

# **Hypertension - The New Silent Killer in Zimbabwe: Is Primary Prevention a Solution?**

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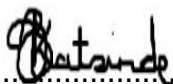
A thesis submitted in partial fulfilment of the requirement for the degree of Master of Public Health

by

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Zimbabwe

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## LIST OF ABBREVIATIONS

|         |  |
|---------|--|
| CHW     | Community Health worker                            |
| CSO     | Central Statistics Office                          |
| CVD     | Cardiovascular diseases                            |
| DALY    | Disability Adjusted Life Years                     |
| DFID    | UK Department for International Development        |
| EU      | European Union                                     |
| FCTC    | Framework Convention on Tobacco control            |
| GDB     | Global Burden of Disease                           |
| HIC     | High Income Countries                              |
| IUGR    | Intra Uterine Growth Retardation                   |
| LBW     | Low birth weight                                   |
| LMIC    | Low and Middle Income Countries                    |
| MoHCW   | Ministry of Health and Child Welfare               |
| MTP     | Medium Term Plan                                   |
| NCD     | Non-Communicable Diseases                          |
| NHPPCP  | National High Blood Pressure Control Program       |
| PHC     | Primary Health Care                                |
| SEP     | Socio economic Position                            |
| SES     | Socio economic Status                              |
| SSA     | Sub-Saharan Africa                                 |
| TARSC   | Training and Research Support Centre               |
| UN      | United Nations                                     |
| UK      | United Kingdom                                     |
| UNICEF  | United Nations Children's Fund                     |
| USAID   | United States Agency for International Development |
| VHW     | Village Health Workers                             |
| WHO     | World Health Organization                          |
| ZDHS    | Zimbabwe Demographic and Health Survey             |
| ZIMSTAT | Zimbabwe National Statistics Agency                |

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### **Dedication**

To my cherished husband Tapfuiwa and children, Shingirai, Rumbidzai and Tinodaishe thank you for allowing me to be away for so long. I appreciate your great support, understanding, encouragement and prayers.

To my mother and siblings thank you for the support and prayers. My special thanks to Millicent for outstanding support to the family during my absence.

## GLOSSARY

**Hypertension** is defined as “the percentage of population aged 25 or older having a systolic blood pressure equal to or greater than 140 mmHg and /a diastolic blood pressure equal to or greater than 90 mmHg or on medication to lower blood pressure” (WHO 2011a).

### **Primary Health Care**

Primary health care is essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination (WHO 1978).

### **Primary Prevention**

Primary prevention the first level of health care, designed to prevent the occurrence of disease and promote health (online medical dictionary).

### **Non-communicable disease**

Non-communicable diseases (NCDs), also known as chronic diseases, non-infectious disease. They are of long duration and generally slow progression. Major non-communicable diseases include; Cardiovascular disease, chronic respiratory disease, diabetes and cancer (WHO 2014).



## ABSTRACT

The burden of hypertension and its sequel are on the increase in Zimbabwe putting strain on the already overburdened and under funded health care system. Identification of effective, evidence – based interventions is important in order to make recommendations to the MoHCW informing policy for implementation of these interventions so as to reduce the burden of hypertension in Zimbabwe.

The thesis is based on literature review. Andersen’s Behavioral Model of health services utilization was used to analyze the risk factors for hypertension and identify interventions that could be used to respond to the burden of hypertension. Studies reviewed were from Zimbabwe, sub-Saharan Africa (SSA) and Low and Middle Income Countries (LMIC) and the world over.

Hypertension is on increase in Zimbabwe. Risk factors identified include advanced age, unhealthy diet, smoking, obesity and physical inactivity. Findings show many effective evidence – based interventions that are implementable at a low cost. Screening, counseling and health education and or promotion activities on diet, salt reduction and physical activities can be implemented in Zimbabwe at both individual and population level. Integration of primary prevention strategies into Primary Health Care (PHC) is feasible

Like many SSA countries, Zimbabwe has been slow in responding to the growing problem of hypertension. However the Ministry of Health and Child Welfare (MoHCW) has initiated the development of the NCDs policy and establishing a department on NCDs in the ministry. The Ministry could start off with the implementation of evidence - based interventions that can easily be integrated into the PHC strategy.

Zimbabwe needs to develop a NCDs policy in order to develop hypertension programs, develop monitoring mechanisms for the laws already in place like the tobacco laws and engage other sectors in the fight against hypertension.

**Key words:** Hypertension, primary prevention, non-communicable disease, lifestyle, Zimbabwe, sub-Sahara Africa.

**Word count:** 12689

## INTRODUCTION

The World Health Organization (WHO) defined hypertension (raised blood pressure) as “the percentage of population aged 25 or older having a systolic blood pressure equal to or greater than 140 mmHg and a diastolic blood pressure equal to or greater than 90 mmHg or on medication to lower blood pressure” (WHO 2011a). Hypertension is the most important risk factor for coronary heart disease, stroke (cardiovascular diseases) and renal disease, the leading risk factor for mortality and a major global public health challenge for both LMIC and High Income Countries (HIC) (Appel et al., 2006). It is estimated that worldwide hypertension kills 9.4 million people every year and 92 million disability adjusted life years (DALYs) (Lawes et al., 2008). Estimates by Kearney and colleagues (2004) predict that 1.56 billion people, that is, more than a quarter of the world’s adult population will be hypertensive by 2025 of which 72% will be from LMIC. Ischemic heart disease and stroke were the greatest causes of deaths between 1990 and 2010 (Lim et al., 2012).

Hypertension is now a widespread problem in (SSA) with an estimated 74.7 million people with hypertension (Os & Rayner 2013). The prevalence is high in urban areas due to mass migration of rural Africans to urban areas, rapid changes in lifestyle and risk factors, frequent under-diagnosis, and the severity of its complications (Opie & Seedat 2005, Os & Rayner 2013).

Zimbabwe is also faced with a rising burden of NCDs and particularly hypertension which is a significant problem (ZIMSTAT 2005). High blood pressure is regarded to be one of the major public health problems posing a great economic burden on families and society because of treatment cost, job loss due to disability, absenteeism due to ill-health and effect on country’s economy (Matenga et al., 1997). Thus hypertension requires urgent national attention.

Hypertension and its sequel became a concern to me during clinical supervision. I realized that stroke was on the increase among admitted patients with more men from the urban areas being affected than women. The out-patients chronic disease register showed many patients were receiving anti-hypertensive medication but of concern were the increasing numbers of those between 30 and 45 years of age on treatment, particularly females.

This was worrisome given the situation that this age group is the most productive and drivers of the country’s economy. I believe that most likely there are more hypertensive people in the community who are not aware that they are hypertensive; hence awareness campaigns can help to increase awareness. Currently health institutions are diagnosing and treating hypertensive clients as they report to hospital with complaints. Small scale hypertension health promotion activities are being done like awareness on World Health Day commemorations. However MoHCW could employ other

prevention strategies at population level to reduce the burden of hypertension. Therefore this study intends to identify the primary prevention strategies that may be used in Zimbabwe so as to inform policy for implementation of evidence- based interventions to reduce the burden of hypertension.

# 1 CHAPTER ONE: BACKGROUND INFORMATION

## Introduction

This chapter addresses the background information on Zimbabwe, the population characteristics, socio economic development, health care system functioning and major health problems.

### 1.1 Administration

Zimbabwe a landlocked country in the southern part of Africa shares borders with Zambia to the North, Botswana to the West, South Africa to the South and Mozambique to the East. The total land area is 390 757 square kilometres with a population of 13 million (ZIMSTAT) 2012). Administratively, Zimbabwe is divided into eight provinces namely; Manicaland, Mashonaland Central, Mashonaland East, Mashonaland West, Matabeleland North, Matabeleland South, Midlands and Masvingo. In 2007 the rate of urbanization was reported to be 3.4 % (World Bank 2013).

### 1.2 Demographics

The age and gender structure is typically pyramid in shape commonly found in LMIC comprising of 38.9% youths under 15 years, 56.9% between the ages 15 to 65 years and 4.2 % above 65 years (World Bank 2013). Life expectancy was 56 years and the sex ratio is 93 males per every 100 females (ZIMSTAT & ICF 2012). The crude birth rate is 32.41 births per 1000 population whilst the crude death rate is 11.4 deaths per 1000 population and the country is realizing a growth rate of 4.38% (ZIMSTAT 2012).

### 1.3 Socio- Economic Development

Gross Domestic Product (GDP) in 2012 was 428.54 USD per capita making Zimbabwe a low income country and 72.3% of the people are considered to be poor according to the World Bank criteria (World Bank 2013). Sixty five percent of the population live in the rural areas and are generally peasant farmers. The rural population is highly unemployed at 62% whilst the urban unemployment rate is 35%. The economy is predominantly based on agriculture and currently not doing well, and the situation is compounded by dry spells (ZIMSTAT 2013). Zimbabwe has gone through an economic crisis for over a decade reaching its peak in 2008 leading to a world record of hyperinflation. However real economic growth of 9% was realized in the period 2010 -2011 and this was followed by a decline in 2012 to 5%. The government of Zimbabwe still faces economic challenges, including infrastructure and regulatory deficiencies, ongoing indigenization pressure, policy uncertainty, a large external debt burden, and insufficient formal employment(MoHCW 2011).

The literacy rate is 83.6% with males better educated (87.8%) compared to females (80.1%). There are two main ethnic groups, the Shona (82%) and Ndebele (14%). English is the official language whilst the principal indigenous languages are Shona and Ndebele. Shona is spoken by 70% and Ndebele by 20% of the population and there are seven other minority Bantu languages and numerous minor tribal dialects which account for 10% (ZIMSTAT & ICF 2012).

Religions in Zimbabwe are part Christians and part indigenous beliefs comprising 50%, Christians 25% and indigenous beliefs 24% Muslim and other 1%. Roman Catholic is the dominant religion (ZIMSTAT & ICF 2012).

## 1.4 Health care system

Health care in Zimbabwe is provided by government, nonprofit groups, faith based organizations, company-operated clinics, and for-profit clinics system (Osika et al., 2010). The MoHCW represents government and provides the bulk of health services which include the prevention curative and rehabilitative services. The private sectors mainly concentrate on curative and very little on preventive services. Health services are decentralized with transfer of decision making powers and resources from the Ministry to the provincial and district levels although some activities like policy and administrative guidance, system decision-making, funding allocation and coordination of responses to national health issues remain centralized. The MoHCW adopted the PHC concept after the Alma Ata Declaration of 1978 and so has incorporated the PHC component in the provision of services at all levels of the health care delivery system (MoHCW 2007). There are four levels of the system with first level contact at the clinic or rural health center which provide a link with the community through village health workers, district level, provincial level and central or referral hospitals (VHW).

### 1.4.1 Health financing

Due to economic crisis the health system in Zimbabwe continues to face challenges on funding since the past decade with a resultant deterioration in health infrastructure, loss of skilled manpower drug stock-outs and poor quality health services (Osika et al., 2010). The severe economic challenges have led to the reduction in health expenditure as a percentage of GDP (0.02% in 2009) and budget falls short of the Abuja Declaration's goal to allocate 15 percent of the GDP to the health sector. Whilst WHO recommends 34 USD per capita spending, the estimated per capita spending for Zimbabwe in 2009 was 5.77 USD (Osika et al 2010).

Health insurance offered by government is limited to the civil servants (military, teachers, and health care workers). Outside the government, health insurance is private and company provided. Overall 16 % of the population is covered by health insurance, 10% from the public sector and 6% from the

private (Nyazema 2010, ZIMSTAT & ICF 2012). Innovative insurance plans to increase coverage for high and middle income persons have been developed in the private industry and it is projected to expand its coverage (Osika et al 2010). Private clinics are not affordable for the ordinary Zimbabwean as they charge high prices for services.

The unaffordability of health care services due to lack of insurance schemes by the general population negatively impacts on the access to health services especially for the rural population and worse still for those with chronic diseases like hypertension who have to pay for services out of their own pocket. Research has shown that health care and related expenditures (out of pocket payment of health services) lead to impoverishment of population in LMIC (Jacobs et al 2012).

Given the crisis scenario the Zimbabwean health care system has become increasingly reliant on donor funds (United Nations Children's Fund (USAID), UK Department for International Development (DFID), European Union (EU) and United Nations (UN)) for supporting significant health issue programs (Osika et al 2010).

#### 1.4.2 Human Resources for health

Zimbabwe still faces a critical shortage of health personnel which resulted from the economic crisis of 2008. WHO recommends that for African countries a population should be covered by a minimum of 2.5 health workers per 1000 population. As of January 2009 Zimbabwe's health system was just 57% staffed to capacity. Nursing and midwifery personnel represent the largest group of facility-based workers comprising 65%, physicians 7%, Pharmacists 1%, Physiotherapists 1%, and other health worker 26% (Osika et al 2010). Below is table 1 showing the national level health worker/population ratios for Zimbabwe in 2009.

Table 1: Health Worker/Population ratios at National Level

|  |        | 2009                |
|--|--------|---------------------|
| Occupational categories/Cadres                                     | Number | HW/ 1000 Population |
| Doctors  | 827    | 0.0669              |
| Nurses   | 16668  | 1.349               |
| Environmental Health   | 1141   | 0.0923              |
| Pharmacy   | 383    | 0.031               |
| Radiographer   | 251    | 0.0203              |
| Physiotherapy  | 36     | 0.072               |
| Nutrition  | 774    | 0.0626              |
| Orthopaedic  | 41     | 0.0033              |
| Oral Health  | 182    | 0.0147              |
| Laboratory   | 274    | 0.0222              |
| Research Officer   | 33     | 0.0027              |
| Health information   | 157    | 0.0127              |
| Health Promotion   | 33     | 0.0027              |
| Source: Human Resources for Health - Country Profile Zimbabwe 2009 |        |                     |

### 1.4.3 National policy on prevention of NCDs

Zimbabwe is one of the LMIC lagging behind in coming up with a policy for the prevention and control of NCDs although there is recent progress. On the World Health Day commemorations in Harare in 2013 the theme was “High blood pressure: WHO + YOU = The key to living longer”. Doctor Charimari who spoke on behalf of the WHO country representative urged the MoHCW to implement standardized guidelines for hypertension management in primary health care settings. He expressed appreciation for the on-going development of a NCDs policy and strategy for Zimbabwe to address the increasing problem of NCDs including raised blood pressure (WHO 2013a). The MoHCW has also created a department to deal with NCDs within the health sector although there are no specific programs for NCD or hypertension. The PHC strategy is being used to implement screening and treatment activities.

### 1.5 Major health problems

The leading health problem in Zimbabwe currently is HIV and AIDS (for both morbidity and mortality) and this has dominated for the past two decades. Other diseases of major importance include other infectious diseases and perinatal and nutritional disorders. The increasing burden of non-communicable disease in Zimbabwe like the pattern in most developing countries adds to the continuing burden of infectious diseases, perinatal and

nutritional disorders. Available data suggest an increasing prevalence of cardiovascular diseases (CVD) in Zimbabwe (ZIMSTAT 2005).



## 2 CHAPTER TWO: OBJECTIVES AND METHODOLOGY

This chapter focuses on the problem statement, justification of the study, objectives, methodology and conceptual framework.

### 2.1 Problem Statement

Globally NCDs are on the increase and a cause for concern due to the rise in global burden of disease. Hypertension is an important public health challenge and a major cause of morbidity and mortality in LMIC and HIC (Kearney et al., 2004). It is the most important modifiable risk factor for cardiovascular diseases causing an estimated mortality of 13.5% of global total deaths and 6% of global total DALYs (Lawes et al., 2008).

In SSA there is a growing burden of CVDs with extensively varying prevalence rates in different countries (Hendricks et al., 2012, Addo et al., 2007). SSA has an estimated prevalence rate of hypertension of 16.2% (Os & Rayner 2013). Hypertension, once believed to be a problem of urban areas due to transition to a western lifestyle associated with increased income and unhealthy diets, is now shown to be on the increase in the rural population (Mittal & Singh 2010, Ibrahim & Damasceno 2012). A systematic review on hypertension in Africa shows many studies found that awareness of hypertension is low (Kayima et al., 2013) and this is likely to be due to low level of literacy and education, as well as a low level of access to medical care (Mittal & Singh 2010. Inadequate diagnosis and suboptimal control of hypertension is a major driver of cardiovascular morbidity and mortality in Africa (Geziano 2009).

Like in many SSA Zimbabwe is experiencing a growing burden of CVD with hypertension being the most important risk factor among the top 15 risk factors and accounting for 3% of DALYs (Lim et al., 2012). In 2011 hypertension deaths were 0.53% of total deaths with age adjusted death rate of 15.87 per 100000 populations (WHO 2011a). The NCDs survey report showed hypertension increased with age, with a prevalence rate of 7.9% in the 25-34 year old age group rising to 30.9% in the 65 years and over age group. A blood pressure survey conducted in an urban environment also revealed hypertension (blood pressure 140/90 mm Hg) prevalence of 35% in women and 24 % in men (Mufunda et al., 2006). WHO estimated a prevalence rate in 2008 of 39% in the general population (WHO 2011a).

Further, deaths from cardiovascular diseases ranked 4 out of the top 10 causes of hospital mortality and stroke was the second cause of death after HIV among the top 20 causes of death accounting for 3.66 % deaths (WHO 2011a). If not checked the effects of hypertension and its sequel will continue to exert a lot of strain on the already stretched limited resources within the public health sector as well as families and communities. Zimbabwe has to start implementing context specific and "effective" interventions.

## 2.2 Justification

In accordance to the WHO recommendations for countries to define and implement strategies to respond to growing burden of NCDs, Zimbabwe has established a department within the MoHCW responsible for NCDs. Funding is available for the treatment and control, prevention and health promotion, NCD surveillance, monitoring and evaluation. However according to available data there is neither specific policy or program which is operational on CVDs nor risk factor intervention programs to curtail the fast growing burden of hypertension with serious public health implications (WHO 2011a, Mufunda et al 2006).

The magnitude of hypertension burden requires concerted efforts to increase awareness and primary prevention. Some studies recommend both individual guided interventions and population based interventions for the prevention of hypertension (Valluri & Gaziano 2013). It is almost 10 years since the NCDs survey recommended urgent attention to NCDs in Zimbabwe.

Currently the Zimbabwean health care system is utilizing the PHC concept and there is screening of individuals as they come to hospital with health problems although the screening lacks risk factor screening which is recommended by WHO. Treatment protocols for hypertension are in place and counseling on lifestyle is provided as necessary. However specific programs for primary prevention of hypertension that are context specific, tried and tested in the SSA which could guide policy development and implementable at a cost afforded by Zimbabwe are not in place. This study intends to identify evidence - based interventions effective in reducing hypertension so as to inform policy for implementation in order to reduce hypertension morbidity and mortality and the burden on the health care system.

## 2.3 Main Objectives

To assess the current response gaps and effective interventions regarding the prevention of hypertension, in order to make evidence - based recommendations to the MoHCW to improve policy, and interventions to reduce the burden of hypertension in Zimbabwe.

### 2.3.1 Specific objectives

To identify risk factors for hypertension in Zimbabwe.

To assess current policy and program responses for hypertension in Zimbabwe.

To identify and discuss context specific, effective interventions that may be used to prevent high blood pressure in Zimbabwe.

To make appropriate evidence based recommendations to the MoHCW to improve policy development and interventions to reduce the burden of hypertension.

## 2.4 Methodology

This study is an exploratory descriptive study based on literature review. Literature from Zimbabwe as well as other countries from SSA, LMIC and world over was included. There is however limited recent literature on hypertension from Zimbabwe. Thus the study focused on strategies that have been tried and tested scientifically and proven to be effective in the prevention of hypertension worldwide.

### 2.4.1 Search strategy

The following data bases were used to solicit information related to hypertension; search engines such as Pub-med, Google scholar; databases such as Medline, Science Direct; websites such WHO, World Bank, Cochrane reviews were used to access peer reviewed information. The organizational websites like MoHCW and information from Health surveys, Central Statistics Office, National Health Strategic Plan were reviewed to allow inclusion of 'grey' literature. The list of key words used included "NCDs", "hypertension", "risk factors", "determinants", "prevention", "lifestyle", and "behavioral model", "Zimbabwe", "sub-Saharan Africa". These words were also used in combinations. Manual search was also done following identification of relevant articles from the reference lists.

### 2.4.2 Inclusion criteria

The Literature search was from 1995 to date. This was necessitated by the fact that Zimbabwe has very little research on hypertension less than 15 years and also some initial studies on diet were done in the late 1990s. The articles were in English and literature from other countries was also used to enable comparison within and outside the African continent.

### 2.4.3 Limitations

Data used in this study was limited to literature review as it was not feasible to go and collect primary data due to time and financial constraints. In terms of best practices the study relied on literature beyond Zimbabwe as most of literature from Zimbabwe is rather old. Most studies on hypertension conducted in Zimbabwe were in the late 1990s.

## 2.5 Conceptual Framework

This study utilized Andersen's Behavioral model (1995). The model helps to provide a broad foundation for the investigation, ensure consistency in the discussion and increase the clarity of reporting (Smyth 2004).

Evidence from a systematic review showed that the model has frequently been used in studies, mainly conducted in the United States and the United Kingdom. It has also been applied in numerous systematic reviews on different aspects of health care utilization to structure their results. Application has been to a broad range of health services sectors and diseases and most studies used the 1995 version of the model (Babitsch et al 2012).

In terms of operationalizations of the model there were huge variations in the way variables were categorized, especially as it concerned predisposing and enabling factors. It is believed this stemmed from the secondary data sets used in the majority of the studies.

An example of one such study was examining the Societal and Individual Determinants of Medical Care Utilization in which the framework helped to explain some key patterns and trends in health services utilization (Andersen and Newman 2005). Another study was used to explore the disparities in health care utilization among Latino children suffering from asthma in California. Exploration of population characteristics was the main focus (Chang et al 2011). One study in Manitoba looked at use of primary data from the institutions especially the risk factors for cardiovascular diseases to inform policy makers in order to plan for intervention strategies (Lix et al 2005).

This model was found to be appropriate as risk factors for hypertension can be as a result of the health care system operations, external environment; the population characteristics ranging from predisposing characteristics to enabling factors and need factors; the behaviors bring out the lifestyle issues. However shortcomings were noted that there was no section on interventions but these were looked at as intertwined in the four major areas. The identified factors were used to determine the evidence – based interventions to achieve them.

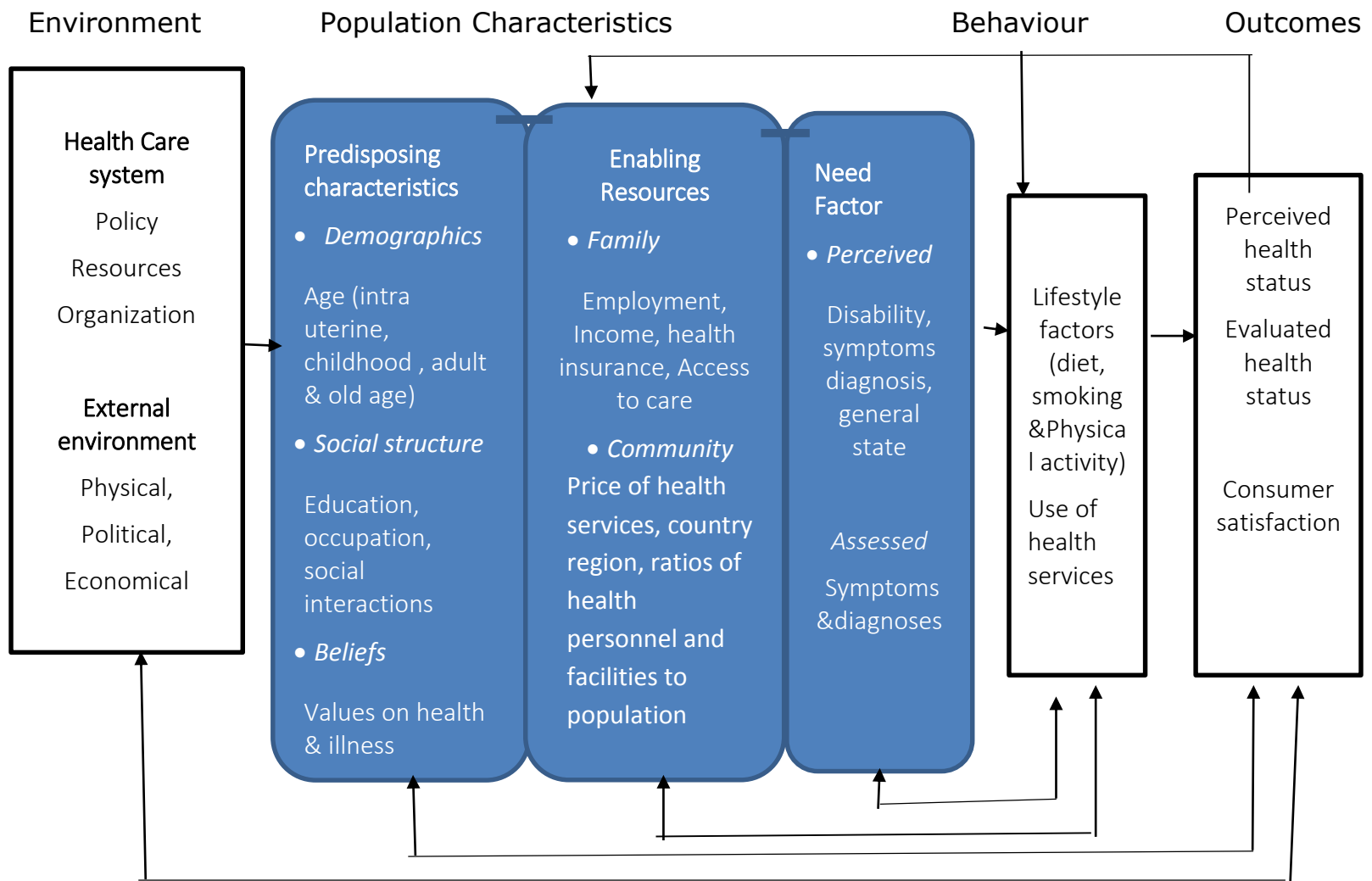


Fig 1. Adapted from Andersen's Behavioural Model(1995)

The model has four major areas ; the environment, population characteristics, behaviour and outcomes. This study will focus on population characteristics and behaviour as they can bring out factors that contribute to the development of hypertension.

### 2.5.1 Environment

This is made up of the health care system and external environment. The health-care system structures are for the provision of formal health care goods and services in society which include physician care, hospital care, drugs, and health appliances and services provided by other health care practitioners. The framework recognizes the importance of national health policy and resources and their organization in the health care system as important determinants of population's use of services. The external environment includes the physical political and economic factors and these have a bearing on access to health care by the population for example geographical distribution of health care services (Andersen 1995).

### 2.5.2 Population characteristics

#### 2.5.2.1 *Predisposing factors*

The model suggests that people's use of health care services is a function of their predisposition to use services, factors which enable or impede use and their need for care. The predisposing factors are the socio-cultural characteristics of individuals that exist prior to their illness which include age ,gender,past illnesses. The social structures e.g. education ,occupation and social interactions determine the status of an individual in society,his/her ability to cope with presenting problems commanding resources to deal with these problems and how healthy or unhealthy the physical environment is likely to be. Health beliefs are attitudes, knowledge and values that people have about health and health services that might influence their perception of need and use of services( Andersen 1995).

#### 2.5.2.2 *Enabling Factors*

These are the logistical aspects of obtaining care by the individual. They include the means and know how to access health services, income, health insurance, extent and quality of social relationships. At community level they include available health personnel and facilities, and waiting time (Andersen 1995).

#### 2.5.2.3 *Need factors*

These relate to the most immediate causes of health service use e.g. individual 's functional and health problems. Perceived need relates to people's own views about their health status and functionality which may prompt seeking care whilst evaluated need is the professional judgment about people's health status and their need for health care (Andersen 1995).

### 2.5.3 Behavior

Health behavior comprises personal health practices and use of health services. Personal health practices determine the use of formal health services (Andersen 1995). In this study personal health practices that influence development of hypertension include smoking, unhealthy diet excessive alcohol drinking and physical inactivity.

### 2.5.4 Outcomes

The outcomes are comprised of perceived health status, evaluated health status and consumer satisfaction. Health status outcomes are important for policy and health reforms as they give valued information on utilization of services. Effective access is thus established if there is improved health status and consumer satisfaction with services. Consumer satisfaction is an important measure of utilization of services. The health system is supposed to maintain and improve the health status of the population both as perceived by the population and evaluated by the professionals (Andersen 1995). Outcomes will not be a focus of this study.

### 3 CHAPTER THREE: HYPERTENSION RISK FACTORS

This chapter addresses the risk factors of hypertension being guided by the Andersen's Behavioral Model for utilization of health services.

#### 3.1 Environmental Factors

##### 3.1.1 Health Care system

The health care system provides formal goods and services in society (Andersen 1995). Availability of health care facilities, easy access and adequate staffing of health care institutions are important determinants of utilization of services. Inadequate institutional resources both material and human is a barrier to utilization due to reduced efficiency and increased waiting time (Khatib 2014). Health facilities are still understaffed in Zimbabwe as shown by the 2009 human resource profile (0.07/1000 population for doctors and 1.3/1000 population for nurses). The WHO recommends that for African countries, a population should be covered by a minimum of 2.5 health workers per 1000 population (WHO & Global Health Workforce Alliance 2009). This affects the services provided like hypertension risk factor screening and counseling and clients are left to go home without adequate information.

##### 3.1.2 External Environment

Whilst the provision of goods and services is important, the external environment which includes the physical, political and economic factors and these have an effect on access to health care services by the population. Geographical distribution of health care services determines their use (Anderson 1995). A study in Zimbabwe on access to health care showed that 23% of the population live between 5 and 10 km away from health centers whilst 17% are over 10 km away (Makuto & James 2007). Economic environment plays a role in determining use of services thus poor SEP of the people has a bearing on health seeking behaviors especially for chronic diseases. Lack of funds to pay for health care especially out of pocket payments and transport costs are barriers to use of services (Khatib et al., 2014), especially for non-acute or communicable conditions like hypertension.



## 3.2 Population Characteristics Factors

The population characteristics comprises of predisposing factors, enabling factors and need factors. Predisposing factors are subdivided into demographic factors, social structure and beliefs about health and health system.

### 3.2.1 Predisposing characteristics

#### 3.2.1.1 Demographics

Age and gender:

These demographic factors exist prior to illness. Hypertension increases with age and contributory factors can be tracked from preconception to old age (Lynch & Kaplan 2000) as described below.

*Intra-uterine:* Intrauterine conditions have an effect on hypertension later on in life and are influenced by socio economic positions of parents (Lynch & Kaplan 2000). Mother's nutrition and diet, lifestyle and exposure to infections affect growth of the fetus. The sub optimal conditions lead to intra uterine growth retardation (IUGR) and ultimately low birth weight (WHO/UNICEF 2014). IUGR is associated with increased rates of chronic disease that include coronary heart disease, stroke, and hypertension in adult life (Pisaneschi et al., 2013). In Zimbabwe 11% of the babies are born with low birth-weight (UNICEF 2009). The burden of infectious diseases like HIV and Malaria is very high and nutritional problems are significant with 7% of women aged 15 to 49 undernourished (ZIMSTAT & ICF 2012). These factors lead to IUGR a risk factor for hypertension later on in life and thus antenatal care is very important for detection and subsequent treatment of infections and also counseling of mothers on diet and lifestyle changes.

*Childhood and adolescence:* Early life factors are important risk factors for adult blood pressure. Children from poor socioeconomic status, whose mothers smoked throughout pregnancy, had LBW, were not breastfed, had high sodium diets in infancy tend to have higher blood pressure in adulthood (Lawlor & Smith 2005). Children exposed to these risk factors are likely to adopt low levels of physical activity, high dietary sodium intake, become obese, and are likely to smoke which adversely affect blood pressure (Kivimati et al., 2006). In Zimbabwe these factors are common and are a predisposition to hypertension; for instance the most recent demographic and a health survey showed only 6 % of all babies were exclusively breastfed and the prevalence of overweight among babies 6 months and below was 13% thus predisposing the children to hypertension in adulthood (ZIMSTAT & ICF 2012).

*Adult:* In an American study by Diaz Roux et al (2002) low SES was associated with developing hypertension in both whites and blacks. Lower-status jobs expose workers to both physical and psychosocial risks (Adler & Newman

2002). Advancing age is associated with an increased prevalence of hypertension and this implies greater burden of hypertension in adulthood (BeLue et al., 2009, Addo et al., 2007).

### 3.2.1.2 *Social structure*

#### Education, employment and income

Education, employment and income are closely linked factors and important determinants of SEP. An American study by Diaz Roux and colleagues in (2002) disadvantages in the three indicators was found to be associated with the greatest risk of developing hypertension in both white and blacks.

Education is the most basic socioeconomic status (SES) component that shapes future occupational opportunities and earning potential. It also provides knowledge and life skills that allow better educated persons to gain more ready access to information and resources to promote health (Adler & Newman 2002). Educational attainment may be important in reducing the health inequalities associated with early-life disadvantage (Lawlor et al., 2006).

Employed status has an effect on health as the employed have better health than the unemployed (Adler & Newman 2002) because of what money can buy such as medical care, food, opportunities for recreational and physical activities which have an effect on preventing conditions like hypertension. Lower-status jobs expose workers to both physical and psychosocial risks. Health and wellbeing in old age are dependent on accrued assets during their entire life (Costa-Font 2008) and this has an impact on the quality and availability of medical support care (Lynch & Kaplan 2000).

In Zimbabwe the literacy level is very high and one of the best in the region but unemployment rate is high exposing people to psychological stress and subsequently hypertension (ZIMSTAT & ICF 2012). The 2008 economic crisis left many Zimbabweans jobless as factories closed and farms redistributed. The labor force report 2011 shows that 20% of males and 15 % of females are formally employed while only one out of five youths aged 15 to 34 were employed (ZIMSTAT 2011).

#### Social Interactions

Socio-economic stress is increasingly being recognized as a major contributor to cardiovascular risk. Communities in SSA currently live with a variety of psychosocial stressors including urbanization and poverty which may significantly contribute to the rise in the burden of hypertension and other cardiovascular morbidity and mortality (Olufemi 2008). Working conditions and income level have an effect on job stress .Social support has an impact on health through complex psycho-biological stress responses (Lynch & Kaplan 2000). Productive relations are important in determining lifestyles and

are reflected in socioeconomic patterning of risk factors, health behaviors and psychosocial attributes (Lynch & Kaplan 2000).

### 3.2.1.3 *Beliefs*

#### Values and Attitudes towards health and Services

Knowledge, attitudes and values that people hold about health and health services influence their perception of need and use of services (Anderson 1995). Bakeera and colleagues (2009) in a Ugandan study found that public health institutes were perceived to providing low quality care, associated with low staffing levels, shortage of essential supplies like drugs and this influenced utilization of services. On the other hand the cultural beliefs, practices, and lifestyle choices also determine utilization of health services (Murimi & Harpel 2010). In Zimbabwe some people believe in traditional and spiritual healers whilst others believe in modern medicine (Machinga 2011). Values about health play a role in influencing health seeking behaviors and hence utilization of services. Delays in seeking care for conditions like hypertension can result in heart complications.

### 3.2.2 Enabling factors

Enabling factors include, income, health insurance, access to health services extent and quality of social relationships. At community level they include available health personnel and facilities, and waiting time (Lynch & Kaplan 2000).

#### 3.2.2.1 *Income*

Income is an important enabling factor as it determines both material resources and SES of an individual (WHO 2010). The growing migration from rural areas to urban areas in search of better opportunities for employment also suggest worsening prevalence of hypertension as migrants adopt western lifestyle (BeLue et al., 2009). Negative effects of urbanization are being experienced such as job stress, decreased physical activity, smoking and increased consumption of alcohol whilst lack of knowledge and limited resources drives individuals to low-cost, high-calorie fast food options, resulting in obesity and hypertension (Lam et al., 2011, Msyamboza et al., 2011). Studies conducted in Africa have shown increasing burden of CVD as a result of urbanization for instance in Burkina Faso, West Africa and South Africa (Niakara et al., 2007, Sobngwi et al., 2004). Accumulated wealth and material resources were positively associated with obesity and in turn association with hypertension (Sodjinou et al., 2008, Ploubidis et al., 2013).

In Zimbabwe rapid urbanization is being experienced as mentioned before and with the adoption of western type lifestyle problems of hypertension will continue to be on increase as is being witnessed in Harare with high prevalence of obesity.

### 3.2.2.2 *Health Insurance*

Affordability of health care is an important determinant for utilizing services. Khatib and colleagues (2014) found lack of health insurance and high cost of drugs, a barrier to utilization of services in LMIC, thus clients seek treatment early for communicable diseases with acute symptoms. In Zimbabwe only 15 % of the population are on health insurance and this is only accessible to those formally employed (ZIMSTAT & ICF 2012) yet more than half the population is poor and majority pay out of pocket. As a means to recover costs health institutions are allowed to collect and retain user fees (McPake et al., 2011). Clients have to pay for services for every visit for all chronic diseases except tuberculosis (Chirwa et al., 2013). The out of pocket payment percentage is too high and most people cannot afford. Inability to pay for health services is a deterrent to freely use health services even for screening services for hypertension.

### 3.2.3 *Need factors*

#### 3.2.3.1 *Perceived Health status*

This relates to individual's views about health status and functionality. Symptoms of illness, pain, and worries help them to judge importance and magnitude of the problem and whether professional help is needed (Anderson 1995). Hypertension is a "silent killer" and in most cases detected through screening during visits to health institutions (WHO 2013b). Lack of knowledge about signs and symptoms as well as screening services makes people seek health care late (Khatib et al., 2014). A systematic review by Addo et al (2013) showed that awareness of hypertension in SSA was very low and this led to under-diagnosis and poor control. In Zimbabwe awareness of hypertension was also found to be very low (Matenga et al., 1997, ZIMSTAT 2005).

#### 3.2.4 *Assessed Health status*

It is the professional judgment about people's health status (correct diagnosis and treatment) and their need for health care. Counselling on lifestyle matters is an important role of the health care system to prevent hypertension (Lix et al., 2005). However health personnel need to be equipped with knowledge and skills on hypertension in order to provide effective interventions.

#### 3.2.5 *Lifestyle factors*

Personal health practices or lifestyle factors that include diet, smoking and physical activity contribute to the increasing rates of CVD in SSA (BeLue et al., 2009).

##### 3.2.5.1 *Diet*

A diet rich in highly saturated fats, sugars, and high salt content is considered to be an important risk factors for hypertension, and obesity among other diseases and they act independently and synergistically (Steyn et al., 2002) .

Whilst in developed countries processed foods have high salt content in Africa studies have found high salt intake is mainly due to adding salt at table and in cooking (Elliot & Brown 2007).

Although there are few intervention studies conducted in sub-Saharan Africa the strength of evidence for salt intake as a factor in blood pressure is much greater than that of other lifestyle factors (Ibrahim & Damasceno 2012).

Studies show that a reduction in salt improves the blood pressure in the population worldwide. For decades salt has been used as a preservative which is a common practice in Africa as well as adding salt during cooking and at table (Chinthapalli 2013, Elliot & Brown 2007) and this increases intake and subsequent hypertension. Reduction of population-wide salt consumption by only 15% would avert up to 8.5 million deaths in 23 high-burden countries over 10 years (Beaglehole et al., 2011). Legislation that mandates reduction in salt content of manufacturers' food accompanied by educational campaigns can reduce blood pressure and would cost \$6 per person per year (Jamison et al., 2006). A systematic review by Strazzulo and colleagues (2009), found that a difference of 5g/day of chronic salt consumption is associated with a 23 % difference in the rate of stroke and a 17 % difference in the rate of cardiovascular disease in general.

According to DFIF report on salt intake, South Africa has moderate problem of salt intake, predominantly from salt added to food for preservation, for taste and added in the cooking process(discretionary salt) (DFID 2011). Bread is the single greatest contributor to sodium intake from non-discretionary sources in South Africa (Charlton et al., 2005). In South Africa and Nigeria it is estimated that salt added after food preparation accounts for 45% of salt intake whilst in Ghana salt is added to 98% of cooking, 52% of the time at table and salted foods such as fish and meat are eaten in both rural and urban communities (Cappuccio et al., 2006).

Zimbabwe is reported to have a moderate problem of salt intake predominantly from salt added to food for preservation, for taste and added in cooking process (DFID 2011). The fast urbanization and exposure to fast foods leading to increase in consumption of fatty and sugary foods and these are known risk factors for hypertension.

### 3.2.5.2 *Smoking*

Smoking is a well-known important risk factor for CVDs (Schiess et al., 2010, Gupta et al., 2013). Every day more than 1 billion people smoke or chew tobacco and about 15 000 die from tobacco-related diseases (Beaglehole et al., 2011). It is the primary cause of preventable deaths worldwide and most serious epidemiological risk factors in terms of prevalence of hypertension and other CVDs (Verdier& Fourcade 2007). Smoking prevalence is increasing

among men and women and a significant number of adolescents 13 to 15 years in SSA (WHO 2001, Warren et al., 2000).

In South Africa tobacco use was associated with poverty and low socioeconomic position (Schneider et al., 2000). Use of smokeless tobacco is common in LMIC (Gupta et al., 2013). Twelve and half per cent of black women in South Africa use snuff and most believe it gives pain relief (Verdier & Fourcade 2007, Steyn et al., 2002).

Tobacco use in Zimbabwe ranges from cigarettes smoking or a pipe, snuff and others chew (ZIMSTAT & ICF 2012). Twenty two per cent of men and only 1 % of women use tobacco and use is common among men living in rural areas than among urban residents. It decreases with increasing education and wealth status (ZIMSTAT & ICF 2012). In a survey on smoking among secondary school pupils in Harare findings were 29% had ever smoked and smoking was associated with higher economic status, parents who smoked , peers who smoked and alcohol consumption (Bandason & Rusakaniko 2010). Increased tobacco use is an important risk factor for hypertension and other cardiovascular diseases and is addictive. Adolescents are likely to continue smoking into adulthood thereby increasing chances of hypertension later in life.

### *3.2.5.3 Physical Activity and obesity*

About 3.2 million deaths each year are attributed to insufficient physical activity (Lachat et al., 2013) which also leads to overweight and obesity. Evidence has shown that physical inactivity is a risk factor for CVD. A study in Romania found a strong correlation of arterial hypertension with obesity and overweight and the prevalence was higher in urban children compared to rural children (Cinteza & Balgradean 2013). In Zimbabwe physical inactivity during normal working hours was high in all the age groups, sedentary traveling was twice as much in females compared to males and it increased with age. Overall 96.7 % reported sedentary leisure time (ZIMSTAT 2005).

Research has shown a close link between obesity and the development of hypertension (Richard 2009). Obesity is increasing in both children and adults in Zimbabwe and the proportion of obese people has increased to 6% between 2006 and 2011. Eleven per cent of Zimbabwean women are obese compared to 2 % in males. Forty-one percent of urban women are overweight or obese, compared with 26 percent of rural women and it increases linearly by age and wealth quintile (ZIMSTAT & ICF 2012). However it is more prevalent in those above 65 years due to aging and inactivity (ZIMSTAT 2005).

## 4 CHAPTER FOUR: CURRENT RESPONSES AND EVIDENCE BASED INTERVENTIONS

### Introduction

This chapter focuses on the current responses to the burden of hypertension and exploring evidence - based interventions that are useful in the prevention of hypertension.

### 4.1 Current Responses

The response to NCD requires that policies are in place to guide development of both individual level or population level interventions (WHO 2011a). Development and implementation of interventions requires governments (i.e. MoHCW) to collaborate with stakeholders in various sectors like agriculture, manufacturing industry, ministry of finance and education and others (Lachat et al., 2013). Accountability and monitoring and evaluation of effectiveness of interventions is necessary.

A systematic review by Lachat and colleagues (2013) showed challenges of inadequate policy response through diet and physical activity in LMIC. They also found that only 56 % of the countries have at least a policy tackling NCDs and need to scale up interventions and develop integrated policies that address various risk factors for NCDs prevention through multi stakeholder collaboration and cross sector involvement. These policies might largely pay for themselves through health gains and reduction of health-care costs in the future especially in LMIC (Lachat et al., 2013).

Development of strategies for the prevention of hypertension starts with countries developing laws and policies to support them. The first key action for success is strong and sustained political leadership at the national levels (Beaglehole et al 2011) Political commitment in developing environmental and legislative interventions that facilitate widespread adoption of healthy lifestyles and development of policies to strengthen primary healthcare systems are crucial for the prevention of hypertension and stroke in Africa (Mensah 2008).

Although the government of Zimbabwe acknowledges the growing burden of NCDs there is currently no policy and specific programs on hypertension (WHO 2013a). Thus it has to learn from other countries in the region with success stories like Mozambique and South Africa. There are however a few laws and policies that are linked to prevention and control of NCDs and these will be highlighted.

#### 4.1.1 Public Health (Control of Tobacco) Regulations SI 264 of 1997 (rev 2002)

Zimbabwe's Public Health Act (15.09) addresses the tobacco problems and introduced measures to control use of tobacco. This is in line with WHO Framework Convention on Tobacco control (FCTC) approved by WHO member states in 2003 which encompasses evidence-based demand and supply side measures. Tobacco is an important risk factor for hypertension and other CVDs as highlighted before. The law helps the public and the state to control illicit trade; sales to and by minors, reduce demand and use through prices, taxes product disclosures; regulate packaging, labeling, advertising, and reduce exposure to smoke. Entitlements can also be set on information, education, cessation services and treatment of dependence (MOHCW& TARSC 2012). This is aimed at reducing the use of tobacco products and in turn addiction and hypertension and other CVDs. However a survey on tobacco control found this law is very weak (TARSC 2009) and thus law enforcement needs to be strengthened.

#### 4.1.2 National Health strategy 2009-2013

Three strategic plan documents have guided Zimbabwe's health system: "Planning for Equity in Health," which dates back to the early 1980s; the National Health Strategy, "Working for Quality and Equity in Health, 1997-2007"; and its successor document, the newly adopted National Health Strategy, "Equity and Quality in Health: A People's Right" (2009-2013) (Osika et al 2010). The first two documents hardly mention the growing burden of NCD. The 2009 - 2013 plan acknowledges that action needs to be taken to reduce the growing burden of NCD and hence the creation of the NCD department within the Ministry. The nation is moving in the right direction as hypertension prevention programs can be identified, planned for and then implemented. Surveillance of NCDs including hypertension is being done in all health institutions as a step to addressing hypertension problem.

#### 4.1.3 Medium Term Plan (MTP) 2010-2015

The health system is also affected by general governance documents like the MTP. This is a five year priority programs implementation plan and it highlights several goals and policy measures for improving health care services (Osika et al., 2010). Non- communicable diseases control program, health promotion including the school health program are among other priority programs. Among the policy measures to be implemented is the enforcement on the implementation of comprehensive PHC approach and free health services at primary level (MoHCW 2009). A combination of all this should see more clients being screened and health education on hypertension given to increase awareness within the communities.



## 4.2 Interventions for the effective prevention of Hypertension

The response to the crisis in NCD requires a strong focus on primary prevention, the only approach that will ensure that future generations are not at risk of premature death from these diseases (Beaglehole et al., 2011). Primary prevention of hypertension provides an opportunity to interrupt and prevent the continuing costly cycle of managing hypertension and its complications (National high blood pressure control program (NHBPCP) 2002). Complementary application of strategies that include a population-based strategy and an intensive targeted strategy directed at those with increased risk of developing hypertension have the greatest potential of reducing the burden of hypertension (Krousel et al., 2004)

Low-cost and highly effective solutions for the prevention of chronic diseases are readily available (WHO 2011a). Governments should invest in population-health strategies and put programs in place to improve long-term-health outcomes (BeLue et al., 2009).

### 4.2.1 Individual level Interventions

At individual level prevention of hypertension can be achieved through the provision of clinical preventive services including awareness, screening and counselling (Halpin et al., 2010, Lix et al., 2005)

#### 4.2.1.1 *Awareness*

Appreciation of hypertension as a leading cause of deaths would lead to improved education and therefore improved awareness (Kayima et al., 2013). Awareness of a diseases (signs and symptoms) is an important determinant for health seeking and health education increases awareness and is more effective when provided through multiple methods and sites, such as schools, workplaces, mass media and health centers (Whelton et al 2002a). In educating people the importance of lifestyle and diet in the primary prevention of hypertension should be emphasized (Addo et al 2012). Short-term educational programs have been shown to be effective to achieve change and in improving lifestyle and controlling NCDs (Mondo et al., 2013).

A Turkish program on tobacco control included 90 minutes of radio program on the harmful impact of tobacco consumption and this combined with population strategies achieved a reduction in mortality due to ischemic heart disease had an effect (Bilir et al., 2012). Education should be reinforced by actions e.g. in schools provide healthy meals, workplace physical activity e.g. cycling to work (Whelton 2002b). Ammerman and colleagues (2002) showed that intensive counseling to promote a healthy diet and counseling directed to high risk clients generally produced larger behavioral changes.

In Zimbabwe a study by Matenga and colleagues 1997 showed low levels of knowledge on hypertension. Raising awareness can be achieved through mass media campaigns, engagement of the lay public and non-governmental organizations in dissemination of information on hypertension and production of simple and easy to read booklets on hypertension (Addo et al., 2013).

#### 4.2.1.2 *Primary Health Care Strategy*

Whilst the population level interventions are important in reaching out to all including the poor and the marginalized this should be complemented by additionally targeting preventive efforts at those considered to be at high risk of developing hypertension (Addo et al., 2012). Improving the prevention of chronic disease in low-income and middle-income countries is a priority for primary health care. To meet the challenge of chronic diseases, primary health care will have to be strengthened substantially. Personnel need appropriate training to deal with hypertension and continuous quality assurance mechanism need to be in place (Beaglehole et al., 2011).

Individual level prevention interventions should include early detection through screening programs by health professionals and this has been found to be cost effective (Addo et al., 2012). It is likely that LMICs face the greatest challenge in adopting this approach without significant development of their primary care infrastructure and resources targeted for this purpose (Muna 2013). Counseling services, for example, regarding tobacco use or healthy diet and losing weight for obese people are important primary prevention interventions for hypertension and other CVDs (Addo et al., 2012). WHO (2013) reiterated that integrated non-communicable disease programmes implemented through a primary health care approach are an affordable and sustainable way for countries to tackle hypertension.

In Zimbabwe the MoHCW adopted the PHC strategy and PHC is provided at all levels of care as mentioned before. A wide range of services are integrated including screening and counseling for hypertension to all clients. However the out of pocket payment for health services especially for chronic diseases by the majority may be a deterrent to using health care services. A multiple indicator monitoring survey in Zimbabwe showed that 66% of people cannot pay for health care services (MoHCW 2009).

#### 4.2.2 Population level interventions

Evidence for the effectiveness of interventions can be generated among others by lowering the prevalence of the major risk factors through population-wide methods directed at everyone. The priority interventions chosen for immediate attention need to meet rigorous, evidence-based criteria with a substantial effect on health (reduction in morbidity, premature deaths and disability). The interventions should also have strong evidence for cost-

effectiveness, low costs of implementation and political and financial feasibility for scale-up (Beaglehole et al., 2011).

WHO made recommendations for some cost effective interventions affordable by LMIC. These interventions cover the important lifestyle changes that help to reduce hypertension and other CVDs. Regarding diet WHO recommended main interventions to include fiscal methods that increase the price of foods high in saturated and industrially produced trans fats and sugar, food labeling, and marketing restrictions of unhealthy food products, especially to children and young people (WHO 2004). WHO also recommends 5 g/day of salt intake and guidelines recommend that persons at least exercise at least 30 minutes on most if not all days of the week (WHO 2011). The Framework for Convention on Tobacco Control (FCTC) emphasizes methods that are both effective and cost effective; to reduce demand for tobacco products by methods such as raising tobacco taxes, legislation of health warnings, smoke-free work and public places, and a complete ban on all forms of tobacco promotion; and supply-side intervention, especially to control the illicit trade in tobacco products (WHO 2003).

Prevention strategies that have been implemented successfully in some settings and have proved to be very effective in reducing the burden of hypertension include those related to diet, smoking and physical activity. Zimbabwe has not yet defined and implemented specific population level interventions for hypertension. Interventions from other settings will be highlighted.

#### 4.2.2.1 Diet

*Consumption of healthy diet* has been found to be a cost effective intervention. A healthy diet comprises unsaturated fats, increased consumption of fruits and vegetables (for potassium supplements) and whole grains, limited sodium intake and excessive calories especially from sugar based beverages (Jamison et al., 2006, Zhao et al., 2011). Replacing 2 % of energy that comes from trans- fats with poly unsaturated fats would reduce CVD by 7 to 40% .The cost effectiveness ratio for the intervention ranges from USD 25 to USD 73 per DALY averted depending on the region (Lachat et al., 2013). Promoting consumption of such a healthy diet will lead to wide ranging health gains, including prevention of overweight (especially in children) and hypertension and other CVDs (Beaglehole et al., 2011).

Jafar and colleagues (2010) carried out cluster randomized controlled trial in Karachi (for two years) to determine the impact of family based home health education on blood pressure in children and young adults at a community level. CHWs were trained for six weeks in methods of conveying standardized health education messages, using behavior change communication strategies. The training was on nutrition and healthy lifestyles with suggestions on

modifying traditional recipes to reduce fat content, retaining cultural acceptability and economic feasibility. Health messages included information on harmful effects of hypertension and how to prevent and control hypertension and CVD. Advice on diet and the importance of engaging in moderate physical activity, maintaining normal body weight, and tobacco cessation was given. The results of this study showed that home health education resulted in a blood pressure that was 1.6/1.4 mm Hg lower in the intervention group than in the control group.

Ard and colleagues in 2000 carried out a randomized modified cross-over study on African Americans on diet and exercises. Cultural modifications were done; decreasing costs; ethnic recipes in the cooking classes and familiar foods were used with emphasis on low fat and low salt; addressing attitudes about exercise and including client's family members in the weight loss efforts. Class sessions (by an African American) for support and advice were held twice a week for 30 to 40 minutes on nutrition and healthy eating low fat and salt cooking techniques. Weight and BP were measured at each session to motivate them. Main measurements were made at 4 and 8 weeks. Results showed that Average weight loss for subjects completing the program was 14.8 pounds. BMI decreased by an average of 2.5 kg/m<sup>2</sup> and total cholesterol levels decreased by an average of 13.7 mg/dl. Systolic and diastolic blood pressure decreased by 4.3 mmHg and 2.4 mmHg respectively. The control group showed no significant change in any outcome measures.

#### 4.2.2.2 *Salt Reduction*

Evidence shows that salt is closely linked to hypertension. In 2001 the DASH-sodium study, a randomized controlled trial of low, intermediate, or high salt diets, found that reducing salt intake could lower systolic blood pressure by up to 7mmHg (Sacks et al., 2001). Furthermore In 2007 long term follow-up of 2400 patients in trials of hypertension reduction indicated that education about diet, counselling, and a commendation to cut dietary salt led to 30% less risk of cardiovascular disease.

In Ghana randomized controlled trials on salt reduction in 12 villages (6 rural and 6 semi urban) was carried out and this involved adults for a period of 6 months. The researchers worked with CHWs in conjunction with the village chiefs and elders. CHWs were trained to give health education using a standard health education package from the Ministry of Health. Village meetings were held after endorsement by the chiefs and community leaders daily for one week then once weekly. Health education was given not only on salt but on other diseases during the meetings. Highlights were made to reducing salt in cooking at table and reducing salt in foods identified to have high salt content by soaking over night before preparation. Measurements were done after 3 months and after 6 months. A difference in 24-hour urinary

sodium of 50 mmol was associated with a lower systolic blood pressure of 2.12 mmHg at 3 months and 1.34 mmHg at 6 months (Cappuccio et al., 2006).

In UK a voluntary 'traffic light scheme' for labelling was introduced by the Food Standards Agency where packaged food is labelled based on fat, sugar, and salt content (green = good, yellow = okay, red = bad) and 75% of packaged foods feature the label (Food standards Agency 2014). The UK salt reduction initiatives have successfully seen a reduction in salt consumption from 9.5 g/day in 2001 to 8.6 g/day in 2008; and caused consumer awareness of daily salt intake recommendations (Shanker et al., 2013).

Currently Zimbabwe has not had any salt reduction programs for the nation and considering this strategy could go a long way in reducing high salt consumption with an effect on reducing hypertension

#### 4.2.2.3 *Physical Activity*

Physical inactivity is a risk factor for cardiovascular diseases and persons who are less active and less fit have a 30% to 50% greater risk for high blood pressure (American heart association in Whelton et al., 2002) The efficacy of exercise on reduction of cardiovascular risk factors is well researched (Rubattu 2007). Unfortunately there is not much evidence from the SSA.

A meta-analysis of randomized controlled trials to measure the effect of aerobic exercise on blood pressure by Whelton and colleagues (2002) showed that aerobic exercise has a blood pressure lowering effect of 3.84 mm Hg for systolic blood pressure and 2.58 mmHg for diastolic blood pressure achieved with low, moderate, and high intensity exercise and that little benefit was gained from exercising for more than 2.5 hours/week. Exercises had blood pressure reduction effect on both hypertensive and normotensive persons.

Angelopoulos and colleagues (2009) conducted a 12 month school –based nutrition and physical activity intervention program developed and implemented in 13 primary schools (urban and rural) in Greece. Student and teacher manuals were developed with some activities to be followed covering self-esteem, body image, nutrition, physical activity and fitness and environmental issues. Interventions were delivered by teachers trained by the researchers and children had two exercise sessions of 45 minutes twice a week in the play grounds. Parental involvement was required for social reinforcement. Motivational strategies to increase knowledge and skills, self-efficacy and monitoring, changing attitudes, beliefs and social influence. Educational materials and motivational interventions that promoted consumption of a balanced diet but with emphasis on fruit and vegetables and what not to eat like fat and sweets were also developed. Parental involvement to increase fruit and vegetables in the home was necessary and homes visited periodically.

The results were positive showing dietary changes and increased consumption of fruits as compared to vegetables. Changes in the body mass index and obesity were noted after a year of implementation.

In South Africa researchers have taken a community based approach in the prevention of hypertension that include physical activity and diet. CHWs are trained and equipped with necessary skills to be able to work within communities on the prevention activities. Pengpid et al (2014) propose a church based lifestyle intervention program for prevention of hypertension and diabetes in Pretoria. Bopp & Fallon (2008) stressed that partnering with community settings (schools, worksites, faith-based organizations and healthcare organizations) offers many benefits and the opportunity to reach specific populations. Setting-based approaches allow for multilevel strategies, ranging from individual-based programs and educational initiatives to physical and social environmental changes. However results of these trials are still to be published.

The Ministry of Education, Art, Sport and Culture of Zimbabwe has policies which guide the teaching of physical education as a compulsory subject in both primary and secondary schools in Zimbabwe (Nhamo 2012). However implementation of this differs in schools with physical activity being implemented better in urban compared to rural schools (Mudekunya & Sithole 2012). Strengthening physical activities in schools can help to reduce obesity and hypertension in high risk children thus reducing the prevalence of hypertension later in life.

#### 4.2.2.4 *Tobacco Use*

Worldwide tobacco use accounts for 1 in 5 deaths among men and 1 in 20 among women 30 years and over (Somonetti et al., 2011). Accelerated tobacco control is the priority for immediate action if the world is to achieve a suggested global goal by 2040 of a world essentially free from tobacco where less than 5% of the population use tobacco (WHO 2011). Full implementation of four of the Framework on Tobacco Control (FCTC) strategies would avert 5.5 million deaths over 10 years in 23 LMIC with a high burden of NCDs (Asaria et al., 2007).

Although youth tobacco use is a global problem, virtually all evidence on the economic determinants of youth smoking comes from HIC and predominantly from the United States (Kostova 2011). There is strong evidence showing that higher cigarette prices, reduce the probability of youth cigarette smoking (Ross & Chaloupka 2003), Wilson 2007). A review of studies carried out in LMIC on youth cigarette smoking has shown that cigarette price is an important determinant of smoking. An increase in price of 10% would reduce youth cigarette consumption by 21.1% (Kostova et al., 2011)

Franks and colleagues (2007) examined the relationship between smoking participation and cigarette pack price by income group and time period in the United States. They used data from the 1984–2004 Behavioral Risk Factor Surveillance System surveys data to examine the prevalence of smoking in relation to cigarette pack price elasticity (change in percentage of persons smoking relative to a 1% change in cigarette price) by income group, from low to high. The study results showed increased cigarette-pack price over time was associated with a marked decline in smoking among higher-income but not among lower-income persons.

For instance Turkey implemented the recommended interventions by the FCTC and this was augmented with a radio program to make an awareness of harmful effects of smoking. In addition to this, they created governing body that will enforce its implementation. This has contributed to 10% reduction in smoking in men and 1.7% in women by 2008 and reduced acute cardiovascular admissions by 33.6% (Özcebe et al., 2011, Bilir et al., 2012).

The situation in Africa is that many tobacco producers in Africa have ratified the FCTC, including DRC, South Africa, Tanzania, Zambia, Uganda and Kenya, and Zimbabwe is in the process. (MOHCW/TARSC 2012). According to the WHO with the exception of South Africa, very few SSA have inadequate tobacco control legislation in place to effectively protect their populations against tobacco use and hence more still has to be done (WHO 2011).

Zimbabwe has a tobacco law as mentioned before and the statutory instrument controls smoking in public premises, on public transport, requires no smoking signs in public places, prohibits trading of tobacco to or by children and sets messages of certain size and wording on tobacco products. Although breaking the law is a punishable offence with a fine ranging from \$50 to \$300 US the control measures are very weak (MOHCW/TARSC 2012).

## 5 CHAPTER FIVE: DISCUSSION

### Introduction

This chapter focuses on the discussion of the findings of this study. The burden of hypertension will be briefly discussed. The discussion will mainly focus on the objectives of the study

#### 5.1. Burden of hypertension

Evidence shows a growing burden of hypertension in Zimbabwe and the nation is now facing a double burden of both pre-existing communicable and emerging non-communicable diseases. The prevalence of hypertension is higher in urban compared to rural areas (ZIMSTAT 2005) and this could be the result of poverty, urbanization and the adoption of a western type lifestyles characterized by consumption of fast foods and processed food with a high salt content, reduced physical activity leading to obesity and increased psychosocial stress. The burden of hypertension and its sequel, stroke and heart disease, to a low income country like Zimbabwe is overburdening the health system which already is under-funded and resource constrained in both material and human resources.

#### 5.2 Risk Factors for Hypertension

The risk factors for hypertension in Zimbabwe and worldwide were explored guided by the Andersen model of health service utilization.

Like many other countries both LMIC and HIC the risk factors for hypertension are well researched. The 2005 NCDs survey in Zimbabwe found risk factors contributing to the high burden of NCDs were not any different from the rest of the world, i.e. SSA, LMIC and HIC. However other contributory factors were noted emanating from economic status of people in the country and services provided. The common risk factors included age, smoking, unhealthy diets, excessive weight gain and physical inactivity.

Age is a well-known risk factor for hypertension. Evidence shows that hypertension increases with increasing age. The 2005 NCDs survey also showed the same in the Zimbabwean population. Awareness of age as a risk factor is important for people to adopt healthy lifestyles and thus delay the onset of hypertension.

Worldwide tobacco use is very common and Zimbabwe is not any different. Evidence shows an increase in tobacco use for both adolescents' and adults in Zimbabwe. Tobacco use in the adults is common in the poor and also those in the rural areas. This could be because of their close proximity to the farms where it is grown and thus easily accessible and very cheap. One study showed high rates of smoking in adolescents in urban schools, this figure could be far less from reality as there are many out of school adolescents who could be smoking. Tobacco use in Zimbabwe is varied and includes smoking, piping,



use of snuff and chewing. Hypertension prevalence is likely to be on the increase because tobacco has addictive effects and it is difficult to quit. All these young smokers will grow to be adult smokers.

Diet has drastically changed from the traditional to western type brought about by urbanization characterized by fast foods and highly processed foods with high fat and salt content. The result is high cholesterol, obesity and hypertension among other problems. The high salt consumption in Zimbabwe is also due to salt in preserved foods and discretionary use. Unhealthy diet is a high risk for hypertension and if no measures are taken hypertension and CVDs will be on increase.

Obesity is also on increase especially in the urban areas Women are more obese compared to men. This excessive weight could be as a result of unhealthy diet coupled with high rates of physical inactivity. The NCD survey reported high sedentary travelling especially in women and very high sedentary leisure time in all ages. This could be as a result of low awareness of consequences of sedentary life and improving people's awareness and also encouraging exercise during leisure time is important.

Other risk factors for hypertension are as a result of health system related factors that include inadequate staffing in health centers and user fees. Long waiting hours especially for screening services deter people from seeking care. Some people cannot be absent from work for many hours. Many people especially from the rural areas have no steady income and are poor. Health care facilities may be so far away that they have to pay for transport. These factors discourage people from seeking health care early and deter them from using services especially if condition is not acute as the case in most chronic diseases like hypertension because they cannot afford to pay. Most will seek care when they start showing signs of complications.

These risk factors are the primary basis for disease prevention and the primary focus for development of prevention strategies. Although WHO published guidelines to address NCD a decade ago, the response especially in African countries has been very slow as has been highlighted in the UN Secretary General's Progress Report on NCDs, highlighting that progress since 2011 has been insufficient and highly uneven (NCD Alliance report 2014). This could be because not all interventions are cost effective or affordable in terms of resources and equity; the feasibility of implementation and scale-up of interventions depends on country resources . It is however important to address health and social needs at all stages of the life course, starting with maternal health.

### 5.3 Responses and Programs

Responses to the burden of hypertension in Zimbabwe were explored and gaps identified.

Although Zimbabwe realized the growing burden of hypertension a decade ago, to date there is no policy or specific prevention programs such as those that exist for communicable diseases as reflected in the National Health Strategy for Zimbabwe 1997 – 2007. Although there is a law on tobacco use Zimbabwe has not yet ratified the FCTC. This has an effect of strengthening the tobacco control activities. Interventions for control are in place but follow up mechanisms to ensure law enforcement is weak as has been found by an evaluation done by TARSC.

The National Health Strategy 2009- 2013 has taken cognizance of the burden of NCDs leading to creation of the NCDs department as an arm in the MoHCW. This is a step towards the fight against NCDs. Screening of NCD has been integrated in the PHC approach and provision of services since the adoption of PHC in the 80s has not been active but part of routine work. Counselling on lifestyle change and medication is being done to people diagnosed of hypertension. The introduction of a NCDs department in the MoHCW brought with it the surveillance of hypertension in all institutions but there is a gap in risk factor surveillance. The risk factors surveillance approach has been cited as the most efficient means of providing evidence based data to plan appropriate programs for prevention (Lix et al., 2005). Prevention strategies applied early in life, provide the greatest long-term potential for avoiding the precursors that lead to hypertension and for reducing the overall burden of blood pressure-related complications in the community.

#### 5.4 Evidence - based Interventions

This study explored and identified interventions proven to be effective at individual and population level in SSA, LMIC and world over. Zimbabwe needs to copy from the best practices and adapt to its own situation taking into account available resources and cultural acceptability

##### 5.4.1 Individual level interventions

Effective individual level interventions which include screening, health education and counselling have been identified through literature. All these are applicable to the Zimbabwean setting.

Zimbabwe is currently implementing individual level interventions through the PHC strategy e.g. screening at institutional level which is client driven. Screening can be done from the antenatal until old age as hypertension is considered to be a life course condition. A step further to screen patients in the community could help to detect potential cases. Community health education and health promotion on healthy lifestyle could increase awareness and encourage community participation in hypertension programs leading to reduced incidence of hypertension. This could be integrated into the outreach programs carried out by the community health department at District level.

Successful implementation, however, requires that MoHCW strengthens human resources for the prevention and control of hypertension, identification of competencies required and investing in improving the knowledge, skills and motivation of the current health workforce to address non-communicable diseases. Pre-service training of health personnel and in-service training of health personnel including community health workers, social workers, professional and non-professional (technical, vocational) staff, with an emphasis on primary health care will strengthen knowledge and skills to deal with non-communicable diseases(WHO 2013c).

Monitoring of the user fees policy needs to be stringent in order to ensure protection of the poor. This will ensure access to health services is equitable and those exempted from paying are encouraged to use services early enough.

#### 5.4.2 Population level interventions

Population level interventions are meant to cover the whole population and hence are cost effective. They have been widely implemented with efficacious results in many but mostly European Union countries. However very few interventions have been implemented successfully in LMIC. This could be due to the slow response on NCDs in Africa. The most implemented interventions include diet, smoking and physical activity.

Health promotion activities, as was done in Ghana, could be a starting point in making people aware of dangers of high salt intake as well as encouraging preservation of foods without salt and not adding too much salt during cooking and at table. Engagement of CHW in giving health education as well as health promotion activities has been shown to increase knowledge in communities and adoption of healthy lifestyles

Zimbabwe could learn from LMIC such Ghana and Pakistan that have successfully implemented dietary controls. Zimbabwe can start with community programs such as those to educate people on diet: reducing salt and fat and help them to prepare culturally accepted diets which are affordable. Faith based organizations could even be part of the implementation process.

Zimbabwe could also start engaging the private sector in developing food laws for instance labelling of salt and fats to ensure cooperation and accountability. Interventions need to be introduced gradually to prevent industry to be overwhelmed and develop resistance.

Schools, crèches and workplace canteens can start introducing and encouraging healthy diets to the pupils, young children and workers in various institutions once food laws are in place. Nation-wide awareness campaigns by the Nutrition Department in the MoHCW will target increasing knowledge of

communities and nutrition programs especially feeding programs can be monitored by the same department.

The evidence of efficacy of exercises on reduction of CVD has been shown widely. The Zimbabwean school curriculum has stipulated hours of physical activity per week in primary and secondary schools. Reinforcing the teaching of sport in schools will ensure children are active and healthy with resultant weight loss for obese children and hypertension for the children at risk. Universities have extra curricula activities and sporting competitions among them held annually. This encourages sporting activities. Some companies and organizations have private sporting facilities for instance banks.

Health promotion can be instituted in these organizations to strengthen physical activities as well as the general public to increase awareness of importance of exercising daily and by using different ways like walking and cycling.

Tobacco use control is an urgent matter and feasible to implement in Zimbabwe. The control strategies are already in place, a step ahead towards the implementation of population interventions. The law can help the public and the state to control illicit trade; sales to and by minors, reduce demand and use through prices, taxes product disclosures; regulate packaging, labelling, advertising, and reduce exposure to smoke. Prevention interventions can be designed from this law. However Zimbabwe needs to come up with specific targeted interventions as well as scale up the monitoring of the law to protect the people from the harmful effects of tobacco. Government also needs to ratify the FCTC to show commitment and political will on the law.

## 6 CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

This chapter will focus on the conclusion and findings of this study and suggested recommendations that could be useful in the implementation of hypertension prevention in Zimbabwe.

### 6.1 Conclusion

The main focus of this study was to identify hypertension prevention strategies that have been tried and tested and could be adopted by Zimbabwe in its response to the growing burden of hypertension. A literature review was done examining evidence based interventions from Zimbabwe, SSA, LMIC and the world over. Prevention strategies have been discussed from the best practices point of view highlighting what Zimbabwe has in place and what the nation can adopt.

Hypertension was found to be an important risk factor for CVD. The burden of hypertension has been noted to be on increase especially in LMIC. Whilst HIC have made strides in addressing NCDs through policies, programs and interventions and are in part experiencing a downward trend, the response in most LMIC is slow. The majority of countries in sub-Saharan Africa are resource constrained yet faced with this growing burden of NCDs. Most of the interventions especially the population wide have been shown to be effective and cost effective and investing in them will help to make a turnaround of the burden.

Evidence shows a growing burden of hypertension in Zimbabwe and this has negative effects on the social and economic development of Zimbabwe. It also pose a burden on the overburdened health care system currently failing to cope with the increased burden of infectious diseases.

The risk factors for hypertension in Zimbabwe were found to be the same as those in LMIC and also HIC to some extent. Hypertension increases with age and more common in women found to be more obese than men especially in the urban areas. Urbanization partly explains the increasing prevalence due to adoption of a Western life characterized with consumption of unhealthy food high in fats, sugars and high salt content. Use of tobacco products in the form of cigarettes, pipe and snuff is on the increase in both children and adults which is worrying as tobacco is addictive and will ultimately lead to increases in hypertension.

Other risk factors arise as a result of health system deficiencies like lack of adequate health care workers who may end up not doing thorough screening for hypertension and so no lifestyle counseling and no health education. The distant facilities and user fees may also hinder clients from using facilities even for screening as clients may not afford due to lack of health insurance and have to pay out of pocket.

In terms of response some gaps were identified which include lack of policy and programs specifically addressing hypertension problem. Although tobacco law is in place its implementation is weak and thus not protecting the general public Dietary controls at policy level are not in place for example fat and salt in manufactured foods.

Both individual and population interventions have been identified. Individual level interventions are targeted at high risk groups for example those with a family history, overweight and obese and those in advanced age. Interventions include screening, counselling and health education on hypertension. Screening is done in the health care systems by trained health care workers, who also provide information on lifestyle changes to be made and as well as education on how to prevent hypertension. Population level interventions are targeted at the whole population or groups of people in the population. Interventions include tobacco use controls, dietary controls on fats and salt. These can be implemented through laws and also health education and or health promotion activities.

Zimbabwe currently is implementing individual level intervention by screening, counseling and giving health education to clients who present to the health care institutions with health problems. Population level interventions are not yet in place. The screening and health education using behavior change strategies could be done at a population level to increase awareness and adoption of healthy lifestyles.

Based on evidence hypertension the silent killer is a problem in Zimbabwe However primary prevention interventions implemented through population screening, health education on lifestyle changes such as low fat and low salt diet and increasing physical activity may be feasible solutions aimed at reducing the burden of hypertension and CVD.

## 6.2 Recommendations

### 6.2.1 Policy

Government should develop a NCDs policy which guides the development of programmes and interventions for prevention of hypertension.

Government should reinforce the tobacco law by instituting heavy fines for people who smoke in non-smoking areas in order to protect the general population.

Government should can raise taxes for tobacco products and stipulate heavy fines for any form of stop tobacco advertisements to discourage smoking especially in children

### 6.2.2 Health system

MoHCW should build capacity of health workers through training to increase knowledge and skills to be able to respond to Hypertension effectively.

MoHCW should to develop protocols for the screening of risk factors for hypertension to be followed in all health care institutions both public and private.

The MoHCW, Ministry of Education and Ministry of youth development should join hands in giving health education and health promotion on issues such as smoking hazards, obesity and physical inactivity and unhealthy foods.

The Information Education and Communication department within the MoHCW should develop materials to augment the health education and health promotion activities on hypertension and risk factors, in simple form and in the three main languages.

The Nutrition department within the MoHCW should develop a standard health education package on diet, compile culturally acceptable recipes that discourage too much salt and fats and distribute nutrition messages to the communities through organs like CHW.

### 6.2.3 Research

MoHCW to encourage more research on hypertension especially on cost effective interventions on diet and tobacco controls.

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