52). They also improve the consistency of care, so that patients with hypertension can be treated according to the same protocol regardless of where, or from whom, they receive care (53). Further, guidelines can help avoid inefficiencies and optimize the value of healthcare expenditures by identifying practices that are unnecessary or unduly expensive (53). Studies showed that health care workers are able to manage hypertension even in the remote area provided they have clear and detailed protocols and guidelines (54,55).

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A study was conducted in Kibera, Kenya on task shifting in health service and results showed that health care workers were able to manage hypertension even in the remote area provided they had clear and detailed protocols and guidelines (54). In a study done to assess the care provided for hypertension at the emergency Department of an Urban Hospital in Mozambique, it showed that no clinical protocols or algorithms for risk stratification of hypertension were available (55). It was highly recommended that if properly used, hypertension guidelines might markedly improve the quality of hypertension care delivered regardless of low knowledge and skills because workers will be able to follow the protocols and manage patients.

Having a specific room for management of hypertension was a challenge in most facilities. As such, patients were seen in the general Out Patient Department (OPD) consultation rooms by the available health care provider attending to patients on that particular day. OPD's are mostly congested with patients and triage system is used to assist the patients. Triage system attend first to the very sick patient (57). Studies shows that having a special room and day for hypertension clinic reduces patient waiting time and increases patient retention in care (58). Not having a special room and day for a clinic might lead to long waiting time which is one of the factors contributing to poor drug adherence and low levels of patient retention in hypertension management (58). Having a specific room and days for management of hypertension might help managers to plan and prepare for the hypertension clinic. With this arrangement, managers might be less likely to overlook the need of training staff, having guidelines and protocols pasted in consultation rooms for reference, equipment and medications available.

We also found that most facilities had the basic equipment for the management of hypertension. This is similar to the findings in Malawi Harmonized Health Facility Assessment done in 2018-2019 (59). Equipment facilitates the delivery of hypertension service. Without equipment it is hard to diagnose, manage and follow-up patients. Having most equipment makes the facility more capable to deliver the care. Patients also might be encouraged to visit a facility where they know that their management will be planned after proper examination, investigations and diagnosis. The equipment might also boost health care workers morale and confidence in the delivery of hypertension care, as such patients might receive quality care.

Having medications available encourages patients to seek hypertension service. This has a positive effect in patient retention in care. Hypertension treatment is given according to antihypertensive ladder which starts with Diuretics on the first line, seconded by Calcium Channel Blockers (CCB), then Beta Blockers and lastly Angiotensin Converting Enzymes (ACE) inhibitors(16). According the MSTG, primary level of care is allowed to prescribe class one and two of the antihypertensive and the rest of the classes can be managed from a secondary level of care. However, some primary level of care especially in urban areas they do have doctors and they are allowed to prescribe up to the last class of drugs in the ladder. This is so unlike in rural areas like of our study where the most senior person at the facility were the least cadre in medical profession.

Similarly, the Malawi Harmonized Health Facility Assessment and Malawi Service Provision Survey 2013-2014 found ACE inhibitors and BB as least available drugs in the facilities (39,59). A study done in Zambia indicated that availability of essential antihypertensive drugs in public health facilities in Lusaka district was a challenge with less than 60% of facilities surveyed experiencing stock-outs over six months (60). Drug stock out might significantly affect the effective management of patients with hypertension and in the districts.

On the same, a study done on drug availability among hypertensive patients in primary healthcare facilities in a rural province in South Africa reviewed that two thirds (67.2%) of patients received all their antihypertensive medications whilst 25.5% received some of their medicines during the study time (61). South Africa and Malawi are in the same region of sub-Saharan yet they have different economic statuses. Malawi is amongst the poorest countries in the world and South Africa is amongst developed countries in the world yet we are all facing the drug stock out issues in the health care facilities.

### **Implications of the Study**

The results of this study can be generalized because the sample represent the true picture of the Malawi health system and it was done in all three regions of the country. Further studies should focus on accessibility and quality of care given.

## **CHAPTER 5: SUMMARY, RECOMMENDATIONS AND CONCLUSIONS**

### **5.1 Summary**

This cross-sectional study analysed data from 28 health facilities of the MLSFH. Managers from each health care facility were interviewed. We found that most health care facilities had the basic equipment available for management of hypertension. Having most equipment makes the facility more capable to deliver the care and might encourage patients also to visit a facility where they know that their management will be planned after proper examination, investigations and diagnosis. However, most managers reported to have had no in-service training or update on hypertension and were challenged by availability of copies of guidelines and drugs for hypertension. As new interventions are being developed through research, in-service trainings on hypertension will provide an avenue to introduce new methods in routine care. Health care workers will be able to manage hypertension even in the remote area provided they have clear and detailed protocols and guidelines. Lastly, constant availability of hypertensive drugs will help to retain patients in care and help in achieving control of BP and prevent complications.

### **5.2 Recommendations**

If Malawi is to make gains towards meeting the SDGs on universal access to quality, safe and affordable essential medicines for all and reducing the NCD burden by 2030, sustainable efforts and health policy directions may need to be addressed going forward. In-service trainings for health care workers in hypertension should be taking place. National guidelines, protocols and Standard Operating Procedures must be oriented to health care providers, be available and used in all health care facilities. It is highly recommended that each and every



facility should have infrastructure for management of hypertensive patients, basic equipment and constant supply of essential medicines for the quality of care to be up to standards.

### **5.3 Conclusions**

We have found some gaps in capacity of health facilities to provide hypertension care. Drugs availability was one of the main challenges. Future interventions should focus on addressing the existing gaps.

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# APPENDICES

## Appendix 1: Letter of Permission to Use Data

 **Penn**  
Arts & Sciences  
Population Aging Research Center  
3718 Locust Walk, 272 McNeil Bldg  
Philadelphia, PA 19104-6298  
parc.pop.upenn.edu

**Hans-Peter Kohler**  
*F.J. Warren Professor of Demography  
Director, Population Aging Research Center*

August 13, 2020

COMREC Secretariat  
College of Medicine  
Private Bag 360  
Blantyre  
Malawi

*Reference:* Letter of Permission for MLSFH Data Use

Dear Sir/Madam:

Malawi Longitudinal Study of Families and Health (MLSFH) is one of the longest studies being conducted in Malawi since 1998 with focus on MLSFH-MAC: mature adult cohort and MLSFH-ACE: Project on adverse Childhood Experiences (focusing on adolescents). Since 1998, a number of data collection rounds have been done (1998, 2001, 2004, 2006, 2008, 2010, 2012, 2013, 2017, 2018 and 2019) in Balaka, Mchinji and Rumphu.

In view of this, I would like to grant permission to Lucia Mbulaje, who is a second year Master Student in Public Health student at College of Medicine at the University of Malawi, to use data collected as part of the MLSFH for her thesis titled "A critical analysis of hypertension care delivered in Balaka, Machinga, Mchinji and Rumphu Health Care Facilities." The data made available for this project include relevant survey data from MLSFH respondents as well as data on Health Care Providers and Health Care Facilities that were collected as part of the MLSFH.

All data that will be made available will be completely de-identified and will not contain personally identifiable information.

Permission to use these data will be subject to the MLSFH Data Use Agreement, which stipulates, among other aspects, the exclusive use of the data for research purposes and the protection of confidentiality of the data. Moreover, because the MLSFH-ACE data are not yet in the public domain, it is expected that all publications and reports based on these data will be co-authored with relevant key members of the MLSFH project (including H-P Kohler and Iliana V. Kohler, and mentors from COM).

UNIVERSITY of PENNSYLVANIA

## Appendix 2: Approval Letter for the Parent Study

Telephone: +265 786 400  
Facsimile: +265 789 431

All Communications should be addressed to:

The Secretary for Health and Population



in reply please quote No.

MINISTRY OF HEALTH AND POPULATION  
P.O. BOX 30377  
LILONGWE 3  
MALAWI

18<sup>th</sup> April, 2019

Hans-Peter Kohler  
University of Pennsylvania

Dear Sir/Madam,

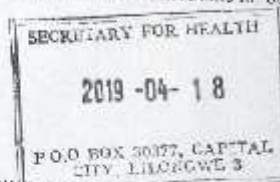
Re: Protocol # 19/01/2214: Surviving an Epidemic: Families and Well-Being, Malawi (SANE) 1998-2021

Thank you for the above titled proposal that you submitted to the National Health Sciences Research Committee (NHSRC) for review. Please be advised that the NHSRC has reviewed and approved your application to conduct the above titled study.

- **APPROVAL NUMBER** : 2214
- The above details should be used on all correspondences, consent forms and documents as appropriate.
- **APPROVAL DATE** : 18/04/2019
- **EXPIRATION DATE**  
This approval expires on 17/04/2020. After this date, this project may only continue upon renewal. For purposes of renewal, a progress report on a standard form obtainable from the NHSRC Secretariat should be submitted one month before the expiration date for continuing review.
- **SERIOUS ADVERSE EVENT REPORTING:** All serious problems having to do with subject safety must be reported to the NHSRC within 10 working days using standard forms obtainable from the NHSRC Secretariat.
- **MODIFICATIONS:** Prior NHSRC approval using forms obtainable from the NHSRC Secretariat is required before implementing any changes in the protocol (including changes in the consent documents). You may not use any other consent documents besides those approved by the NHSRC.
- **TERMINATION OF STUDY:** On termination of a study, a report has to be submitted to the NHSRC using standard forms obtainable from the NHSRC Secretariat.
- **QUESTIONS:** Please contact the NHSRC or phone number +265 994 063 425 or by email on [nhsc@centre@gmail.com](mailto:nhsc@centre@gmail.com).
- **OTHER:** Please be reminded to send in copies of your final research results for our records (Health Research Database)

Kind regards from the NHSRC Secretariat.

For: **CHAIRPERSON, NATIONAL HEALTH SCIENCES RESEARCH COMMITTEE**  
Promoting Ethical Conduct of Research!



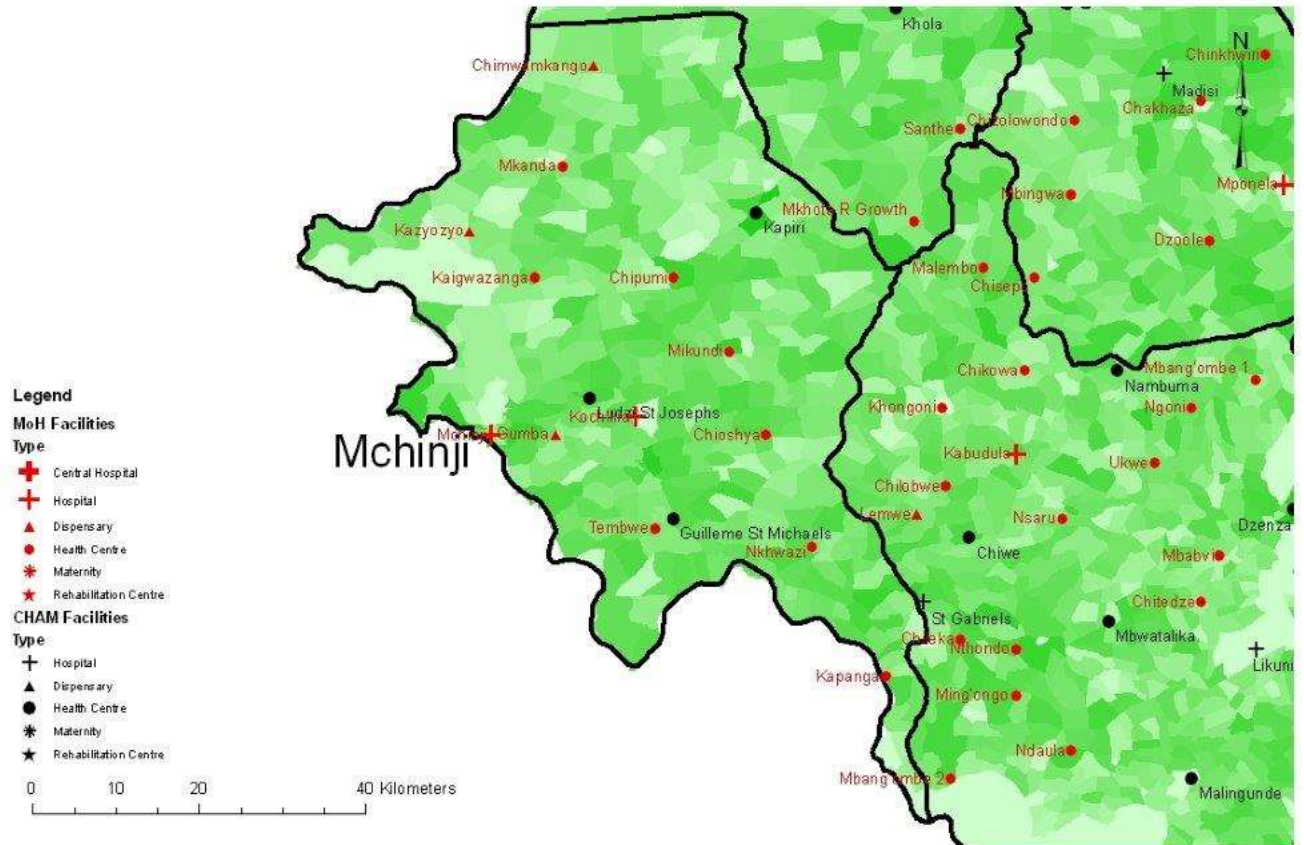
Executive Committee: *Dr B. Chilina (Chairperson), Dr B. Ngwira (Vice-Chairperson)*  
Registered with the USA Office for Human Research Protections (OHRP) as an International IRB/IRB  
Number IRB00002965 FWA00005976

### Appendix 3: COMREC Approval Certificate

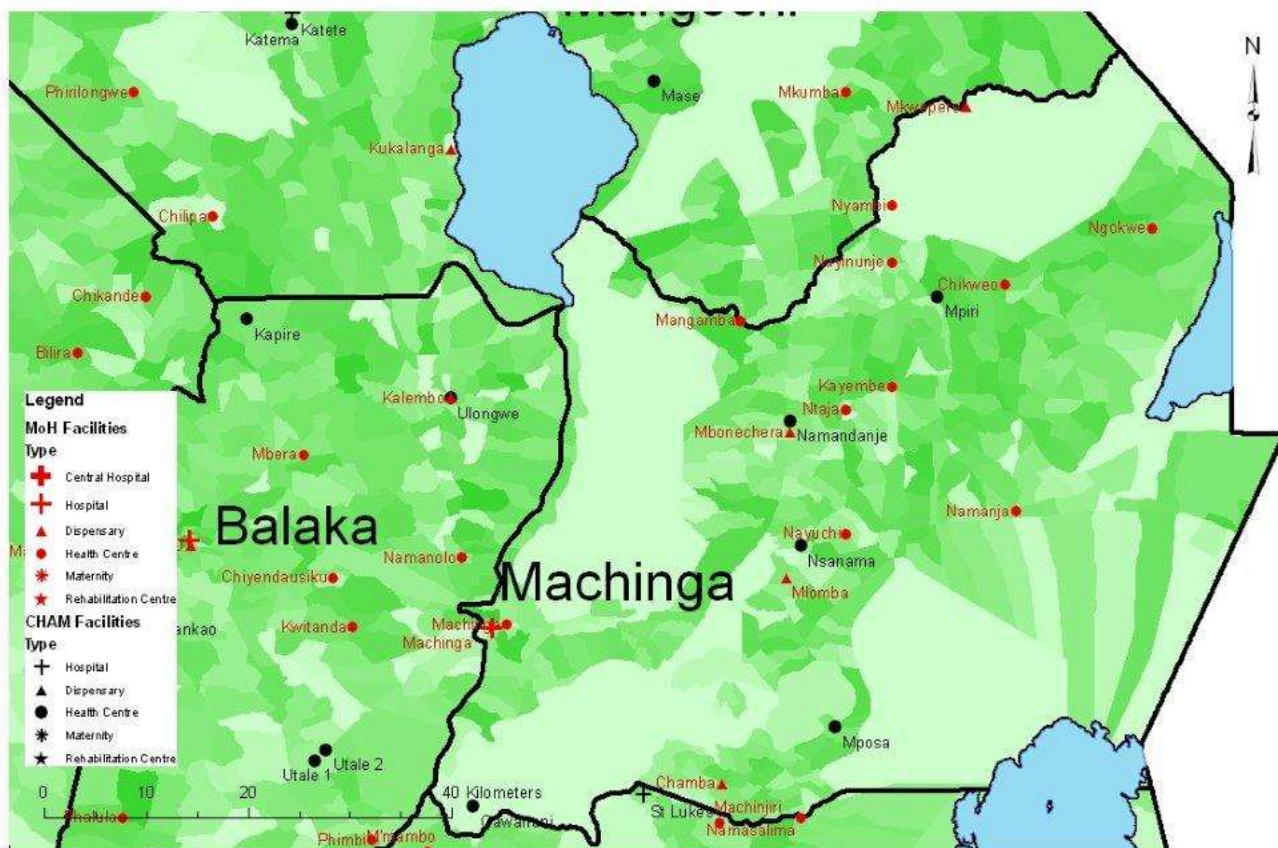


## Appendix 4: Maps of the four districts

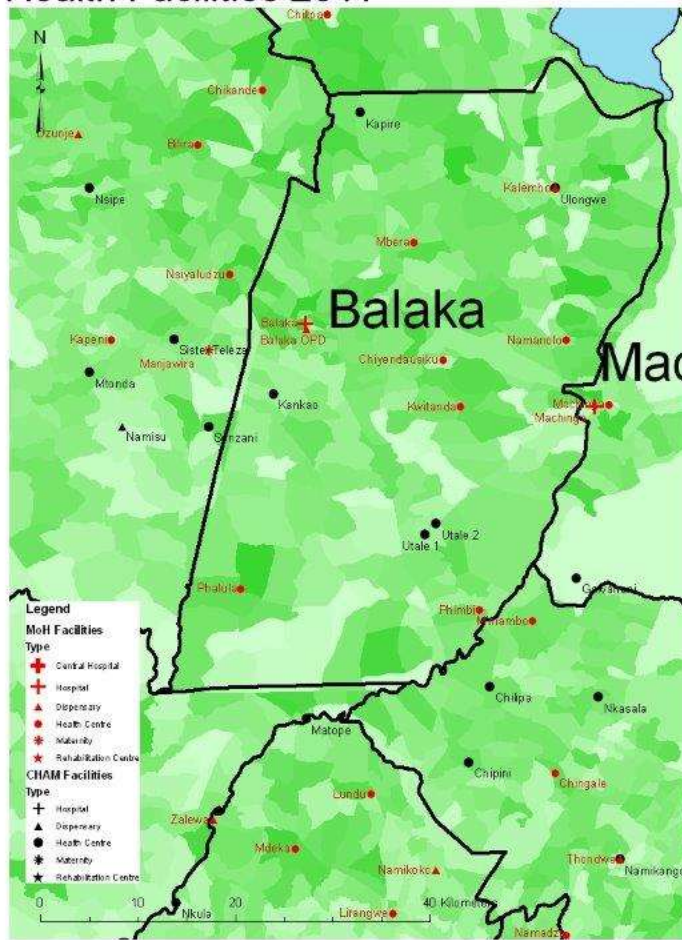
### Health Facilities 2011



# Health Facilities 2011



# Health Facilities 2011



# Health Facilities 2011

